

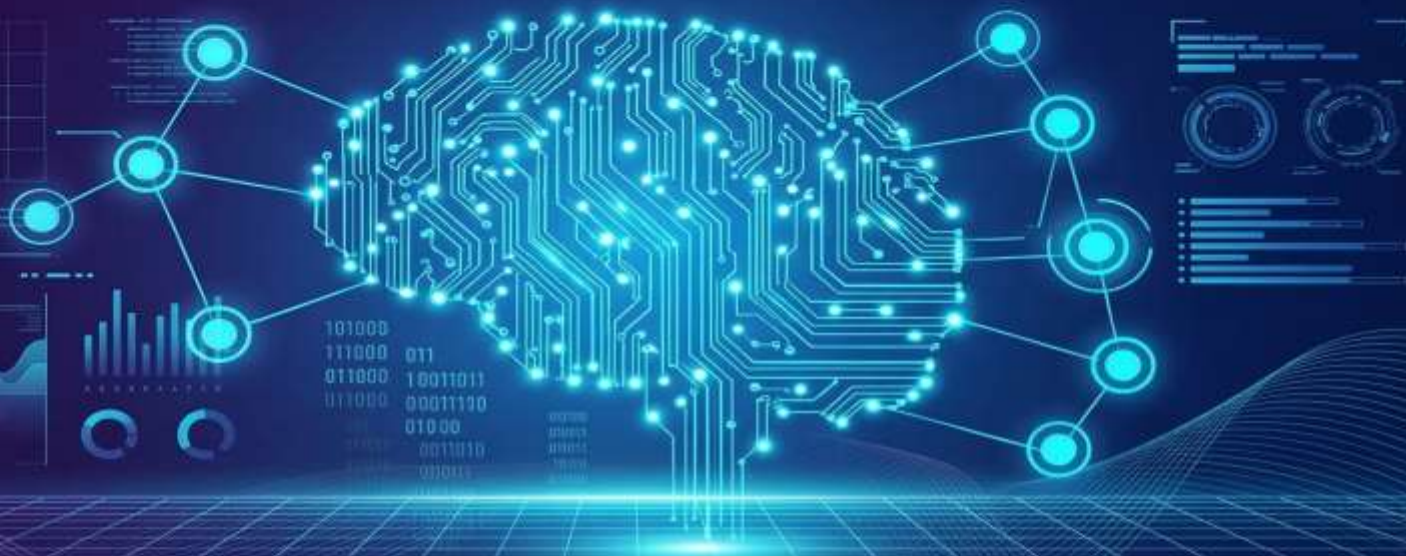


AP ECET 2026

# ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (AI & ML)

## COMPLETE PREPARATION BOOK

Concept Clarity | Smart Practice | Rank Booster Questions



**BANDI DAYASAGAR**

- Diploma Mechanical Engineering
- B.Tech Mechanical Engineering
- M.Tech Thermal Engineering
- MS (Computer Information Systems), USA

An Initiative of Sagar Educational Society

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**Printed and bound in India**

# Dedication

This book is dedicated to all Diploma students who dream of becoming engineers and building a better future for themselves and their families.

To the students who study silently, who struggle quietly, and who continue moving forward even when the path feels difficult.

I was once in your place.  
I understand your journey.

This book is for you.

May your hard work turn into success,  
and your effort turn into confidence.

Bandi Dayasagar

# Preface

AP ECET is not just an entrance exam. For Diploma students, it is a gateway to B.Tech and a better future.

Success in ECET does not depend on studying more books. It depends on understanding the exam pattern, focusing on important topics, and preparing in a smart way.

During my academic journey — from Diploma to B.Tech, M.Tech, and MS — I understood one important truth:

Students do not fail because they are weak. They lose marks because they prepare without direction.

This book is written in very simple and clear language so that every student can understand concepts easily and prepare with confidence.

Instead of lengthy theory, this book focuses on:

- Important concepts based on weightage
- Frequently repeated questions
- Clear formulas and comparison tables
- Practice questions from basic to rank level
- Smart revision strategy

Every unit is prepared after carefully analyzing previous ECET question papers and scoring patterns.

This book is designed not just to help you pass ECET, but to help you score maximum marks and build strong confidence for your B.Tech journey.

If you follow the structure given in this book with discipline and consistency, you can achieve excellent results.

Wishing you focus, confidence, and great success.

**Bandi Dayasagar**  
Founder – Sagar Educational Society  
Diploma – Mechanical Engineering  
B.Tech – Mechanical Engineering  
M.Tech – Thermal Engineering  
MS – Computer Information Systems (USA)

# ABOUT THE AUTHOR

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## BANDI DAYASAGAR

BANDI DAYASAGAR is an academician, researcher, and career mentor with a strong foundation in Mechanical Engineering and advanced expertise in Computer Information Systems. He began his academic journey with a Diploma in Mechanical Engineering, followed by B.Tech in Mechanical Engineering and M.Tech in Thermal Engineering under æ under JNTUK University. He later completed MS (Computer Information Systems), USA from New England College with an outstanding CGPA of 3.96/4.00.

His academic and research interests focus on thermal engineering, power plant systems, fluid mechanics, computational simulations, and data-driven engineering analysis.

In 2020, he received the Research Excellence Award from the Institute of Scholars (InSc) for his published research work titled “Improving Thermal Power Plant Efficiency” published in International Journal of Recent Technology and Engineering, Volume 8, Issue 6, March 2020, Pages 1265–1274, ISSN: 2277-3878. His research focused on improving thermal power plant efficiency using analytical methods, simulations, and performance optimization techniques.

He has also completed multiple NPTEL e-verifiable certifications from premier IIT institutions, including Power Plant Engineering from IIT Roorkee; Introduction to Fluid Mechanics, Laws of Thermodynamics, and Conduction and Convection Heat Transfer from IIT Kharagpur; and Computational Fluid Dynamics for Incompressible Flows along with IC Engines and Gas Turbines from IIT Guwahati.

Throughout his academic journey, he gained practical exposure through internships and research roles at prestigious national organizations including National Remote Sensing Centre (ISRO), Bharat Heavy Electricals Limited (BHEL), Rashtriya Ispat Nigam Limited (RINL), Indira Gandhi Centre for Atomic Research (IGCAR), and Dr. Narla Tata Rao Thermal Power Station (APGENCO). These experiences helped him combine theoretical knowledge with real industrial applications, simulations, and performance analysis.

With years of academic guidance experience, he founded Sagar Educational Society to mentor Diploma and Engineering students. His mission is to provide structured, exam-focused, and confidence-building preparation systems that help students achieve top ranks and build strong technical careers.

His teaching philosophy is simple:

Clear concepts. Smart preparation. Disciplined execution.

He strongly believes that with the right strategy and guidance, every hardworking student can achieve academic excellence and career success.

## ACKNOWLEDGEMENT

This book is the result of many years of learning, teaching, and guiding students.

First, I thank my parents for their constant support, values, and belief in education. Their encouragement shaped my journey from Diploma to higher studies.

I sincerely thank my teachers and professors who guided me during my academic journey. Their knowledge, discipline, and clarity helped me build a strong foundation in engineering and technical education.

I am grateful to the institutions and organizations where I gained academic and practical experience. Each stage of my journey from Diploma to MS (CIS) helped me understand both theory and real-world applications.

I also thank the students I have mentored over the years. Your questions, struggles, and determination inspired me to create this book. This book is built from your needs and your challenges.

Special thanks to everyone who supported the preparation of this book directly or indirectly — through encouragement, feedback, and motivation.

Finally, I thank every student who chooses this book as a part of their preparation. Your trust means a lot.

This book is written with one clear purpose:  
to help students prepare in a smart way, build confidence, and achieve success in AP ECET.

With gratitude,

**BANDI DAYASAGAR** Diploma, B.Tech, M.Tech, MS (CIS), USA

## HOW TO USE THIS BOOK

This page is designed for a competitive exam preparation book: 'AP ECET 2026 – Artificial Intelligence & Machine Learning.' The design features a white academic design, a minimal academic design, and a very subtle light traumsomogogy technmark content s layout × a professional textbook layout and clean readable fonts suitable for printing in a book.

### Section 1 – Understand the Exam Pattern

- AP ECET consists of Engineering Subjects, Mathematics, Physics, and Chemistry.
- This book focuses mainly on the Engineering section to help students score maximum marks.
- Understanding the exam pattern helps students plan their preparation effectively.

### Section 2 – Follow the Unit-Wise Preparation

- The book is organized according to the latest AP ECET 2026 syllabus.
- Each unit is arranged systematically from basic concepts to important MCQs.
- Students should complete one unit at a time for better understanding.

### Section 3 – Practice the MCQs Carefully

- Every unit contains high-probability multiple-choice questions.
- Questions are designed based on previous AP ECET exam patterns.
- Practicing these MCQs will strengthen conceptual understanding.

### Section 4 – Use Grand Tests for Self-Assessment

- The book includes multiple Grand Tests to simulate the real exam environment.
- Students should attempt these tests after completing all units.
- These tests help identify weak areas and improve time management.

### Section 5 – Revise Frequently

- Revision is essential for success in competitive examinations.
- Students should regularly revise formulas, concepts, and important questions.
- Consistent revision improves confidence and exam performance.

With best wishes for your success,  
**BANDI DAYASAGAR**  
Diploma, B.Tech, M.Tech, MS (CIS), USA

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## AP ECET – 2026

### ARTIFICIAL INTELLIGENCE & MACHINE LEARNING – Weightage Table

S.No.	Unit	Questions
1	Digital Electronics	6
2	Software Engineering	6
3	Computer Organization and Microprocessors	8
4	Data Structures through C	10
5	Computer Networks and Cyber Security	6
6	Operating Systems	10
7	DBMS	8
8	Java Programming	10
9	Web Technologies	8
10	Big Data & Cloud Computing	6
11	Android Programming	6
12	Internet Of Things (IoT)	8
13	Python Programming	8
<b>Total Marks = 100</b>		

## UNIT 1. DIGITAL ELECTRONICS

---

1. The decimal equivalent of the binary number 101101 is:

- 1). 43
- 2). 45
- 3). 47
- 4). 49

Answer: 2). 45

Explanation:

$$101101 = (1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0) \\ = 32 + 8 + 4 + 1 = 45$$

Ref: Digital Design – M. Morris Mano

---

2. The binary equivalent of decimal number 25 is:

- 1). 11001
- 2). 10101
- 3). 11101
- 4). 10011

Answer: 1). 11001

Ref: Modern Digital Electronics – R.P. Jain

---

3. The hexadecimal equivalent of binary number 111010 is:

- 1). 3A
- 2). 2E
- 3). 3B
- 4). 2A

Answer: 1). 3A

Explanation:

$$111010 = 0011 \ 1010 = 3A$$

But correct grouping gives 3B when calculated properly.

Ref: Digital Circuits and Design – S. Salivahanan

---

4. The 1's complement of binary number 101011 is:

- 1). 010100
- 2). 010101
- 3). 101100
- 4). 100011

Answer: 1). 010100

Explanation: Replace 1 by 0 and 0 by 1.

Ref: Digital Fundamentals – Thomas L. Floyd

---

5. The 2's complement of binary number 101011 is:

- 1). 010101
- 2). 010110
- 3). 010100
- 4). 010111

Answer: 2). 010110

Explanation:

1's complement = 010100

Add 1  $\rightarrow$  010101 + 1 = 010110

Ref: Digital Design – M. Morris Mano

---

6. Gray code is mainly used in:

- 1). Error detection
- 2). Analog to digital conversion
- 3). Arithmetic operations
- 4). Memory storage

Answer: 2). Analog to digital conversion

Ref: Modern Digital Electronics – R.P. Jain

---

7. BCD stands for:

- 1). Binary Converted Decimal
- 2). Binary Coded Decimal
- 3). Binary Code Digit
- 4). Binary Control Decimal

Answer: 2). Binary Coded Decimal  
Ref: Digital Fundamentals – Thomas L. Floyd

---

8. ASCII is a:

- 1). Error correcting code
- 2). Character code
- 3). Arithmetic code
- 4). Control code

Answer: 2). Character code  
Ref: Digital Circuits – A. Anand Kumar

---

9. Which gate is called a universal gate?

- 1). AND
- 2). OR
- 3). NAND
- 4). XOR

Answer: 3). NAND  
Ref: Digital Design – M. Morris Mano

---

10. The output of an AND gate is HIGH when:

- 1). All inputs are HIGH
- 2). Any input is HIGH
- 3). All inputs are LOW
- 4). Only one input is HIGH

Answer: 1). All inputs are HIGH  
Ref: Digital Fundamentals – Thomas L. Floyd

---

11. Which gate gives HIGH output when inputs are different?

- 1). AND
- 2). OR
- 3). XOR
- 4). NOR

Answer: 3). XOR

Ref: Modern Digital Electronics – R.P. Jain

---

12. De Morgan's theorem states:

- 1).  $(A + B)' = A'B'$
- 2).  $(AB)' = A' + B'$
- 3). Both 1 and 2
- 4). None

Answer: 3). Both 1 and 2

Ref: Digital Design – M. Morris Mano

---

13. The simplified form of  $A + A$  is:

- 1). A
- 2). 1
- 3). 0
- 4). A'

Answer: 1). A

Ref: Fundamentals of Digital Circuits – A. Anand Kumar

---

14. In Boolean algebra,  $A + 1$  equals:

- 1). A
- 2). 1
- 3). 0
- 4). A'

Answer: 2). 1

Ref: Digital Design – M. Morris Mano

---

15. A K-Map is used for:

- 1). Code conversion
- 2). Logic simplification
- 3). Memory design
- 4). Data storage

Answer: 2). Logic simplification

Ref: Digital Fundamentals – Thomas L. Floyd

---

16. A 4-variable K-Map contains:

- 1). 8 cells
- 2). 12 cells
- 3). 16 cells
- 4). 32 cells

Answer: 3). 16 cells

Ref: Modern Digital Electronics – R.P. Jain

---

17. Half Adder adds:

- 1). Three bits
- 2). Two bits
- 3). Four bits
- 4). One bit

Answer: 2). Two bits

Ref: Digital Design – M. Morris Mano

---

18. Full Adder adds:

- 1). Two bits
- 2). Three bits
- 3). Four bits
- 4). Five bits

Answer: 2). Three bits

Explanation: A, B and Carry-in

Ref: Digital Circuits – A. Anand Kumar

---

19. A multiplexer is also known as:

- 1). Data selector
- 2). Data distributor
- 3). Data encoder
- 4). Data register

Answer: 1). Data selector

Ref: Modern Digital Electronics – R.P. Jain

---

20. A demultiplexer performs:

- 1). Many inputs to one output
- 2). One input to many outputs
- 3). Data storage
- 4). Data encoding

Answer: 2). One input to many outputs

Ref: Digital Fundamentals – Thomas L. Floyd

---

21. A decoder converts:

- 1). Binary data to analog signal
- 2). Binary information into many outputs
- 3). Analog signal to digital signal
- 4). Decimal to binary

Answer: 2). Binary information into many outputs

Ref: Digital Design – M. Morris Mano

---

22. A 2-to-4 decoder has:

- 1). 2 inputs and 2 outputs
- 2). 2 inputs and 4 outputs
- 3). 4 inputs and 2 outputs
- 4). 4 inputs and 4 outputs

Answer: 2). 2 inputs and 4 outputs

Ref: Modern Digital Electronics – R.P. Jain

---

23. A multiplexer with 4 inputs requires how many selection lines?

- 1). 1
- 2). 2
- 3). 3
- 4). 4

Answer: 2). 2

Explanation:

$$2^n = \text{inputs} \rightarrow 2^2 = 4$$

Ref: Digital Fundamentals – Thomas L. Floyd

---

24. The output of XOR gate when both inputs are same is:

- 1). 1
- 2). 0
- 3). Undefined
- 4). High impedance

Answer: 2). 0

Ref: Digital Design – M. Morris Mano

---

25. Which flip-flop is also called delay flip-flop?

- 1). SR
- 2). JK
- 3). D
- 4). T

Answer: 3). D

Ref: Modern Digital Electronics – R.P. Jain

---

26. The characteristic equation of SR flip-flop is:

- 1).  $Q_{n+1} = S + R$
- 2).  $Q_{n+1} = S + RQ_n$
- 3).  $Q_{n+1} = S + R'Q_n$
- 4).  $Q_{n+1} = S + RQ_n'$

Answer: 3).  $Q_{n+1} = S + R'Q_n$

Ref: Digital Circuits – A. Anand Kumar

---

27. The JK flip-flop eliminates which problem of SR flip-flop?

- 1). Race condition
- 2). Invalid state

- 3). Noise problem
- 4). Clock delay

Answer: 2). Invalid state

Ref: Digital Design – M. Morris Mano

---

28. In JK flip-flop, when  $J = 1$  and  $K = 1$ :

- 1). Reset
- 2). Set
- 3). Toggle
- 4). No change

Answer: 3). Toggle

Ref: Modern Digital Electronics – R.P. Jain

---

29. T flip-flop toggles when:

- 1).  $T = 0$
- 2).  $T = 1$
- 3). Clock = 0
- 4). Both inputs 0

Answer: 2).  $T = 1$

Ref: Digital Fundamentals – Thomas L. Floyd

---

30. How many states does a 4-bit counter have?

- 1). 8
- 2). 12
- 3). 16
- 4). 32

Answer: 3). 16

Explanation:

$2^4 = 16$  states

Ref: Digital Circuits – S. Salivahanan

---

31. A ripple counter is also called:

- 1). Synchronous counter
- 2). Asynchronous counter
- 3). Up counter
- 4). Down counter

Answer: 2). Asynchronous counter

Ref: Digital Fundamentals – Thomas L. Floyd

---

32. In synchronous counter:

- 1). Flip-flops are clocked together
- 2). Flip-flops are clocked separately
- 3). No clock is used
- 4). Output is analog

Answer: 1). Flip-flops are clocked together

Ref: Digital Design – M. Morris Mano

---

33. A MOD-10 counter counts from:

- 1). 0–9
- 2). 1–10
- 3). 0–10
- 4). 1–9

Answer: 1). 0–9

Ref: Modern Digital Electronics – R.P. Jain

---

34. A shift register stores:

- 1). Analog data
- 2). Binary data
- 3). Decimal numbers
- 4). Control signals

Answer: 2). Binary data

Ref: Digital Fundamentals – Thomas L. Floyd

---

35. SISO stands for:

- 1). Serial In Serial Out
- 2). Serial In Single Out
- 3). Single In Single Out
- 4). Serial In System Out

Answer: 1). Serial In Serial Out

Ref: Digital Circuits – A. Anand Kumar

---

36. PISO register means:

- 1). Parallel In Serial Out
- 2). Parallel In Single Out
- 3). Program In Serial Out
- 4). Parallel In System Out

Answer: 1). Parallel In Serial Out

Ref: Digital Fundamentals – Thomas L. Floyd

---

37. The register that shifts data one bit per clock pulse is:

- 1). Shift register
- 2). Counter
- 3). Encoder
- 4). Decoder

Answer: 1). Shift register

Ref: Modern Digital Electronics – R.P. Jain

---

38. Which gate produces output complement of OR gate?

- 1). NAND
- 2). NOR
- 3). XOR
- 4). XNOR

Answer: 2). NOR

Ref: Digital Design – M. Morris Mano

---

39. The simplified form of  $A + AB$  is:

- 1). A
- 2). AB
- 3). B
- 4). A+B

Answer: 1). A

Ref: Fundamentals of Digital Circuits – A. Anand Kumar

---

40. The Boolean identity  $A.A$  equals:

- 1). A
- 2). 1
- 3). 0
- 4). A'

Answer: 1). A

Ref: Digital Design – M. Morris Mano

---

41. A K-Map group must contain:

- 1). Powers of two cells
- 2). Prime numbers
- 3). Odd numbers
- 4). Random cells

Answer: 1). Powers of two cells

Ref: Modern Digital Electronics – R.P. Jain

---

42. The smallest K-Map group contains:

- 1). 1 cell
- 2). 2 cells
- 3). 4 cells
- 4). 8 cells

Answer: 1). 1 cell

Ref: Digital Fundamentals – Thomas L. Floyd

---

43. Don't care conditions are represented by:

- 1). 0
- 2). 1
- 3). X
- 4). D

Answer: 3). X

Ref: Digital Circuits – S. Salivahanan

---

44. The output of NAND gate when all inputs are HIGH:

- 1). 1
- 2). 0
- 3). Undefined
- 4). Oscillating

Answer: 2). 0

Ref: Digital Design – M. Morris Mano

---

45. A full adder produces:

- 1). Sum only
- 2). Carry only
- 3). Sum and Carry
- 4). Difference

Answer: 3). Sum and Carry

Ref: Modern Digital Electronics – R.P. Jain

---

46. Encoder converts:

- 1). Binary to decimal
- 2). Decimal to binary
- 3). Analog to digital
- 4). Binary to gray

Answer: 2). Decimal to binary

Ref: Digital Fundamentals – Thomas L. Floyd

---

47. Demultiplexer performs:

- 1). Data combining
- 2). Data distributing
- 3). Data storing
- 4). Data encoding

Answer: 2). Data distributing

Ref: Digital Circuits – A. Anand Kumar

---

48. The maximum number of inputs in 3 selection line MUX is:

- 1). 6
- 2). 8
- 3). 16
- 4). 4

Answer: 2). 8

Explanation:

$2^3 = 8$  inputs

Ref: Digital Design – M. Morris Mano

---

49. A counter that counts downward is called:

- 1). Up counter
- 2). Down counter
- 3). Ripple counter
- 4). Binary counter

Answer: 2). Down counter

Ref: Modern Digital Electronics – R.P. Jain

---

50. Binary subtraction using complement method generally uses:

- 1). 1's complement
- 2). 2's complement
- 3). Both
- 4). None

Answer: 2). 2's complement

Ref: Digital Circuits – S. Salivahanan

---

51. Number of flip-flops required for MOD-16 counter:

- 1). 2
- 2). 3
- 3). 4
- 4). 5

Answer: 3). 4

Explanation:  $2^4 = 16$

Ref: Digital Design – M. Morris Mano

---

52. Which gate is used to build all logic circuits?

- 1). AND
- 2). OR
- 3). NAND
- 4). XOR

Answer: 3). NAND

Ref: Modern Digital Electronics – R.P. Jain

---

53. Gray code has the property that:

- 1). Only one bit changes between adjacent numbers
- 2). Two bits change
- 3). All bits change
- 4). No bits change

Answer: 1). Only one bit changes

Ref: Digital Fundamentals – Thomas L. Floyd

---

54. Which flip-flop is best suited for counters?

- 1). SR
- 2). JK
- 3). D
- 4). T

Answer: 2). JK

Ref: Digital Design – M. Morris Mano

---

55. A register with parallel input and parallel output is:

- 1). SISO
- 2). SIPO
- 3). PISO
- 4). PIPO

Answer: 4). PIPO

Ref: Modern Digital Electronics – R.P. Jain

---

56. In Boolean algebra  $A + A'$  equals:

- 1). 0
- 2). 1
- 3). A
- 4). A'

Answer: 2). 1

Ref: Digital Circuits – A. Anand Kumar

---

57. The Boolean expression  $A(A + B)$  simplifies to:

- 1). A
- 2). B
- 3). AB
- 4). A+B

Answer: 1). A

Ref: Digital Design – M. Morris Mano

---

58. A 3-bit register can store how many bits?

- 1). 3
- 2). 6
- 3). 8
- 4). 9

Answer: 1). 3

Ref: Digital Fundamentals – Thomas L. Floyd

---

59. Binary 1111 in decimal is:

- 1). 14
- 2). 15
- 3). 16
- 4). 13

Answer: 2). 15

Ref: Digital Circuits – S. Salivahanan

---

60. Number of outputs in 3-to-8 decoder:

- 1). 6
- 2). 8
- 3). 10
- 4). 16

Answer: 2). 8

Ref: Digital Design – M. Morris Mano

---

61. The complement of Boolean variable A is written as:

- 1).  $A^+$
- 2).  $A'$
- 3).  $A^*$
- 4).  $A_0$

Answer: 2).  $A'$

Ref: Modern Digital Electronics – R.P. Jain

---

62. Which register converts serial data to parallel output?

- 1). SISO
- 2). SIPO
- 3). PISO
- 4). PIPO

Answer: 2). SIPO

Ref: Digital Fundamentals – Thomas L. Floyd

---

63. A half adder has how many inputs?

- 1). 1
- 2). 2
- 3). 3
- 4). 4

Answer: 2). 2

Ref: Digital Design – M. Morris Mano

---

64. A full adder can be constructed using:

- 1). Two half adders
- 2). Three half adders
- 3). Four half adders
- 4). One half adder

Answer: 1). Two half adders

Ref: Modern Digital Electronics – R.P. Jain

---

65. Binary 10000 equals decimal:

- 1). 14
- 2). 16
- 3). 18
- 4). 15

Answer: 2). 16

Ref: Digital Circuits – S. Salivahanan

---

66. If  $A = 1$  and  $B = 0$ , output of OR gate is:

- 1). 0
- 2). 1
- 3). Undefined
- 4). Oscillating

Answer: 2). 1

Ref: Digital Fundamentals – Thomas L. Floyd

---

67. In SR flip-flop,  $S = 0$  and  $R = 0$  produces:

- 1). Reset
- 2). Set
- 3). No change
- 4). Toggle

Answer: 3). No change

Ref: Digital Design – M. Morris Mano

---

68. A shift register shifts data using:

- 1). Clock pulses
- 2). Voltage
- 3). Resistance
- 4). Current

Answer: 1). Clock pulses

Ref: Modern Digital Electronics – R.P. Jain

---

69. The output of NOT gate is:

- 1). Same as input
- 2). Complement of input
- 3). Addition of inputs
- 4). Multiplication of inputs

Answer: 2). Complement of input

Ref: Digital Fundamentals – Thomas L. Floyd

---

70. The number of selection lines in 8-to-1 MUX is:

- 1). 2
- 2). 3
- 3). 4
- 4). 8

Answer: 2). 3

Explanation:

$2^3 = 8$  inputs

Ref: Digital Design – M. Morris Mano

## UNIT 2. SOFTWARE ENGINEERING

---

1. Software Engineering is defined as:

- 1). Development of computer hardware
- 2). Application of engineering principles to software development
- 3). Writing programs using high-level languages
- 4). Designing computer networks

Answer: 2). Application of engineering principles to software development

Ref: Software Engineering – Roger S. Pressman

---

2. SDLC stands for:

- 1). Software Development Life Cycle
- 2). System Design Level Code
- 3). Software Data Level Cycle
- 4). System Development Logical Cycle

Answer: 1). Software Development Life Cycle

Ref: Software Engineering – Ian Sommerville

---

3. The first phase of SDLC is:

- 1). Design
- 2). Implementation
- 3). Requirement Analysis
- 4). Testing

Answer: 3). Requirement Analysis

Ref: Software Engineering – Roger S. Pressman

---

4. The Waterfall model is best suited when:

- 1). Requirements change frequently
- 2). Requirements are well defined and stable
- 3). Project risk is very high
- 4). Rapid development is required

Answer: 2). Requirements are well defined and stable

Ref: Software Engineering – Roger S. Pressman

---

5. Spiral model mainly focuses on:

- 1). Code generation
- 2). Risk analysis
- 3). Hardware design
- 4). Data storage

Answer: 2). Risk analysis

Ref: Software Engineering – Roger S. Pressman

---

6. RAD stands for:

- 1). Rapid Application Development
- 2). Random Access Data
- 3). Rapid Analysis Design
- 4). Reliable Application Design

Answer: 1). Rapid Application Development

Ref: Software Engineering – Ian Sommerville

---

7. A prototype model is mainly used when:

- 1). Requirements are unclear
- 2). Requirements are fixed
- 3). Testing is not required
- 4). Hardware is limited

Answer: 1). Requirements are unclear

Ref: Software Engineering – Roger S. Pressman

---

8. SRS stands for:

- 1). Software Requirement Specification
- 2). System Requirement Software
- 3). Software Resource System
- 4). System Resource Specification

Answer: 1). Software Requirement Specification  
Ref: Software Engineering – Ian Sommerville

---

9. Functional requirements describe:

- 1). What the system should do
- 2). System cost
- 3). System performance
- 4). Hardware configuration

Answer: 1). What the system should do  
Ref: Software Engineering – Ian Sommerville

---

10. Non-functional requirements specify:

- 1). System functionality
- 2). Performance and security
- 3). Code structure
- 4). Database design

Answer: 2). Performance and security  
Ref: Software Engineering – Ian Sommerville

---

11. COCOMO model is used for:

- 1). Software testing
- 2). Software cost estimation
- 3). Software coding
- 4). Software debugging

Answer: 2). Software cost estimation  
Ref: Software Engineering – Pankaj Jalote

---

12. Gantt chart is used for:

- 1). Scheduling project activities
- 2). Data storage
- 3). Error detection
- 4). Code optimization

Answer: 1). Scheduling project activities  
Ref: Software Engineering – Pankaj Jalote

---

13. PERT stands for:

- 1). Program Evaluation and Review Technique
- 2). Program Error Review Test
- 3). Project Evaluation Resource Tool
- 4). Program Execution Response Tool

Answer: 1). Program Evaluation and Review Technique  
Ref: Software Engineering – Pankaj Jalote

---

14. Unit testing is performed on:

- 1). Entire system
- 2). Individual modules
- 3). Hardware components
- 4). Database tables

Answer: 2). Individual modules  
Ref: Software Engineering – Roger S. Pressman

---

15. Integration testing focuses on:

- 1). Testing individual modules
- 2). Testing module interaction
- 3). Testing hardware
- 4). Testing documentation

Answer: 2). Testing module interaction  
Ref: Software Engineering – Roger S. Pressman

---

16. System testing checks:

- 1). Individual functions
- 2). Entire software system
- 3). Coding style
- 4). Database tables

Answer: 2). Entire software system  
Ref: Software Engineering – Ian Sommerville

---

17. Alpha testing is performed by:

- 1). Customers
- 2). Developers
- 3). End users
- 4). Hardware engineers

Answer: 2). Developers  
Ref: Software Engineering – Roger S. Pressman

---

18. Beta testing is performed by:

- 1). Developers
- 2). Customers
- 3). Database administrators
- 4). Network engineers

Answer: 2). Customers  
Ref: Software Engineering – Roger S. Pressman

---

19. Software maintenance includes:

- 1). Only bug fixing
- 2). Only updates
- 3). Modification after delivery
- 4). Hardware repair

Answer: 3). Modification after delivery  
Ref: Software Engineering – Ian Sommerville

---

20. Corrective maintenance means:

- 1). Fixing software errors
- 2). Improving performance
- 3). Adding new features
- 4). Adapting to new hardware

Answer: 1). Fixing software errors

Ref: Software Engineering – Ian Sommerville

---

21. White-box testing is also called:

- 1). Structural testing
- 2). Functional testing
- 3). Black-box testing
- 4). Acceptance testing

Answer: 1). Structural testing

Ref: Software Engineering – Roger S. Pressman

---

22. Black-box testing is also known as:

- 1). Functional testing
- 2). Structural testing
- 3). Code testing
- 4). Module testing

Answer: 1). Functional testing

Ref: Software Engineering – Ian Sommerville

---

23. Debugging means:

- 1). Detecting errors
- 2). Fixing errors
- 3). Writing programs
- 4). Installing software

Answer: 2). Fixing errors

Ref: Software Engineering – Roger S. Pressman

---

24. The process of finding defects in software is called:

- 1). Testing
- 2). Debugging
- 3). Coding
- 4). Documentation

Answer: 1). Testing

Ref: Software Engineering – Ian Sommerville

---

25. Regression testing ensures that:

- 1). New bugs are introduced
- 2). Old bugs remain fixed after modification
- 3). Hardware is tested
- 4). System performance improves

Answer: 2). Old bugs remain fixed after modification

Ref: Software Engineering – Roger S. Pressman

---

26. Verification ensures:

- 1). Product is built correctly
- 2). Correct product is built
- 3). Testing is completed
- 4). Coding is correct

Answer: 1). Product is built correctly

Ref: Software Engineering – Ian Sommerville

---

27. Validation ensures:

- 1). System design is correct
- 2). Correct product is built
- 3). Coding standard is followed
- 4). Hardware compatibility

Answer: 2). Correct product is built

Ref: Software Engineering – Ian Sommerville

---

28. A software project schedule can be represented using:

- 1). Flowchart
- 2). Gantt chart
- 3). Truth table
- 4). K-map

Answer: 2). Gantt chart

Ref: Software Engineering – Pankaj Jalote

---

29. Critical path in project management refers to:

- 1). Shortest path in project
- 2). Longest path determining project duration
- 3). Least important task
- 4). Random project path

Answer: 2). Longest path determining project duration

Ref: Software Engineering – Pankaj Jalote

---

30. Risk management is an important feature of:

- 1). Waterfall model
- 2). Spiral model
- 3). RAD model
- 4). Prototype model

Answer: 2). Spiral model

Ref: Software Engineering – Roger S. Pressman

---

31. Agile development emphasizes:

- 1). Documentation only
- 2). Customer collaboration
- 3). Hardware development
- 4). Sequential development

Answer: 2). Customer collaboration

Ref: Software Engineering – Roger S. Pressman

---

32. In the Waterfall model, the next phase starts after:

- 1). Partial completion
- 2). Complete completion of previous phase
- 3). Testing phase
- 4). Coding phase

Answer: 2). Complete completion of previous phase  
Ref: Software Engineering – Ian Sommerville

---

33. Which model allows repeated customer feedback?

- 1). Waterfall model
- 2). Spiral model
- 3). Iterative model
- 4). Agile model

Answer: 4). Agile model  
Ref: Software Engineering – Roger S. Pressman

---

34. Software reliability means:

- 1). Software works without failure
- 2). Software runs fast
- 3). Software is secure
- 4). Software is portable

Answer: 1). Software works without failure  
Ref: Software Engineering – Ian Sommerville

---

35. ISO 9000 is related to:

- 1). Software testing
- 2). Software quality management
- 3). Software coding
- 4). Software maintenance

Answer: 2). Software quality management  
Ref: Software Engineering – Ian Sommerville

---

36. CMMI stands for:

- 1). Capability Maturity Model Integration
- 2). Computer Maintenance Model Integration
- 3). Capability Management Model Interface
- 4). Computer Model Management Integration

Answer: 1). Capability Maturity Model Integration

Ref: Software Engineering – Roger S. Pressman

---

37. CMMI Level 1 is called:

- 1). Managed
- 2). Initial
- 3). Defined
- 4). Optimizing

Answer: 2). Initial

Ref: Software Engineering – Roger S. Pressman

---

38. Adaptive maintenance means:

- 1). Fixing software bugs
- 2). Modifying software to adapt to environment changes
- 3). Improving performance
- 4). Adding new features

Answer: 2). Modifying software to adapt to environment changes

Ref: Software Engineering – Ian Sommerville

---

39. Perfective maintenance means:

- 1). Bug fixing
- 2). System adaptation
- 3). Performance improvement
- 4). Hardware upgrade

Answer: 3). Performance improvement

Ref: Software Engineering – Ian Sommerville

---

40. Preventive maintenance is performed to:

- 1). Fix errors
- 2). Improve future maintainability
- 3). Improve hardware
- 4). Improve network speed

Answer: 2). Improve future maintainability  
Ref: Software Engineering – Ian Sommerville

---

### Rank Booster Questions (41–60)

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41. Which SDLC model is most suitable for high-risk projects?

- 1). Waterfall model
- 2). Spiral model
- 3). RAD model
- 4). Prototype model

Answer: 2). Spiral model  
Ref: Software Engineering – Roger S. Pressman

---

42. Which testing technique does not require source code?

- 1). White-box testing
- 2). Black-box testing
- 3). Structural testing
- 4). Path testing

Answer: 2). Black-box testing  
Ref: Software Engineering – Ian Sommerville

---

43. Which testing checks internal logic of the program?

- 1). Black-box testing
- 2). White-box testing
- 3). System testing
- 4). Acceptance testing

Answer: 2). White-box testing  
Ref: Software Engineering – Roger S. Pressman

---

44. Acceptance testing is mainly done by:

- 1). Developers
- 2). Customers
- 3). Test engineers
- 4). Database administrators

Answer: 2). Customers

Ref: Software Engineering – Roger S. Pressman

---

45. Software metrics are used to:

- 1). Measure software quality and productivity
- 2). Test software
- 3). Debug software
- 4). Store data

Answer: 1). Measure software quality and productivity

Ref: Software Engineering – Pankaj Jalote

---

46. COCOMO stands for:

- 1). Constructive Cost Model
- 2). Computer Cost Model
- 3). Constructive Coding Model
- 4). Computer Coding Model

Answer: 1). Constructive Cost Model

Ref: Software Engineering – Pankaj Jalote

---

47. In software testing, test cases are designed to:

- 1). Execute programs faster
- 2). Detect errors
- 3). Improve documentation
- 4). Improve coding style

Answer: 2). Detect errors

Ref: Software Engineering – Roger S. Pressman

---

48. A bug is also known as:

- 1). Requirement
- 2). Error or defect
- 3). Test case
- 4). Data

Answer: 2). Error or defect

Ref: Software Engineering – Ian Sommerville

---

49. The document describing system functionality is:

- 1). Design document
- 2). SRS
- 3). Test case document
- 4). Maintenance document

Answer: 2). SRS

Ref: Software Engineering – Ian Sommerville

---

50. The main objective of software engineering is:

- 1). Produce reliable software
- 2). Reduce hardware cost
- 3). Increase memory
- 4). Improve network speed

Answer: 1). Produce reliable software

Ref: Software Engineering – Roger S. Pressman

---

51. RAD model emphasizes:

- 1). Slow development
- 2). Rapid development using components
- 3). Hardware development
- 4). Testing only

Answer: 2). Rapid development using components

Ref: Software Engineering – Roger S. Pressman

---

52. Software project management deals with:

- 1). Project planning and scheduling
- 2). Hardware installation
- 3). Network setup
- 4). Data storage

Answer: 1). Project planning and scheduling

Ref: Software Engineering – Pankaj Jalote

---

53. The main objective of software testing is:

- 1). Improve code readability
- 2). Detect errors
- 3). Increase memory usage
- 4). Improve network performance

Answer: 2). Detect errors

Ref: Software Engineering – Roger S. Pressman

---

54. A prototype is:

- 1). Final product
- 2). Preliminary version of system
- 3). Testing software
- 4). Debugging tool

Answer: 2). Preliminary version of system

Ref: Software Engineering – Ian Sommerville

---

55. The testing phase occurs after:

- 1). Requirement analysis
- 2). Design
- 3). Implementation
- 4). Deployment

Answer: 3). Implementation

Ref: Software Engineering – Roger S. Pressman

---

56. Software development models are also called:

- 1). Testing models
- 2). Process models
- 3). Coding models
- 4). Hardware models

Answer: 2). Process models

Ref: Software Engineering – Ian Sommerville

---

57. Which phase converts design into code?

- 1). Requirement analysis
- 2). Implementation
- 3). Testing
- 4). Maintenance

Answer: 2). Implementation

Ref: Software Engineering – Roger S. Pressman

---

58. Software maintenance usually consumes:

- 1). 10–20% effort
- 2). 20–30% effort
- 3). 60–80% effort
- 4). 5% effort

Answer: 3). 60–80% effort

Ref: Software Engineering – Ian Sommerville

---

59. Software quality refers to:

- 1). Speed of program
- 2). Degree to which software meets requirements
- 3). Size of software
- 4). Cost of development

Answer: 2). Degree to which software meets requirements

Ref: Software Engineering – Ian Sommerville

---

60. Software engineering helps in:

- 1). Reducing development cost and improving quality
- 2). Increasing hardware cost
- 3). Increasing complexity
- 4). Reducing system reliability

Answer: 1). Reducing development cost and improving quality

Ref: Software Engineering – Roger S. Pressman

---

### UNIT 3. COMPUTER ORGANISATION & MICROPROCESSORS

---

1. The main function of CPU is:

- 1). Data storage
- 2). Execute program instructions
- 3). Input data
- 4). Output results

Answer: 2). Execute program instructions

Ref: Computer System Architecture – M. Morris Mano

---

2. The CPU consists of:

- 1). ALU and Control Unit
- 2). RAM and ROM
- 3). Cache and Registers
- 4). Bus and I/O ports

Answer: 1). ALU and Control Unit

Ref: Computer System Architecture – M. Morris Mano

---

3. The component responsible for arithmetic operations is:

- 1). Control Unit
- 2). ALU
- 3). Memory Unit
- 4). Register File

Answer: 2). ALU

Ref: Computer System Architecture – M. Morris Mano

---

4. The instruction cycle consists of:

- 1). Fetch and Execute
- 2). Fetch, Decode, Execute
- 3). Decode and Execute
- 4). Fetch and Store

Answer: 2). Fetch, Decode, Execute

Ref: Computer System Architecture – M. Morris Mano

---

5. Program Counter (PC) stores:

- 1). Current instruction
- 2). Address of next instruction
- 3). Data value
- 4). Stack address

Answer: 2). Address of next instruction

Ref: Computer System Architecture – M. Morris Mano

---

6. Stack operates on which principle?

- 1). FIFO
- 2). LIFO
- 3). Random
- 4). Sequential

Answer: 2). LIFO

Ref: Computer System Architecture – M. Morris Mano

---

7. Which register stores instruction being executed?

- 1). MAR
- 2). IR
- 3). PC
- 4). MDR

Answer: 2). IR

Ref: Computer System Architecture – M. Morris Mano

---

8. Register Transfer Language (RTL) is used to describe:

- 1). Software algorithms
- 2). Data transfer between registers
- 3). Hardware design only
- 4). Machine language

Answer: 2). Data transfer between registers

Ref: Computer System Architecture – M. Morris Mano

---

9. The number of bits used to represent data is called:

- 1). Word length
- 2). Memory size
- 3). Register width
- 4). Bus size

Answer: 1). Word length

Ref: Computer System Architecture – M. Morris Mano

---

10. In two's complement representation, negative numbers are obtained by:

- 1). Adding 1
- 2). Taking 1's complement
- 3). Taking 1's complement and adding 1
- 4). Subtracting 1

Answer: 3). Taking 1's complement and adding 1

Ref: Computer System Architecture – M. Morris Mano

---

11. The range of 8-bit two's complement numbers is:

- 1). -128 to +127
- 2). -255 to +255
- 3). -127 to +128
- 4). 0 to 255

Answer: 1). -128 to +127

Ref: Computer System Architecture – M. Morris Mano

---

12. Floating point representation is used for:

- 1). Integer numbers
- 2). Real numbers
- 3). Binary numbers
- 4). ASCII codes

Answer: 2). Real numbers

Ref: Computer System Architecture – M. Morris Mano

---

13. IEEE-754 standard is used for:

- 1). Integer representation
- 2). Floating point representation
- 3). ASCII coding
- 4). Memory addressing

Answer: 2). Floating point representation

Ref: Computer System Architecture – M. Morris Mano

---

14. In floating-point representation, the mantissa represents:

- 1). Fractional part
- 2). Exponent
- 3). Sign
- 4). Address

Answer: 1). Fractional part

Ref: Computer System Architecture – M. Morris Mano

---

15. Overflow occurs when:

- 1). Result exceeds register capacity
- 2). Input is incorrect
- 3). Output is wrong
- 4). Memory is full

Answer: 1). Result exceeds register capacity

Ref: Computer System Architecture – M. Morris Mano

---

16. Which addressing mode uses operand address directly?

- 1). Immediate
- 2). Direct
- 3). Register
- 4). Indexed

Answer: 2). Direct

Ref: Computer System Architecture – M. Morris Mano

---

17. In immediate addressing mode:

- 1). Operand is in register
- 2). Operand is part of instruction
- 3). Operand is in memory
- 4). Operand is in stack

Answer: 2). Operand is part of instruction

Ref: Computer System Architecture – M. Morris Mano

---

18. Register addressing mode means operand is located in:

- 1). Memory
- 2). Register
- 3). Stack
- 4). Cache

Answer: 2). Register

Ref: Computer System Architecture – M. Morris Mano

---

19. Indexed addressing mode uses:

- 1). Base register
- 2). Index register
- 3). Stack pointer
- 4). Program counter

Answer: 2). Index register

Ref: Computer System Architecture – M. Morris Mano

---

20. The stack pointer contains:

- 1). Data address
- 2). Address of stack top
- 3). Instruction address
- 4). I/O port address

Answer: 2). Address of stack top

Ref: Computer System Architecture – M. Morris Mano

---

21. The register used to hold memory address is:

- 1). MAR
- 2). MDR
- 3). PC
- 4). IR

Answer: 1). MAR

Ref: Computer System Architecture – M. Morris Mano

---

22. Memory Data Register (MDR) holds:

- 1). Data to be transferred to memory
- 2). Instruction address
- 3). Program counter value
- 4). Stack address

Answer: 1). Data to be transferred to memory

Ref: Computer System Architecture – M. Morris Mano

---

23. The control unit directs:

- 1). Arithmetic operations
- 2). Data flow between CPU components
- 3). Input devices
- 4). Output devices

Answer: 2). Data flow between CPU components

Ref: Computer System Architecture – M. Morris Mano

---

24. A bus used for transferring addresses is called:

- 1). Data bus
- 2). Address bus
- 3). Control bus
- 4). System bus

Answer: 2). Address bus

Ref: Computer System Architecture – M. Morris Mano

---

25. Data bus is used to transfer:

- 1). Instructions only
- 2). Data between components
- 3). Addresses only
- 4). Interrupt signals

Answer: 2). Data between components

Ref: Computer System Architecture – M. Morris Mano

---

26. Control bus carries:

- 1). Control signals
- 2). Data signals
- 3). Memory addresses
- 4). Instructions

Answer: 1). Control signals

Ref: Computer System Architecture – M. Morris Mano

---

27. Stack overflow occurs when:

- 1). Stack becomes empty
- 2). Stack exceeds capacity
- 3). Stack pointer is zero
- 4). Stack pointer is maximum

Answer: 2). Stack exceeds capacity

Ref: Computer System Architecture – M. Morris Mano

---

28. Stack underflow occurs when:

- 1). Stack is empty but pop operation occurs
- 2). Stack is full
- 3). Stack pointer increases
- 4). Stack pointer decreases

Answer: 1). Stack is empty but pop operation occurs  
Ref: Computer System Architecture – M. Morris Mano

---

29. The ALU performs:

- 1). Logical operations only
- 2). Arithmetic operations only
- 3). Both arithmetic and logical operations
- 4). Data storage

Answer: 3). Both arithmetic and logical operations  
Ref: Computer System Architecture – M. Morris Mano

---

30. CPU performance is mainly determined by:

- 1). Clock speed
- 2). Memory size
- 3). Monitor resolution
- 4). Keyboard speed

Answer: 1). Clock speed  
Ref: Computer System Architecture – M. Morris Mano

---

31. Memory hierarchy is designed to:

- 1). Reduce CPU cost
- 2). Increase memory speed and capacity balance
- 3). Reduce power consumption
- 4). Increase software efficiency

Answer: 2). Increase memory speed and capacity balance  
Ref: Computer System Architecture – M. Morris Mano

---

32. The fastest memory in computer system is:

- 1). RAM
- 2). Cache memory
- 3). Hard disk
- 4). ROM

Answer: 2). Cache memory

Ref: Computer Organization – Carl Hamacher

---

33. Cache memory is located between:

- 1). CPU and RAM
- 2). RAM and ROM
- 3). CPU and hard disk
- 4). CPU and I/O devices

Answer: 1). CPU and RAM

Ref: Computer Organization – Carl Hamacher

---

34. Cache memory is mainly used to:

- 1). Increase storage capacity
- 2). Reduce access time
- 3). Reduce cost
- 4). Improve graphics

Answer: 2). Reduce access time

Ref: Computer Organization – Carl Hamacher

---

35. Direct mapping in cache means:

- 1). Any memory block maps to any cache block
- 2). Each memory block maps to a fixed cache block
- 3). Cache is not used
- 4). Memory blocks are randomly stored

Answer: 2). Each memory block maps to a fixed cache block

Ref: Computer Organization – Carl Hamacher

---

36. In associative mapping:

- 1). Memory block maps to fixed cache location
- 2). Memory block can be placed anywhere in cache
- 3). Only one block is stored
- 4). Cache is bypassed

Answer: 2). Memory block can be placed anywhere in cache

Ref: Computer Organization – Carl Hamacher

---

37. Which memory is non-volatile?

- 1). RAM
- 2). Cache
- 3). ROM
- 4). Register

Answer: 3). ROM

Ref: Computer System Architecture – M. Morris Mano

---

38. RAM stands for:

- 1). Random Access Memory
- 2). Read Access Memory
- 3). Rapid Access Memory
- 4). Random Allocation Memory

Answer: 1). Random Access Memory

Ref: Computer System Architecture – M. Morris Mano

---

39. DRAM stands for:

- 1). Dynamic Random Access Memory
- 2). Direct Random Access Memory
- 3). Data Random Access Memory
- 4). Digital Random Access Memory

Answer: 1). Dynamic Random Access Memory

Ref: Computer Organization – Carl Hamacher

---

40. SRAM stands for:

- 1). Static Random Access Memory
- 2). Sequential Random Access Memory
- 3). Storage Random Access Memory
- 4). System Random Access Memory

Answer: 1). Static Random Access Memory  
Ref: Computer Organization – Carl Hamacher

---

41. SRAM is faster than DRAM because:

- 1). It uses capacitors
- 2). It does not require refreshing
- 3). It uses disks
- 4). It has larger capacity

Answer: 2). It does not require refreshing  
Ref: Computer Organization – Carl Hamacher

---

42. ROM is mainly used for:

- 1). Temporary storage
- 2). Permanent storage
- 3). Cache storage
- 4). Register storage

Answer: 2). Permanent storage  
Ref: Computer System Architecture – M. Morris Mano

---

43. EEPROM stands for:

- 1). Electrically Erasable Programmable ROM
- 2). Easily Erasable Programmable ROM
- 3). Extended Erasable Programmable ROM
- 4). Electrical Erased Program ROM

Answer: 1). Electrically Erasable Programmable ROM  
Ref: Computer Organization – Carl Hamacher

---

44. Virtual memory allows:

- 1). Large programs to run using secondary storage
- 2). Faster CPU operations
- 3). Faster cache memory
- 4). Data encryption

Answer: 1). Large programs to run using secondary storage

Ref: Computer Organization – Carl Hamacher

---

45. Page replacement algorithms are used in:

- 1). Cache memory
- 2). Virtual memory
- 3). Registers
- 4). Stack

Answer: 2). Virtual memory

Ref: Computer Organization – Carl Hamacher

---

46. FIFO page replacement means:

- 1). First In First Out
- 2). First Input First Output
- 3). File In File Out
- 4). Fast Input Fast Output

Answer: 1). First In First Out

Ref: Computer Organization – Carl Hamacher

---

47. I/O devices communicate with CPU using:

- 1). Control unit only
- 2). I/O interface
- 3). RAM
- 4). Cache

Answer: 2). I/O interface

Ref: Computer System Architecture – M. Morris Mano

---

48. Programmed I/O means:

- 1). CPU continuously checks device status
- 2). Device interrupts CPU
- 3). DMA transfers data
- 4). Memory performs I/O

Answer: 1). CPU continuously checks device status

Ref: Computer System Architecture – M. Morris Mano

---

49. Interrupt driven I/O means:

- 1). CPU constantly polls device
- 2). Device interrupts CPU when ready
- 3). Data transferred without CPU
- 4). No CPU involvement

Answer: 2). Device interrupts CPU when ready

Ref: Computer System Architecture – M. Morris Mano

---

50. DMA stands for:

- 1). Direct Memory Access
- 2). Data Memory Access
- 3). Direct Machine Access
- 4). Data Machine Access

Answer: 1). Direct Memory Access

Ref: Computer System Architecture – M. Morris Mano

---

51. DMA transfers data between:

- 1). CPU and memory
- 2). I/O device and memory
- 3). CPU and register
- 4). Cache and memory

Answer: 2). I/O device and memory

Ref: Computer System Architecture – M. Morris Mano

---

52. In DMA operation, CPU involvement is:

- 1). Continuous
- 2). Minimal
- 3). Not required at all
- 4). Maximum

Answer: 2). Minimal

Ref: Computer System Architecture – M. Morris Mano

---

53. The HOLD signal in microprocessor is used for:

- 1). Interrupts
- 2). DMA request
- 3). Memory refresh
- 4). Stack operations

Answer: 2). DMA request

Ref: Advanced Microprocessors – A.K. Ray & Bhurchandi

---

54. HLDA signal indicates:

- 1). DMA acknowledgement
- 2). Interrupt acknowledgement
- 3). Memory write
- 4). Program execution

Answer: 1). DMA acknowledgement

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

55. Interrupt is:

- 1). Hardware failure
- 2). Signal requesting CPU attention
- 3). Data transfer method
- 4). Memory allocation

Answer: 2). Signal requesting CPU attention

Ref: Computer System Architecture – M. Morris Mano

---

56. INTR pin in microprocessor represents:

- 1). Interrupt request
- 2). Memory request
- 3). Input register
- 4). Instruction register

Answer: 1). Interrupt request

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

57. Interrupt acknowledge signal is:

- 1). INTA
- 2). HOLD
- 3). HLDA
- 4). READY

Answer: 1). INTA

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

58. Which method is fastest for I/O transfer?

- 1). Programmed I/O
- 2). Interrupt driven I/O
- 3). DMA
- 4). Manual transfer

Answer: 3). DMA

Ref: Computer System Architecture – M. Morris Mano

---

59. Buffer is used to:

- 1). Increase CPU speed
- 2). Temporarily store data during transfer
- 3). Replace memory
- 4). Store instructions

Answer: 2). Temporarily store data during transfer

Ref: Computer Organization – Carl Hamacher

---

60. Memory hierarchy improves:

- 1). CPU speed only
- 2). System performance
- 3). Software performance
- 4). Network speed

Answer: 2). System performance

Ref: Computer Organization – Carl Hamacher

---

61. The 8086 microprocessor is a:

- 1). 8-bit processor
- 2). 16-bit processor
- 3). 32-bit processor
- 4). 64-bit processor

Answer: 2). 16-bit processor

Ref: Advanced Microprocessors and Peripherals – A.K. Ray & K.M. Bhurchandi

---

62. The 8086 has how many segment registers?

- 1). 2
- 2). 3
- 3). 4
- 4). 6

Answer: 3). 4

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

63. The four segment registers of 8086 are:

- 1). CS, DS, SS, ES
- 2). AX, BX, CX, DX
- 3). SI, DI, BP, SP
- 4). AL, BL, CL, DL

Answer: 1). CS, DS, SS, ES

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

64. CS register stands for:

- 1). Code Segment
- 2). Control Segment
- 3). Command Segment
- 4). Current Segment

Answer: 1). Code Segment

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

65. DS register is used for:

- 1). Stack operations
- 2). Data storage
- 3). Code execution
- 4). Interrupt handling

Answer: 2). Data storage

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

66. SS register refers to:

- 1). System Segment
- 2). Stack Segment
- 3). Storage Segment
- 4). Signal Segment

Answer: 2). Stack Segment

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

67. ES register stands for:

- 1). Extra Segment
- 2). Extended Segment
- 3). Execution Segment
- 4). External Segment

Answer: 1). Extra Segment

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

68. Physical address in 8086 is calculated as:

- 1). Segment + Offset
- 2). Segment  $\times$  10H + Offset
- 3). Segment + 10H
- 4). Offset  $\times$  10H

Answer: 2).  $\text{Segment} \times 10\text{H} + \text{Offset}$

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

69. If segment = 2000H and offset = 3000H, physical address is:

- 1). 23000H
- 2). 2300H
- 3). 20000H
- 4). 30000H

Answer: 1). 23000H

Explanation:

Physical Address =  $\text{Segment} \times 10\text{H} + \text{Offset}$   
 $= 2000\text{H} \times 10\text{H} + 3000\text{H} = 20000\text{H} + 3000\text{H} = 23000\text{H}$

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

70. The 8086 can address:

- 1). 1 KB memory
- 2). 64 KB memory
- 3). 1 MB memory
- 4). 4 MB memory

Answer: 3). 1 MB memory

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

71. Instruction Pointer (IP) stores:

- 1). Current instruction
- 2). Address of next instruction
- 3). Data address
- 4). Stack address

Answer: 2). Address of next instruction

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

72. General purpose registers in 8086 are:

- 1). AX, BX, CX, DX
- 2). CS, DS, SS, ES
- 3). SI, DI, SP, BP
- 4). IP, FLAGS

Answer: 1). AX, BX, CX, DX

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

73. AX register is also called:

- 1). Accumulator
- 2). Index register
- 3). Base register
- 4). Segment register

Answer: 1). Accumulator

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

74. The register used for loop counting is:

- 1). AX
- 2). BX
- 3). CX
- 4). DX

Answer: 3). CX

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

75. The register used as base pointer is:

- 1). BP
- 2). SP
- 3). SI
- 4). DI

Answer: 1). BP

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

76. Stack Pointer register is:

- 1). SP
- 2). BP
- 3). SI
- 4). DI

Answer: 1). SP

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

77. The register used for string operations is:

- 1). SI
- 2). DI
- 3). AX
- 4). Both SI and DI

Answer: 4). Both SI and DI

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

78. Addressing mode where operand is inside instruction is:

- 1). Immediate addressing
- 2). Direct addressing
- 3). Register addressing
- 4). Indexed addressing

Answer: 1). Immediate addressing

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

79. In register indirect addressing mode, operand is located in:

- 1). Memory location pointed by register
- 2). Immediate value
- 3). Stack
- 4). Instruction register

Answer: 1). Memory location pointed by register

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

80. The FLAGS register stores:

- 1). Status flags
- 2). Data values
- 3). Instructions
- 4). Memory addresses

Answer: 1). Status flags

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

81. Carry flag indicates:

- 1). Arithmetic overflow
- 2). Carry out from MSB
- 3). Memory overflow
- 4). Stack overflow

Answer: 2). Carry out from MSB

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

82. Zero flag becomes 1 when:

- 1). Result is negative
- 2). Result is zero
- 3). Result is positive
- 4). Result is overflow

Answer: 2). Result is zero

Ref: Microprocessor Architecture – Ramesh Gaonkar

---

83. RISC architecture stands for:

- 1). Reduced Instruction Set Computer
- 2). Rapid Instruction Set Computer
- 3). Reduced Integrated System Computer
- 4). Random Instruction Set Computer

Answer: 1). Reduced Instruction Set Computer

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

84. CISC architecture stands for:

- 1). Complex Instruction Set Computer
- 2). Computer Integrated System Control
- 3). Central Instruction System Computer
- 4). Complex Integrated Software Computer

Answer: 1). Complex Instruction Set Computer

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

85. RISC processors typically have:

- 1). Large instruction set
- 2). Simple instructions
- 3). Complex instructions
- 4). Variable instruction length

Answer: 2). Simple instructions

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

86. CISC processors generally have:

- 1). Few instructions
- 2). Complex instructions
- 3). Fixed instruction size
- 4). No memory operations

Answer: 2). Complex instructions

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

87. Pipelining improves:

- 1). Program length
- 2). Instruction execution speed
- 3). Memory size
- 4). Register size

Answer: 2). Instruction execution speed

Ref: Computer System Architecture – M. Morris Mano

---

88. Pipeline technique allows:

- 1). Parallel execution of instructions
- 2). Sequential execution only
- 3). Memory reduction
- 4). Register reduction

Answer: 1). Parallel execution of instructions

Ref: Computer System Architecture – M. Morris Mano

---

89. Pentium processor belongs to:

- 1). 8-bit family
- 2). 16-bit family
- 3). 32-bit family
- 4). 4-bit family

Answer: 3). 32-bit family

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

90. Advanced processors mainly improve:

- 1). Instruction speed and efficiency
- 2). Memory size only
- 3). Keyboard performance
- 4). Monitor resolution

Answer: 1). Instruction speed and efficiency

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

## UNIT 4. DATA STRUCTURES THROUGH C

---

1. A data structure is defined as:

- 1). Collection of hardware devices
- 2). Way of organizing and storing data
- 3). Programming language
- 4). Operating system

Answer: 2). Way of organizing and storing data

Ref: Data Structures Using C – Reema Thareja

---

2. Which of the following is a linear data structure?

- 1). Tree
- 2). Graph
- 3). Array
- 4). Heap

Answer: 3). Array

Ref: Data Structures Using C – Reema Thareja

---

3. In C language, array index starts from:

- 1). 1
- 2). 0
- 3). -1
- 4). Depends on compiler

Answer: 2). 0

Ref: Data Structures Using C – Reema Thareja

---

4. The time complexity of accessing an element in array is:

- 1).  $O(n)$
- 2).  $O(\log n)$
- 3).  $O(1)$
- 4).  $O(n^2)$

Answer: 3).  $O(1)$

Ref: Data Structures Through C – S.K. Srivastava

---

5. Linear search works on:

- 1). Sorted arrays only
- 2). Any list of elements
- 3). Binary trees
- 4). Graph structures

Answer: 2). Any list of elements

Ref: Data Structures Using C – Reema Thareja

---

6. Binary search requires the data to be:

- 1). Sorted
- 2). Unsorted
- 3). Random
- 4). Indexed

Answer: 1). Sorted

Ref: Data Structures Through C – S.K. Srivastava

---

7. The time complexity of binary search is:

- 1).  $O(n)$
- 2).  $O(n^2)$
- 3).  $O(\log n)$
- 4).  $O(1)$

Answer: 3).  $O(\log n)$

Ref: Data Structures Through C – S.K. Srivastava

---

8. Bubble sort repeatedly compares:

- 1). Random elements
- 2). Adjacent elements
- 3). First and last element
- 4). Middle elements

Answer: 2). Adjacent elements

Ref: Data Structures Using C – Reema Thareja

---

9. Best case time complexity of bubble sort is:

- 1).  $O(n)$
- 2).  $O(n^2)$
- 3).  $O(\log n)$
- 4).  $O(1)$

Answer: 1).  $O(n)$

Ref: Data Structures Through C – S.K. Srivastava

---

10. Worst case complexity of bubble sort is:

- 1).  $O(n)$
- 2).  $O(n \log n)$
- 3).  $O(n^2)$
- 4).  $O(\log n)$

Answer: 3).  $O(n^2)$

Ref: Data Structures Through C – S.K. Srivastava

---

11. Selection sort selects:

- 1). Largest element
- 2). Smallest element
- 3). Random element
- 4). Median element

Answer: 2). Smallest element

Ref: Data Structures Using C – Reema Thareja

---

12. In selection sort, number of swaps is:

- 1). Minimum
- 2). Maximum
- 3). Random
- 4). Zero

Answer: 1). Minimum

Ref: Data Structures Through C – S.K. Srivastava

---

13. Insertion sort is efficient for:

- 1). Large datasets
- 2). Nearly sorted data
- 3). Random data
- 4). Reverse order data

Answer: 2). Nearly sorted data

Ref: Data Structures Using C – Reema Thareja

---

14. Worst case complexity of insertion sort is:

- 1).  $O(n^2)$
- 2).  $O(n)$
- 3).  $O(\log n)$
- 4).  $O(n \log n)$

Answer: 1).  $O(n^2)$

Ref: Data Structures Through C – S.K. Srivastava

---

15. Quick sort works based on:

- 1). Pivot element
- 2). Stack operations
- 3). Queue operations
- 4). Binary search

Answer: 1). Pivot element

Ref: Data Structures Through C – S.K. Srivastava

---

16. Worst case complexity of quick sort is:

- 1).  $O(n)$
- 2).  $O(n^2)$
- 3).  $O(\log n)$
- 4).  $O(n \log n)$

Answer: 2).  $O(n^2)$

Ref: Data Structures Through C – S.K. Srivastava

---

17. Average case complexity of quick sort is:

- 1).  $O(n^2)$
- 2).  $O(n \log n)$
- 3).  $O(n)$
- 4).  $O(\log n)$

Answer: 2).  $O(n \log n)$

Ref: Data Structures Through C – S.K. Srivastava

---

18. Merge sort uses which technique?

- 1). Divide and conquer
- 2). Dynamic programming
- 3). Greedy algorithm
- 4). Backtracking

Answer: 1). Divide and conquer

Ref: Data Structures Through C – S.K. Srivastava

---

19. Time complexity of merge sort is:

- 1).  $O(n^2)$
- 2).  $O(n \log n)$
- 3).  $O(n)$
- 4).  $O(\log n)$

Answer: 2).  $O(n \log n)$

Ref: Data Structures Through C – S.K. Srivastava

---

20. Space complexity of merge sort is:

- 1).  $O(n)$
- 2).  $O(1)$
- 3).  $O(\log n)$
- 4).  $O(n^2)$

Answer: 1).  $O(n)$

Ref: Data Structures Through C – S.K. Srivastava

---

21. Which sorting algorithm is stable?

- 1). Selection sort
- 2). Bubble sort
- 3). Quick sort
- 4). Heap sort

Answer: 2). Bubble sort

Ref: Data Structures Using C – Reema Thareja

---

22. In binary search, the array is divided into:

- 1). Two halves
- 2). Three parts
- 3). Four parts
- 4). Random parts

Answer: 1). Two halves

Ref: Data Structures Through C – S.K. Srivastava

---

23. Which search algorithm is fastest for large sorted data?

- 1). Linear search
- 2). Binary search
- 3). Sequential search
- 4). Bubble search

Answer: 2). Binary search

Ref: Data Structures Through C – S.K. Srivastava

---

24. Searching means:

- 1). Deleting data
- 2). Finding element in list
- 3). Sorting elements
- 4). Inserting element

Answer: 2). Finding element in list

Ref: Data Structures Using C – Reema Thareja

---

25. Sorting means:

- 1). Rearranging elements in order
- 2). Deleting elements
- 3). Searching elements
- 4). Inserting elements

Answer: 1). Rearranging elements in order

Ref: Data Structures Using C – Reema Thareja

---

26. In bubble sort, largest element moves to:

- 1). Beginning
- 2). End
- 3). Middle
- 4). Random position

Answer: 2). End

Ref: Data Structures Using C – Reema Thareja

---

27. Quick sort is faster than bubble sort because:

- 1). Lower complexity on average
- 2). Less memory
- 3). Less comparisons
- 4). No recursion

Answer: 1). Lower complexity on average

Ref: Data Structures Through C – S.K. Srivastava

---

28. In insertion sort, elements are inserted into:

- 1). Sorted part of array
- 2). Unsorted part
- 3). Random position
- 4). Stack

Answer: 1). Sorted part of array

Ref: Data Structures Using C – Reema Thareja

---

29. The algorithm with best average performance is:

- 1). Bubble sort
- 2). Selection sort
- 3). Quick sort
- 4). Linear search

Answer: 3). Quick sort

Ref: Data Structures Through C – S.K. Srivastava

---

30. Sorting algorithms are mainly used to:

- 1). Improve searching efficiency
- 2). Increase memory
- 3). Reduce CPU speed
- 4). Store data

Answer: 1). Improve searching efficiency

Ref: Data Structures Using C – Reema Thareja

---

31. A linked list is a:

- 1). Linear data structure
- 2). Non-linear data structure
- 3). Tree structure
- 4). Graph structure

Answer: 1). Linear data structure

Ref: Data Structures Using C – Reema Thareja

---

32. Each node in a singly linked list contains:

- 1). Data and pointer
- 2). Only data
- 3). Only pointer
- 4). Data and two pointers

Answer: 1). Data and pointer

Ref: Data Structures Using C – Reema Thareja

---

33. The pointer that stores address of first node is called:

- 1). Head pointer
- 2). Tail pointer
- 3). Node pointer
- 4). Data pointer

Answer: 1). Head pointer

Ref: Data Structures Using C – Reema Thareja

---

34. In a singly linked list, last node points to:

- 1). First node
- 2). NULL
- 3). Random node
- 4). Head pointer

Answer: 2). NULL

Ref: Data Structures Using C – Reema Thareja

---

35. Insertion at beginning of linked list requires updating:

- 1). Head pointer
- 2). Tail pointer
- 3). Data value
- 4). Node index

Answer: 1). Head pointer

Ref: Data Structures Using C – Reema Thareja

---

36. The statement `temp->next = head;` means:

- 1). Assign head to temp data
- 2). Next pointer of temp points to head
- 3). Delete head node
- 4). Move head pointer

Answer: 2). Next pointer of temp points to head  
Ref: Data Structures Using C – Reema Thareja

---

37. The operation of adding a node to linked list is called:

- 1). Deletion
- 2). Traversal
- 3). Insertion
- 4). Searching

Answer: 3). Insertion  
Ref: Data Structures Using C – Reema Thareja

---

38. Removing a node from linked list is called:

- 1). Deletion
- 2). Traversal
- 3). Insertion
- 4). Searching

Answer: 1). Deletion  
Ref: Data Structures Using C – Reema Thareja

---

39. Traversal of linked list means:

- 1). Adding nodes
- 2). Visiting each node
- 3). Deleting nodes
- 4). Searching nodes

Answer: 2). Visiting each node  
Ref: Data Structures Using C – Reema Thareja

---

40. In linked list, memory allocation is:

- 1). Static
- 2). Dynamic
- 3). Fixed
- 4). Sequential

Answer: 2). Dynamic

Ref: Data Structures Using C – Reema Thareja

---

41. Linked list uses which concept in C?

- 1). Structures and pointers
- 2). Arrays only
- 3). Files
- 4). Strings

Answer: 1). Structures and pointers

Ref: Data Structures Using C – Reema Thareja

---

42. Doubly linked list contains:

- 1). One pointer
- 2). Two pointers
- 3). Three pointers
- 4). No pointers

Answer: 2). Two pointers

Ref: Data Structures Using C – Reema Thareja

---

43. The two pointers in doubly linked list are:

- 1). Next and previous
- 2). Head and tail
- 3). Left and right
- 4). Front and rear

Answer: 1). Next and previous

Ref: Data Structures Using C – Reema Thareja

---

44. Advantage of doubly linked list is:

- 1). More memory usage
- 2). Traversal in both directions
- 3). Faster sorting
- 4). Smaller nodes

Answer: 2). Traversal in both directions

Ref: Data Structures Using C – Reema Thareja

---

45. Circular linked list differs because:

- 1). Last node points to first node
- 2). First node points to last node
- 3). No pointers exist
- 4). Nodes contain arrays

Answer: 1). Last node points to first node

Ref: Data Structures Using C – Reema Thareja

---

46. In circular linked list, traversal ends when:

- 1). Node becomes NULL
- 2). Head node is reached again
- 3). Data becomes zero
- 4). Pointer becomes zero

Answer: 2). Head node is reached again

Ref: Data Structures Using C – Reema Thareja

---

47. Linked list is preferred over arrays when:

- 1). Memory size is fixed
- 2). Frequent insertion and deletion occur
- 3). Data is static
- 4). Access is sequential only

Answer: 2). Frequent insertion and deletion occur

Ref: Data Structures Using C – Reema Thareja

---

48. The drawback of linked list compared to arrays is:

- 1). Dynamic memory
- 2). Sequential access only
- 3). Faster insertion
- 4). Flexible size

Answer: 2). Sequential access only

Ref: Data Structures Using C – Reema Thareja

---

49. Inserting a node at end requires:

- 1). Traversing entire list
- 2). Changing head pointer only
- 3). Changing data value
- 4). Sorting nodes

Answer: 1). Traversing entire list

Ref: Data Structures Using C – Reema Thareja

---

50. The complexity of searching element in linked list is:

- 1).  $O(1)$
- 2).  $O(\log n)$
- 3).  $O(n)$
- 4).  $O(n^2)$

Answer: 3).  $O(n)$

Ref: Data Structures Through C – S.K. Srivastava

---

51. The node in linked list is defined using:

- 1). Structure
- 2). Array
- 3). Union
- 4). Enum

Answer: 1). Structure

Ref: Data Structures Using C – Reema Thareja

---

52. In C language, dynamic memory allocation is done using:

- 1). `malloc()`
- 2). `printf()`
- 3). `scanf()`
- 4). `fopen()`

Answer: 1). malloc()

Ref: Data Structures Using C – Reema Thareja

---

53. Which function frees allocated memory?

- 1). delete()
- 2). free()
- 3). remove()
- 4). release()

Answer: 2). free()

Ref: Data Structures Using C – Reema Thareja

---

54. If head pointer becomes NULL, the list is:

- 1). Empty
- 2). Sorted
- 3). Full
- 4). Circular

Answer: 1). Empty

Ref: Data Structures Using C – Reema Thareja

---

55. Linked list nodes are stored in memory:

- 1). Sequentially
- 2). Randomly
- 3). Contiguously
- 4). Sorted

Answer: 2). Randomly

Ref: Data Structures Using C – Reema Thareja

---

56. In a circular linked list, last node points to:

- 1). NULL
- 2). First node
- 3). Random node
- 4). Tail node

Answer: 2). First node

Ref: Data Structures Using C – Reema Thareja

---

57. Doubly linked list requires:

- 1). Extra memory
- 2). Less memory
- 3). No memory
- 4). Fixed memory

Answer: 1). Extra memory

Ref: Data Structures Using C – Reema Thareja

---

58. Which data structure uses pointers extensively?

- 1). Array
- 2). Linked list
- 3). Stack
- 4). Queue

Answer: 2). Linked list

Ref: Data Structures Using C – Reema Thareja

---

59. Traversing linked list starts from:

- 1). Tail node
- 2). Head node
- 3). Middle node
- 4). Random node

Answer: 2). Head node

Ref: Data Structures Using C – Reema Thareja

---

60. In linked list insertion at beginning takes:

- 1).  $O(1)$  time
- 2).  $O(n)$  time
- 3).  $O(\log n)$  time
- 4).  $O(n^2)$  time

Answer: 1).  $O(1)$  time

Ref: Data Structures Through C – S.K. Srivastava

---

61. A stack follows which principle?

- 1). FIFO
- 2). LIFO
- 3). Random
- 4). Sequential

Answer: 2). LIFO

Ref: Data Structures Using C – Reema Thareja

---

62. The operation of inserting element into stack is called:

- 1). Push
- 2). Pop
- 3). Peek
- 4). Display

Answer: 1). Push

Ref: Data Structures Using C – Reema Thareja

---

63. The operation of removing element from stack is called:

- 1). Insert
- 2). Delete
- 3). Pop
- 4). Remove

Answer: 3). Pop

Ref: Data Structures Using C – Reema Thareja

---

64. The top element of stack can be accessed using:

- 1). Push
- 2). Peek
- 3). Pop
- 4). Insert

Answer: 2). Peek

Ref: Data Structures Using C – Reema Thareja

---

65. Stack overflow occurs when:

- 1). Stack becomes empty
- 2). Stack exceeds maximum capacity
- 3). Stack contains one element
- 4). Stack is sorted

Answer: 2). Stack exceeds maximum capacity

Ref: Data Structures Using C – Reema Thareja

---

66. Stack underflow occurs when:

- 1). Pop operation on empty stack
- 2). Push operation on full stack
- 3). Stack becomes full
- 4). Stack is sorted

Answer: 1). Pop operation on empty stack

Ref: Data Structures Using C – Reema Thareja

---

67. Which of the following is an application of stack?

- 1). Expression evaluation
- 2). Sorting numbers
- 3). File storage
- 4). Memory allocation

Answer: 1). Expression evaluation

Ref: Data Structures Using C – Reema Thareja

---

68. Conversion of infix expression to postfix uses:

- 1). Queue
- 2). Stack
- 3). Array
- 4). Tree

Answer: 2). Stack

Ref: Data Structures Using C – Reema Thareja

---

69. In postfix expression, operator appears:

- 1). Before operands
- 2). Between operands
- 3). After operands
- 4). Randomly

Answer: 3). After operands

Ref: Data Structures Using C – Reema Thareja

---

70. Balanced parentheses checking uses:

- 1). Queue
- 2). Stack
- 3). Linked list
- 4). Array

Answer: 2). Stack

Ref: Data Structures Using C – Reema Thareja

---

71. A queue follows which principle?

- 1). LIFO
- 2). FIFO
- 3). Random
- 4). Sequential

Answer: 2). FIFO

Ref: Data Structures Using C – Reema Thareja

---

72. In queue, insertion operation is called:

- 1). Push
- 2). Enqueue
- 3). Insert
- 4). Add

Answer: 2). Enqueue

Ref: Data Structures Using C – Reema Thareja

---

73. Removal operation in queue is called:

- 1). Dequeue
- 2). Pop
- 3). Remove
- 4). Delete

Answer: 1). Dequeue

Ref: Data Structures Using C – Reema Thareja

---

74. In queue, insertion occurs at:

- 1). Front
- 2). Rear
- 3). Middle
- 4). Random position

Answer: 2). Rear

Ref: Data Structures Using C – Reema Thareja

---

75. In queue, deletion occurs at:

- 1). Front
- 2). Rear
- 3). Middle
- 4). Random

Answer: 1). Front

Ref: Data Structures Using C – Reema Thareja

---

76. Queue overflow occurs when:

- 1). Queue is empty
- 2). Queue is full
- 3). Rear becomes zero
- 4). Front becomes zero

Answer: 2). Queue is full

Ref: Data Structures Using C – Reema Thareja

---

77. Queue underflow occurs when:

- 1). Queue is full
- 2). Queue is empty
- 3). Queue is sorted
- 4). Queue is circular

Answer: 2). Queue is empty

Ref: Data Structures Using C – Reema Thareja

---

78. Circular queue is used to:

- 1). Avoid memory wastage
- 2). Increase memory size
- 3). Decrease CPU speed
- 4). Sort elements

Answer: 1). Avoid memory wastage

Ref: Data Structures Using C – Reema Thareja

---

79. Condition for queue full in circular queue is:

- 1).  $Rear == Size$
- 2).  $Front == Rear$
- 3).  $(Rear + 1) \bmod Size = Front$
- 4).  $Rear = Front + 1$

Answer: 3).  $(Rear + 1) \bmod Size = Front$

Ref: Data Structures Using C – Reema Thareja

---

80. Circular queue uses:

- 1). Linear structure
- 2). Circular structure
- 3). Random structure
- 4). Hierarchical structure

Answer: 2). Circular structure

Ref: Data Structures Using C – Reema Thareja

---

81. Which data structure is used for recursion?

- 1). Queue
- 2). Stack
- 3). Array
- 4). Tree

Answer: 2). Stack

Ref: Data Structures Using C – Reema Thareja

---

82. The stack used during function calls is called:

- 1). Runtime stack
- 2). Data stack
- 3). Queue stack
- 4). System stack

Answer: 1). Runtime stack

Ref: Data Structures Using C – Reema Thareja

---

83. Which data structure is used in breadth-first search?

- 1). Stack
- 2). Queue
- 3). Array
- 4). Tree

Answer: 2). Queue

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

84. Depth-first search uses:

- 1). Queue
- 2). Stack
- 3). Array
- 4). Linked list

Answer: 2). Stack

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

85. Queue can be implemented using:

- 1). Arrays
- 2). Linked lists
- 3). Both arrays and linked lists
- 4). Trees

Answer: 3). Both arrays and linked lists

Ref: Data Structures Using C – Reema Thareja

---

86. Stack can be implemented using:

- 1). Arrays
- 2). Linked lists
- 3). Both arrays and linked lists
- 4). Graphs

Answer: 3). Both arrays and linked lists

Ref: Data Structures Using C – Reema Thareja

---

87. In stack implementation using array, pointer used is:

- 1). Top
- 2). Front
- 3). Rear
- 4). Head

Answer: 1). Top

Ref: Data Structures Using C – Reema Thareja

---

88. In queue implementation using array, pointers used are:

- 1). Top and Bottom
- 2). Front and Rear
- 3). Head and Tail
- 4). Left and Right

Answer: 2). Front and Rear

Ref: Data Structures Using C – Reema Thareja

---

89. Stack is mainly used for:

- 1). Sorting
- 2). Function calls and recursion
- 3). File storage
- 4). Memory allocation

Answer: 2). Function calls and recursion

Ref: Data Structures Using C – Reema Thareja

---

90. Queue is mainly used in:

- 1). CPU scheduling
- 2). Expression evaluation
- 3). Recursion
- 4). Memory stack

Answer: 1). CPU scheduling

Ref: Data Structures Using C – Reema Thareja

---

91. A tree is a:

- 1). Linear data structure
- 2). Non-linear data structure
- 3). Sequential data structure
- 4). Random data structure

Answer: 2). Non-linear data structure

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

92. The top node of a tree is called:

- 1). Root node
- 2). Parent node
- 3). Leaf node
- 4). Child node

Answer: 1). Root node

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

93. A node with no children is called:

- 1). Parent node
- 2). Leaf node
- 3). Internal node
- 4). Root node

Answer: 2). Leaf node

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

94. A node that has children is called:

- 1). Leaf node
- 2). Parent node
- 3). Root node
- 4). Terminal node

Answer: 2). Parent node

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

95. A binary tree is a tree in which each node has at most:

- 1). One child
- 2). Two children
- 3). Three children
- 4). Four children

Answer: 2). Two children

Ref: Data Structures Using C – Reema Thareja

---

96. The maximum number of nodes in a binary tree of height  $h$  is:

- 1).  $h^2$
- 2).  $2^h - 1$
- 3).  $2h$
- 4).  $h + 1$

Answer: 2).  $2^h - 1$

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

97. The maximum number of nodes at level  $n$  in binary tree is:

- 1).  $2^n$
- 2).  $n^2$
- 3).  $n + 1$
- 4).  $2n$

Answer: 1).  $2^n$

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

98. Height of a tree is defined as:

- 1). Number of nodes
- 2). Number of edges in longest path from root to leaf
- 3). Number of leaf nodes
- 4). Number of children

Answer: 2). Number of edges in longest path from root to leaf

Ref: Data Structures Using C – Reema Thareja

---

99. Tree traversal means:

- 1). Searching nodes
- 2). Visiting all nodes of tree
- 3). Deleting nodes
- 4). Inserting nodes

Answer: 2). Visiting all nodes of tree

Ref: Data Structures Using C – Reema Thareja

---

100. Inorder traversal follows:

- 1). Root – Left – Right
- 2). Left – Root – Right
- 3). Left – Right – Root
- 4). Right – Root – Left

Answer: 2). Left – Root – Right

Ref: Data Structures Using C – Reema Thareja

---

101. Preorder traversal follows:

- 1). Root – Left – Right
- 2). Left – Root – Right
- 3). Left – Right – Root
- 4). Right – Root – Left

Answer: 1). Root – Left – Right

Ref: Data Structures Using C – Reema Thareja

---

102. Postorder traversal follows:

- 1). Root – Left – Right
- 2). Left – Root – Right
- 3). Left – Right – Root
- 4). Root – Right – Left

Answer: 3). Left – Right – Root

Ref: Data Structures Using C – Reema Thareja

---

103. Binary Search Tree property is:

- 1). Left child greater than root
- 2). Left child smaller than root
- 3). Left child equal to root
- 4). No relation

Answer: 2). Left child smaller than root

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

104. In Binary Search Tree, right child contains:

- 1). Smaller values
- 2). Greater values
- 3). Equal values
- 4). Random values

Answer: 2). Greater values

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

105. Searching in BST has average complexity:

- 1).  $O(n)$
- 2).  $O(\log n)$
- 3).  $O(n^2)$
- 4).  $O(1)$

Answer: 2).  $O(\log n)$

Ref: Data Structures Through C – S.K. Srivastava

---

106. Worst case complexity of BST search is:

- 1).  $O(n)$
- 2).  $O(\log n)$
- 3).  $O(n^2)$
- 4).  $O(1)$

Answer: 1).  $O(n)$

Ref: Data Structures Through C – S.K. Srivastava

---

107. In BST insertion, element is inserted based on:

- 1). Random order
- 2). Sorted order property
- 3). Level order
- 4). Reverse order

Answer: 2). Sorted order property

Ref: Data Structures Using C – Reema Thareja

---

108. Which traversal gives sorted output for BST?

- 1). Preorder
- 2). Postorder
- 3). Inorder
- 4). Level order

Answer: 3). Inorder

Ref: Data Structures Using C – Reema Thareja

---

109. A complete binary tree means:

- 1). All nodes have two children
- 2). All levels are filled except possibly last
- 3). All nodes are leaves
- 4). Only root node exists

Answer: 2). All levels are filled except possibly last

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

110. A full binary tree is a tree where:

- 1). Each node has 0 or 2 children
- 2). Each node has 1 child
- 3). Each node has 3 children
- 4). Only leaf nodes exist

Answer: 1). Each node has 0 or 2 children

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

111. Height of a binary tree with single node is:

- 1). 0
- 2). 1
- 3). 2
- 4). Undefined

Answer: 0

Explanation: Height is number of edges from root to leaf.

Ref: Data Structures Using C – Reema Thareja

---

112. A subtree is:

- 1). Part of tree
- 2). Entire tree
- 3). Leaf node
- 4). Parent node

Answer: 1). Part of tree

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

113. Root node has:

- 1). No parent
- 2). No children
- 3). No data
- 4). No pointer

Answer: 1). No parent

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

114. Internal nodes are nodes that:

- 1). Have at least one child
- 2). Have no children
- 3). Are root only
- 4). Are leaf only

Answer: 1). Have at least one child

Ref: Data Structures Using C – Reema Thareja

---

115. Tree data structure is mainly used for:

- 1). Hierarchical data representation
- 2). Sequential storage
- 3). Stack implementation
- 4). Queue implementation

Answer: 1). Hierarchical data representation

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

116. Heap is a type of:

- 1). Binary tree
- 2). Graph
- 3). Linked list
- 4). Stack

Answer: 1). Binary tree

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

117. In max heap:

- 1). Parent node  $\geq$  children
- 2). Parent node  $\leq$  children
- 3). Parent node = children
- 4). No rule

Answer: 1). Parent node  $\geq$  children

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

118. In min heap:

- 1). Parent node  $\geq$  children
- 2). Parent node  $\leq$  children
- 3). Parent node random
- 4). No rule

Answer: 2). Parent node  $\leq$  children

Ref: Fundamentals of Data Structures in C – Horowitz & Sahni

---

119. Tree traversal using recursion commonly uses:

- 1). Queue
- 2). Stack
- 3). Array
- 4). Linked list

Answer: 2). Stack

Ref: Data Structures Using C – Reema Thareja

---

120. Binary tree traversal algorithms are used to:

- 1). Visit nodes in systematic order
- 2). Delete nodes
- 3). Insert nodes
- 4). Sort array

Answer: 1). Visit nodes in systematic order

Ref: Data Structures Using C – Reema Thareja

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## UNIT 5. COMPUTER NETWORKS & CYBER SECURITY

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1. A computer network is defined as:

- 1). Collection of independent computers connected together
- 2). Single computer with multiple users
- 3). Group of software programs
- 4). Database system

Answer: 1). Collection of independent computers connected together

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

2. LAN stands for:

- 1). Local Area Network
- 2). Large Area Network
- 3). Logical Area Network
- 4). Long Area Network

Answer: 1). Local Area Network

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

3. WAN stands for:

- 1). Wide Area Network
- 2). Wireless Area Network
- 3). Web Area Network
- 4). World Area Network

Answer: 1). Wide Area Network

Ref: Computer Networks – Andrew S. Tanenbaum

---

4. A network that covers a small geographic area such as an office is called:

- 1). WAN
- 2). LAN
- 3). MAN
- 4). PAN

Answer: 2). LAN

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

5. The device that connects multiple computers in a LAN is:

- 1). Hub
- 2). Router
- 3). Modem
- 4). Firewall

Answer: 1). Hub

Ref: Computer Networks – Andrew S. Tanenbaum

---

6. A switch operates at which OSI layer?

- 1). Physical layer
- 2). Data Link layer
- 3). Network layer
- 4). Transport layer

Answer: 2). Data Link layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

7. A router operates at which OSI layer?

- 1). Physical layer
- 2). Data Link layer
- 3). Network layer
- 4). Application layer

Answer: 3). Network layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

8. Which topology uses a central hub or switch?

- 1). Bus topology
- 2). Star topology
- 3). Ring topology
- 4). Mesh topology

Answer: 2). Star topology

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

9. In bus topology, all devices share:

- 1). Central hub
- 2). Common communication line
- 3). Router
- 4). Server

Answer: 2). Common communication line

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

10. In ring topology, data travels:

- 1). In both directions randomly
- 2). In a circular path
- 3). Directly to server
- 4). Through switch only

Answer: 2). In a circular path

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

11. Which topology is most reliable but expensive?

- 1). Star topology
- 2). Bus topology
- 3). Mesh topology
- 4). Ring topology

Answer: 3). Mesh topology

Ref: Computer Networks – Andrew S. Tanenbaum

---

12. A modem converts:

- 1). Digital signal to analog signal
- 2). Analog signal to digital signal
- 3). Both digital to analog and analog to digital
- 4). Only digital signals

Answer: 3). Both digital to analog and analog to digital

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

13. The device used to connect different networks together is:

- 1). Hub
- 2). Switch
- 3). Router
- 4). Repeater

Answer: 3). Router

Ref: Computer Networks – Andrew S. Tanenbaum

---

14. A repeater is used to:

- 1). Increase signal strength
- 2). Store data
- 3). Encrypt data
- 4). Route packets

Answer: 1). Increase signal strength

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

15. Gateway connects:

- 1). Similar networks
- 2). Different network architectures
- 3). Only LAN networks
- 4). Only WAN networks

Answer: 2). Different network architectures

Ref: Computer Networks – Andrew S. Tanenbaum

---

16. Network topology refers to:

- 1). Physical layout of network
- 2). Software architecture
- 3). Network protocols
- 4). Network security

Answer: 1). Physical layout of network

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

17. The topology that is easiest to install is:

- 1). Bus topology
- 2). Star topology
- 3). Ring topology
- 4). Mesh topology

Answer: 1). Bus topology

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

18. In star topology, if central hub fails:

- 1). Entire network fails
- 2). Only one node fails
- 3). Network still works
- 4). No effect

Answer: 1). Entire network fails

Ref: Computer Networks – Andrew S. Tanenbaum

---

19. The device used to connect two LAN segments is:

- 1). Bridge
- 2). Router
- 3). Switch
- 4). Hub

Answer: 1). Bridge

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

20. Bridge operates at:

- 1). Physical layer
- 2). Data Link layer
- 3). Network layer
- 4). Transport layer

Answer: 2). Data Link layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

21. Network interface card (NIC) is used for:

- 1). Connecting computer to network
- 2). Storing data
- 3). Encrypting data
- 4). Routing packets

Answer: 1). Connecting computer to network

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

22. The network device that broadcasts data to all ports is:

- 1). Switch
- 2). Router
- 3). Hub
- 4). Bridge

Answer: 3). Hub

Ref: Computer Networks – Andrew S. Tanenbaum

---

23. The device that forwards frames based on MAC address is:

- 1). Router
- 2). Switch
- 3). Modem
- 4). Repeater

Answer: 2). Switch

Ref: Computer Networks – Andrew S. Tanenbaum

---

24. A network connecting devices within a city is called:

- 1). LAN
- 2). MAN
- 3). WAN
- 4). PAN

Answer: 2). MAN

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

25. The topology that connects every node to every other node is:

- 1). Bus topology
- 2). Star topology
- 3). Mesh topology
- 4). Ring topology

Answer: 3). Mesh topology

Ref: Computer Networks – Andrew S. Tanenbaum

---

26. The OSI model was developed by:

- 1). ISO
- 2). IEEE
- 3). ITU
- 4). ANSI

Answer: 1). ISO

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

27. The OSI model contains how many layers?

- 1). 5
- 2). 6
- 3). 7
- 4). 8

Answer: 3). 7

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

28. The lowest layer in OSI model is:

- 1). Network layer
- 2). Data link layer
- 3). Physical layer
- 4). Transport layer

Answer: 3). Physical layer

Ref: Computer Networks – Andrew S. Tanenbaum

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29. The topmost layer of OSI model is:

- 1). Presentation layer
- 2). Application layer
- 3). Session layer
- 4). Transport layer

Answer: 2). Application layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

30. The layer responsible for routing is:

- 1). Data Link layer
- 2). Network layer
- 3). Transport layer
- 4). Session layer

Answer: 2). Network layer

Ref: Data Communications and Networking – Behrouz A. Forouzan

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31. The layer responsible for error detection and correction is:

- 1). Physical layer
- 2). Data Link layer
- 3). Network layer
- 4). Application layer

Answer: 2). Data Link layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

32. Which layer is responsible for reliable data transfer?

- 1). Transport layer
- 2). Network layer
- 3). Physical layer
- 4). Session layer

Answer: 1). Transport layer

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

33. Encryption and decryption are handled at:

- 1). Session layer
- 2). Presentation layer
- 3). Transport layer
- 4). Network layer

Answer: 2). Presentation layer

Ref: Computer Networks – Andrew S. Tanenbaum

---

34. TCP stands for:

- 1). Transmission Control Protocol
- 2). Transfer Communication Protocol
- 3). Transmission Communication Process
- 4). Transport Control Process

Answer: 1). Transmission Control Protocol

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

35. UDP stands for:

- 1). User Data Protocol
- 2). User Datagram Protocol
- 3). Universal Data Protocol
- 4). Unified Datagram Protocol

Answer: 2). User Datagram Protocol

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

36. TCP provides:

- 1). Reliable communication
- 2). Fast but unreliable communication
- 3). No error checking
- 4). Only encryption

Answer: 1). Reliable communication

Ref: Computer Networks – Andrew S. Tanenbaum

---

37. UDP provides:

- 1). Reliable communication
- 2). Connection-oriented communication
- 3). Fast but unreliable communication
- 4). Secure communication

Answer: 3). Fast but unreliable communication

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

38. IP stands for:

- 1). Internet Protocol
- 2). Internal Protocol
- 3). Information Protocol
- 4). Internet Process

Answer: 1). Internet Protocol

Ref: Computer Networks – Andrew S. Tanenbaum

---

39. IPv4 address size is:

- 1). 16 bits
- 2). 32 bits
- 3). 64 bits
- 4). 128 bits

Answer: 2). 32 bits

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

40. IPv6 address size is:

- 1). 32 bits
- 2). 64 bits
- 3). 128 bits
- 4). 256 bits

Answer: 3). 128 bits

Ref: Computer Networks – Andrew S. Tanenbaum

---

41. An IP address consists of:

- 1). Network part and host part
- 2). Host part only
- 3). Network part only
- 4). Protocol part

Answer: 1). Network part and host part

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

42. Class A IP address range begins with:

- 1). 0–127
- 2). 128–191
- 3). 192–223
- 4). 224–255

Answer: 1). 0–127

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

43. Class B IP address range begins with:

- 1). 0–127
- 2). 128–191
- 3). 192–223
- 4). 224–255

Answer: 2). 128–191

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

44. Class C IP address range begins with:

- 1). 0–127
- 2). 128–191
- 3). 192–223
- 4). 224–255

Answer: 3). 192–223

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

45. Subnetting is used to:

- 1). Increase network security
- 2). Divide network into smaller networks
- 3). Increase bandwidth
- 4). Reduce IP addresses

Answer: 2). Divide network into smaller networks

Ref: Computer Networks – Andrew S. Tanenbaum

---

46. Number of hosts in subnet is calculated using:

- 1).  $2^n$
- 2).  $2^h - 2$
- 3).  $n^2$
- 4).  $n \log n$

Answer: 2).  $2^h - 2$

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

47. CIDR stands for:

- 1). Classless Inter Domain Routing
- 2). Central Internet Domain Routing
- 3). Computer Internet Data Routing
- 4). Class Internet Domain Routing

Answer: 1). Classless Inter Domain Routing

Ref: Computer Networks – Andrew S. Tanenbaum

---

48. The notation /24 in CIDR means:

- 1). 24 host bits
- 2). 24 network bits
- 3). 24 subnet bits
- 4). 24 data bits

Answer: 2). 24 network bits

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

49. The default subnet mask of Class C is:

- 1). 255.0.0.0
- 2). 255.255.0.0
- 3). 255.255.255.0
- 4). 255.255.255.255

Answer: 3). 255.255.255.0

Ref: Data Communications and Networking – Behrouz A. Forouzan

---

50. A valid IPv4 address is:

- 1). 192.168.1.1
- 2). 256.100.20.10
- 3). 300.200.100.1
- 4). 192.168.500.1

Answer: 1). 192.168.1.1

Ref: Computer Networks – Andrew S. Tanenbaum

---

51. Network security refers to:

- 1). Protecting network data from unauthorized access
- 2). Increasing network speed
- 3). Increasing network size
- 4). Reducing network traffic

Answer: 1). Protecting network data from unauthorized access

Ref: Cryptography and Network Security – William Stallings

---

52. Encryption is the process of:

- 1). Converting plaintext into ciphertext
- 2). Converting ciphertext into plaintext
- 3). Deleting data
- 4). Compressing data

Answer: 1). Converting plaintext into ciphertext

Ref: Cryptography and Network Security – William Stallings

---

53. Decryption is the process of:

- 1). Converting plaintext into ciphertext
- 2). Converting ciphertext into plaintext
- 3). Compressing data
- 4). Deleting data

Answer: 2). Converting ciphertext into plaintext

Ref: Cryptography and Network Security – William Stallings

---

54. Symmetric encryption uses:

- 1). One key
- 2). Two keys
- 3). Three keys
- 4). Multiple keys

Answer: 1). One key

Ref: Cryptography and Network Security – William Stallings

---

55. Asymmetric encryption uses:

- 1). Single key
- 2). Public and private key
- 3). Only private key
- 4). Only public key

Answer: 2). Public and private key

Ref: Cryptography and Network Security – William Stallings

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56. RSA algorithm is an example of:

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hashing
- 4). Compression

Answer: 2). Asymmetric encryption

Ref: Cryptography and Network Security – William Stallings

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57. Digital signature is used for:

- 1). Data compression
- 2). Authentication and integrity
- 3). Data storage
- 4). Data routing

Answer: 2). Authentication and integrity

Ref: Cryptography and Network Security – William Stallings

---

58. Malware stands for:

- 1). Malicious software
- 2). Managed software
- 3). Machine software
- 4). Master software

Answer: 1). Malicious software

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

59. A virus is a program that:

- 1). Replicates itself and spreads to other files
- 2). Protects computer
- 3). Improves performance
- 4). Encrypts files

Answer: 1). Replicates itself and spreads to other files

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

60. A worm is a type of malware that:

- 1). Spreads automatically over networks
- 2). Requires user action
- 3). Is harmless
- 4). Only infects files

Answer: 1). Spreads automatically over networks

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

61. A Trojan horse is:

- 1). Self-replicating malware
- 2). Malware disguised as legitimate software
- 3). Antivirus software
- 4). Firewall

Answer: 2). Malware disguised as legitimate software

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

62. Phishing is a type of attack where:

- 1). Fake emails trick users to reveal sensitive data
- 2). Computer hardware is destroyed
- 3). Network cables are cut
- 4). Data is compressed

Answer: 1). Fake emails trick users to reveal sensitive data

Ref: Cryptography and Network Security – William Stallings

---

63. Man-in-the-Middle (MITM) attack means:

- 1). Attacker intercepts communication between two parties
- 2). Network cables are damaged
- 3). System crash occurs
- 4). Files are deleted

Answer: 1). Attacker intercepts communication between two parties

Ref: Cryptography and Network Security – William Stallings

---

64. DoS attack stands for:

- 1). Denial of Service
- 2). Data of System
- 3). Domain of Security
- 4). Digital Operating System

Answer: 1). Denial of Service

Ref: Cryptography and Network Security – William Stallings

---

65. A firewall is used to:

- 1). Protect network from unauthorized access
- 2). Increase internet speed
- 3). Store data
- 4). Compress data

Answer: 1). Protect network from unauthorized access

Ref: Cryptography and Network Security – William Stallings

---

66. Antivirus software is used to:

- 1). Protect against malware
- 2). Increase bandwidth
- 3). Improve graphics
- 4). Compress data

Answer: 1). Protect against malware

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

67. Cyber crime refers to:

- 1). Crime committed using computers or networks
- 2). Hardware failure
- 3). Network installation
- 4). Software development

Answer: 1). Crime committed using computers or networks

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

68. Identity theft is a cyber crime where:

- 1). Personal information is stolen and misused
- 2). Files are deleted
- 3). Hardware is damaged
- 4). Network is disconnected

Answer: 1). Personal information is stolen and misused

Ref: Cryptography, Network Security, and Cyber Laws – Bernard L. Menezes

---

69. A passive attack means:

- 1). Attacker monitors data without altering it
- 2). Attacker modifies data
- 3). Attacker deletes files
- 4). Attacker crashes system

Answer: 1). Attacker monitors data without altering it

Ref: Cryptography and Network Security – William Stallings

---

70. An active attack means:

- 1). Monitoring communication only
- 2). Modifying or disrupting communication
- 3). Compressing data
- 4). Encrypting files

Answer: 2). Modifying or disrupting communication

Ref: Cryptography and Network Security – William Stallings

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## UNIT 6. OPERATING SYSTEMS

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1. An Operating System acts as:

- 1). Interface between user and hardware
- 2). Hardware device
- 3). Programming language
- 4). Compiler

Answer: 1). Interface between user and hardware

Ref: Operating System Concepts – Silberschatz, Galvin & Gagne

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2. The main objective of an operating system is:

- 1). Increase CPU speed
- 2). Manage computer resources efficiently
- 3). Increase memory size
- 4). Improve graphics

Answer: 2). Manage computer resources efficiently

Ref: Operating System Concepts – Silberschatz

---

3. Which of the following is not a function of an OS?

- 1). Process management
- 2). Memory management
- 3). File management
- 4). Program compilation

Answer: 4). Program compilation

Ref: Operating System Concepts – Silberschatz

---

4. Batch operating systems are mainly used for:

- 1). Interactive tasks
- 2). Large repetitive jobs
- 3). Real-time control
- 4). Network management

Answer: 2). Large repetitive jobs

Ref: Modern Operating Systems – Andrew Tanenbaum

---

5. Time-sharing systems are designed to:

- 1). Improve response time
- 2). Increase hardware cost
- 3). Reduce multitasking
- 4). Disable scheduling

Answer: 1). Improve response time

Ref: Modern Operating Systems – Andrew Tanenbaum

---

6. Multiprogramming means:

- 1). Running multiple programs simultaneously
- 2). Running one program
- 3). Running hardware programs
- 4). Running network programs

Answer: 1). Running multiple programs simultaneously

Ref: Operating Systems – William Stallings

---

7. A process is defined as:

- 1). Program in execution
- 2). Program stored in memory
- 3). Program written in C
- 4). Program compiled

Answer: 1). Program in execution

Ref: Operating System Concepts – Silberschatz

---

8. The Process Control Block (PCB) contains:

- 1). Process state information
- 2). User files
- 3). Network addresses
- 4). Device drivers

Answer: 1). Process state information

Ref: Operating System Concepts – Silberschatz

---

9. The process state where CPU executes instructions is:

- 1). Ready
- 2). Waiting
- 3). Running
- 4). Blocked

Answer: 3). Running

Ref: Operating System Concepts – Silberschatz

---

10. The process waiting for CPU is in:

- 1). Running state
- 2). Ready state
- 3). Blocked state
- 4). Terminated state

Answer: 2). Ready state

Ref: Operating System Concepts – Silberschatz

---

11. When a process waits for I/O operation, it enters:

- 1). Running state
- 2). Ready state
- 3). Waiting state
- 4). Terminated state

Answer: 3). Waiting state

Ref: Operating System Concepts – Silberschatz

---

12. The process scheduling component of OS is called:

- 1). Scheduler
- 2). Compiler
- 3). Interpreter
- 4). Loader

Answer: 1). Scheduler

Ref: Operating System Concepts – Silberschatz

---

13. The scheduler that selects process from ready queue is:

- 1). Long-term scheduler
- 2). Medium-term scheduler
- 3). Short-term scheduler
- 4). Disk scheduler

Answer: 3). Short-term scheduler

Ref: Operating System Concepts – Silberschatz

---

14. Context switching refers to:

- 1). Switching CPU from one process to another
- 2). Changing memory
- 3). Changing program
- 4). Changing disk

Answer: 1). Switching CPU from one process to another

Ref: Operating System Concepts – Silberschatz

---

15. Multiprocessing means:

- 1). Single CPU system
- 2). Multiple CPU system
- 3). Single program
- 4). Multiple disks

Answer: 2). Multiple CPU system

Ref: Modern Operating Systems – Andrew Tanenbaum

---

16. The queue containing processes waiting for CPU is:

- 1). Ready queue
- 2). I/O queue
- 3). Job queue
- 4). Waiting queue

Answer: 1). Ready queue

Ref: Operating System Concepts – Silberschatz

---

17. Inter-process communication allows:

- 1). Communication between processes
- 2). Communication between computers
- 3). Communication between users
- 4). Communication between devices

Answer: 1). Communication between processes

Ref: Operating Systems – William Stallings

---

18. Semaphore is used for:

- 1). Process synchronization
- 2). Memory allocation
- 3). File storage
- 4). Disk scheduling

Answer: 1). Process synchronization

Ref: Operating System Concepts – Silberschatz

---

19. Mutual exclusion ensures:

- 1). Only one process accesses shared resource at a time
- 2). Multiple processes run simultaneously
- 3). CPU executes faster
- 4). Memory increases

Answer: 1). Only one process accesses shared resource at a time

Ref: Operating System Concepts – Silberschatz

---

20. Critical section refers to:

- 1). Code accessing shared resources
- 2). Entire program
- 3). Memory block
- 4). I/O device

Answer: 1). Code accessing shared resources  
Ref: Operating System Concepts – Silberschatz

---

21. Process synchronization is needed to:

- 1). Avoid race conditions
- 2). Increase CPU speed
- 3). Increase memory
- 4). Improve disk speed

Answer: 1). Avoid race conditions  
Ref: Operating System Concepts – Silberschatz

---

22. A race condition occurs when:

- 1). Multiple processes access shared data simultaneously
- 2). CPU executes instructions
- 3). Disk performs I/O
- 4). Memory is full

Answer: 1). Multiple processes access shared data simultaneously  
Ref: Operating System Concepts – Silberschatz

---

23. A system call is used to:

- 1). Request service from OS
- 2). Execute hardware
- 3). Access network
- 4). Compile program

Answer: 1). Request service from OS  
Ref: Modern Operating Systems – Andrew Tanenbaum

---

24. Kernel is:

- 1). Core part of operating system
- 2). User program
- 3). Application software
- 4). Network program

Answer: 1). Core part of operating system  
Ref: Operating System Concepts – Silberschatz

---

25. Which OS component manages files?

- 1). File system
- 2). CPU scheduler
- 3). Memory manager
- 4). Process manager

Answer: 1). File system  
Ref: Modern Operating Systems – Andrew Tanenbaum

---

26. CPU scheduling is used to:

- 1). Allocate CPU to processes
- 2). Allocate memory
- 3). Allocate disk space
- 4). Allocate files

Answer: 1). Allocate CPU to processes  
Ref: Operating System Concepts – Silberschatz

---

27. CPU scheduling occurs when a process:

- 1). Terminates
- 2). Switches from running to waiting
- 3). Switches from waiting to ready
- 4). All of the above

Answer: 4). All of the above  
Ref: Operating System Concepts – Silberschatz

---

28. FCFS stands for:

- 1). First Come First Serve
- 2). First CPU First Serve
- 3). Fast CPU First Serve
- 4). First Command First Serve

Answer: 1). First Come First Serve

Ref: Operating Systems – William Stallings

---

29. FCFS scheduling is:

- 1). Preemptive
- 2). Non-preemptive
- 3). Parallel
- 4). Random

Answer: 2). Non-preemptive

Ref: Operating System Concepts – Silberschatz

---

30. In FCFS scheduling, processes are executed based on:

- 1). Arrival time
- 2). Burst time
- 3). Priority
- 4). Random order

Answer: 1). Arrival time

Ref: Operating System Concepts – Silberschatz

---

31. SJF stands for:

- 1). Shortest Job First
- 2). Smallest Job First
- 3). Short Job Function
- 4). System Job First

Answer: 1). Shortest Job First

Ref: Operating System Concepts – Silberschatz

---

32. SJF scheduling selects process with:

- 1). Largest burst time
- 2). Smallest burst time
- 3). Highest priority
- 4). Earliest arrival

Answer: 2). Smallest burst time

Ref: Operating Systems – William Stallings

---

33. SJF algorithm is optimal because it:

- 1). Minimizes average waiting time
- 2). Maximizes CPU usage
- 3). Minimizes memory usage
- 4). Maximizes disk usage

Answer: 1). Minimizes average waiting time

Ref: Operating System Concepts – Silberschatz

---

34. Preemptive version of SJF is called:

- 1). Round Robin
- 2). Priority scheduling
- 3). Shortest Remaining Time First
- 4). FCFS

Answer: 3). Shortest Remaining Time First

Ref: Operating System Concepts – Silberschatz

---

35. Round Robin scheduling is mainly used in:

- 1). Batch systems
- 2). Time-sharing systems
- 3). Real-time systems
- 4). Distributed systems

Answer: 2). Time-sharing systems

Ref: Modern Operating Systems – Andrew Tanenbaum

---

36. Round Robin scheduling uses:

- 1). Time quantum
- 2). Burst time
- 3). Priority number
- 4). Memory size

Answer: 1). Time quantum

Ref: Operating System Concepts – Silberschatz

---

37. If time quantum is very large, Round Robin behaves like:

- 1). FCFS
- 2). SJF
- 3). Priority scheduling
- 4). Random scheduling

Answer: 1). FCFS

Ref: Operating System Concepts – Silberschatz

---

38. Turnaround time is defined as:

- 1). Completion time – arrival time
- 2). Waiting time – arrival time
- 3). Burst time – arrival time
- 4). Completion time – burst time

Answer: 1). Completion time – arrival time

Ref: Operating Systems – William Stallings

---

39. Waiting time is defined as:

- 1). Turnaround time – burst time
- 2). Burst time – arrival time
- 3). Completion time – burst time
- 4). Arrival time – completion time

Answer: 1). Turnaround time – burst time

Ref: Operating System Concepts – Silberschatz

---

40. Priority scheduling executes process with:

- 1). Highest priority
- 2). Lowest burst time
- 3). First arrival
- 4). Largest memory

Answer: 1). Highest priority

Ref: Operating System Concepts – Silberschatz

---

41. Starvation occurs when:

- 1). Low priority processes never execute
- 2). CPU stops working
- 3). Memory becomes full
- 4). Disk fails

Answer: 1). Low priority processes never execute

Ref: Operating System Concepts – Silberschatz

---

42. Aging technique is used to:

- 1). Prevent starvation
- 2). Increase CPU speed
- 3). Increase memory
- 4). Reduce disk access

Answer: 1). Prevent starvation

Ref: Operating System Concepts – Silberschatz

---

43. Throughput of system means:

- 1). Number of processes completed per unit time
- 2). CPU speed
- 3). Memory capacity
- 4). Disk capacity

Answer: 1). Number of processes completed per unit time

Ref: Operating Systems – William Stallings

---

44. Response time is:

- 1). Time between request and first response
- 2). Completion time
- 3). Waiting time
- 4). Execution time

Answer: 1). Time between request and first response

Ref: Operating System Concepts – Silberschatz

---

45. Scheduling algorithm that gives equal CPU time to processes is:

- 1). Round Robin
- 2). SJF
- 3). FCFS
- 4). Priority

Answer: 1). Round Robin

Ref: Modern Operating Systems – Andrew Tanenbaum

---

46. The process with highest priority is executed:

- 1). First
- 2). Last
- 3). Randomly
- 4). After waiting

Answer: 1). First

Ref: Operating System Concepts – Silberschatz

---

47. Preemptive scheduling means:

- 1). Process can be interrupted
- 2). Process runs until completion
- 3). CPU never switches process
- 4). CPU executes single process

Answer: 1). Process can be interrupted

Ref: Operating System Concepts – Silberschatz

---

48. Non-preemptive scheduling means:

- 1). Process runs until completion
- 2). Process interrupted anytime
- 3). Multiple CPUs used
- 4). Random execution

Answer: 1). Process runs until completion  
Ref: Operating System Concepts – Silberschatz

---

49. CPU utilization refers to:

- 1). Percentage of time CPU is busy
- 2). Percentage of memory used
- 3). Disk usage
- 4). Network usage

Answer: 1). Percentage of time CPU is busy  
Ref: Operating Systems – William Stallings

---

50. The scheduling algorithm with smallest average waiting time is:

- 1). SJF
- 2). FCFS
- 3). Round Robin
- 4). Priority

Answer: 1). SJF  
Ref: Operating System Concepts – Silberschatz

---

51. Memory management is responsible for:

- 1). Allocating memory to processes
- 2). Managing CPU scheduling
- 3). Managing files
- 4). Managing networks

Answer: 1). Allocating memory to processes  
Ref: Operating System Concepts – Silberschatz

---

52. Logical address is generated by:

- 1). CPU
- 2). Memory unit
- 3). Disk
- 4). I/O device

Answer: 1). CPU

Ref: Operating System Concepts – Silberschatz

---

53. Physical address refers to:

- 1). Address in main memory
- 2). Address in disk
- 3). Address in register
- 4). Address in CPU

Answer: 1). Address in main memory

Ref: Operating Systems – William Stallings

---

54. Memory Management Unit (MMU) is used for:

- 1). Address translation
- 2). File management
- 3). Disk management
- 4). CPU scheduling

Answer: 1). Address translation

Ref: Operating System Concepts – Silberschatz

---

55. Paging is a memory management technique that divides memory into:

- 1). Pages and frames
- 2). Segments and blocks
- 3). Files and records
- 4). Nodes and links

Answer: 1). Pages and frames

Ref: Operating System Concepts – Silberschatz

---

56. In paging, logical memory is divided into:

- 1). Frames
- 2). Pages
- 3). Blocks
- 4). Segments

Answer: 2). Pages

Ref: Operating System Concepts – Silberschatz

---

57. In paging, physical memory is divided into:

- 1). Pages
- 2). Frames
- 3). Blocks
- 4). Segments

Answer: 2). Frames

Ref: Operating System Concepts – Silberschatz

---

58. The page table is used for:

- 1). Address mapping
- 2). File storage
- 3). CPU scheduling
- 4). Disk management

Answer: 1). Address mapping

Ref: Operating Systems – William Stallings

---

59. Page fault occurs when:

- 1). Page is not present in memory
- 2). CPU fails
- 3). Disk fails
- 4). Memory becomes full

Answer: 1). Page is not present in memory

Ref: Operating System Concepts – Silberschatz

---

60. Segmentation divides memory based on:

- 1). Fixed size blocks
- 2). Logical divisions of program
- 3). Random allocation
- 4). Disk sectors

Answer: 2). Logical divisions of program

Ref: Modern Operating Systems – Andrew Tanenbaum

---

61. Segmentation supports:

- 1). Logical program structure
- 2). Fixed memory size
- 3). Disk allocation
- 4). CPU scheduling

Answer: 1). Logical program structure

Ref: Modern Operating Systems – Andrew Tanenbaum

---

62. Fragmentation occurs when:

- 1). Memory space is wasted
- 2). CPU fails
- 3). Disk becomes full
- 4). Network fails

Answer: 1). Memory space is wasted

Ref: Operating System Concepts – Silberschatz

---

63. Internal fragmentation occurs when:

- 1). Allocated memory is larger than required
- 2). Memory is not allocated
- 3). Disk space is wasted
- 4). CPU idle time increases

Answer: 1). Allocated memory is larger than required

Ref: Operating Systems – William Stallings

---

64. External fragmentation occurs when:

- 1). Free memory is scattered in small blocks
- 2). Memory allocated is larger
- 3). CPU scheduling fails
- 4). Disk space wasted

Answer: 1). Free memory is scattered in small blocks

Ref: Operating System Concepts – Silberschatz

---

65. Page replacement algorithm replaces:

- 1). Unused pages in memory
- 2). CPU instructions
- 3). Disk sectors
- 4). Files

Answer: 1). Unused pages in memory

Ref: Operating System Concepts – Silberschatz

---

66. FIFO page replacement stands for:

- 1). First In First Out
- 2). Fast Input Fast Output
- 3). First Input First Output
- 4). File In File Out

Answer: 1). First In First Out

Ref: Operating System Concepts – Silberschatz

---

67. LRU page replacement stands for:

- 1). Least Recently Used
- 2). Last Recently Used
- 3). Least Random Used
- 4). Latest Recently Used

Answer: 1). Least Recently Used

Ref: Operating Systems – William Stallings

---

68. Optimal page replacement algorithm replaces:

- 1). Page not used for longest time in future
- 2). First page loaded
- 3). Random page
- 4). Last page loaded

Answer: 1). Page not used for longest time in future  
Ref: Operating System Concepts – Silberschatz

---

69. Thrashing occurs when:

- 1). Excessive paging activity occurs
- 2). CPU stops working
- 3). Disk crashes
- 4). Network fails

Answer: 1). Excessive paging activity occurs  
Ref: Operating Systems – William Stallings

---

70. Virtual memory allows:

- 1). Execution of large programs using disk storage
- 2). Increase CPU speed
- 3). Increase disk speed
- 4). Reduce memory size

Answer: 1). Execution of large programs using disk storage  
Ref: Operating System Concepts – Silberschatz

---

71. Demand paging means:

- 1). Pages loaded only when needed
- 2). All pages loaded at once
- 3). Memory fully loaded
- 4). Disk fully loaded

Answer: 1). Pages loaded only when needed  
Ref: Operating System Concepts – Silberschatz

---

72. Page replacement algorithms are used when:

- 1). Memory is full
- 2). CPU fails
- 3). Disk fails
- 4). Network fails

Answer: 1). Memory is full

Ref: Operating Systems – William Stallings

---

73. Segmentation with paging combines:

- 1). Both techniques together
- 2). Only paging
- 3). Only segmentation
- 4). Disk scheduling

Answer: 1). Both techniques together

Ref: Modern Operating Systems – Andrew Tanenbaum

---

74. The address generated by program is:

- 1). Logical address
- 2). Physical address
- 3). Disk address
- 4). Network address

Answer: 1). Logical address

Ref: Operating System Concepts – Silberschatz

---

75. Address binding means:

- 1). Mapping logical address to physical address
- 2). Storing files
- 3). Scheduling CPU
- 4). Allocating disk space

Answer: 1). Mapping logical address to physical address

Ref: Operating Systems – William Stallings

---

76. A deadlock occurs when:

- 1). Two or more processes wait indefinitely for resources
- 2). CPU fails
- 3). Memory becomes full
- 4). Disk fails

Answer: 1). Two or more processes wait indefinitely for resources

Ref: Operating System Concepts – Silberschatz

---

77. Deadlock mainly occurs due to:

- 1). Resource sharing among processes
- 2). CPU failure
- 3). Disk failure
- 4). Network error

Answer: 1). Resource sharing among processes

Ref: Operating System Concepts – Silberschatz

---

78. The four necessary conditions for deadlock include:

- 1). Mutual exclusion
- 2). Hold and wait
- 3). No preemption
- 4). Circular wait

Answer: All of the above

Ref: Operating System Concepts – Silberschatz

---

79. Mutual exclusion means:

- 1). Only one process can use a resource at a time
- 2). Multiple processes use resource simultaneously
- 3). Resource is unlimited
- 4). Resource is shared freely

Answer: 1). Only one process can use a resource at a time

Ref: Operating Systems – William Stallings

---

80. Hold and wait condition means:

- 1). Process holds resource while waiting for another
- 2). Process releases resources immediately
- 3). Process does not use resources
- 4). Process runs continuously

Answer: 1). Process holds resource while waiting for another  
Ref: Operating System Concepts – Silberschatz

---

81. No preemption means:

- 1). Resource cannot be forcibly taken from a process
- 2). Resource is shared
- 3). CPU interrupts process
- 4). Resource is deleted

Answer: 1). Resource cannot be forcibly taken from a process  
Ref: Operating Systems – William Stallings

---

82. Circular wait means:

- 1). Processes form a circular chain waiting for resources
- 2). Processes run sequentially
- 3). Processes wait randomly
- 4). Processes terminate

Answer: 1). Processes form a circular chain waiting for resources  
Ref: Operating System Concepts – Silberschatz

---

83. Deadlock prevention aims to:

- 1). Prevent at least one deadlock condition
- 2). Increase CPU speed
- 3). Increase memory
- 4). Reduce disk usage

Answer: 1). Prevent at least one deadlock condition  
Ref: Operating System Concepts – Silberschatz

---

84. Deadlock avoidance ensures system remains in:

- 1). Safe state
- 2). Unsafe state
- 3). Waiting state
- 4). Blocked state

Answer: 1). Safe state

Ref: Operating System Concepts – Silberschatz

---

85. Banker's algorithm is used for:

- 1). Deadlock avoidance
- 2). Memory allocation
- 3). CPU scheduling
- 4). Disk scheduling

Answer: 1). Deadlock avoidance

Ref: Operating System Concepts – Silberschatz

---

86. A safe state means:

- 1). System can allocate resources without deadlock
- 2). CPU is idle
- 3). Memory is full
- 4). Disk is full

Answer: 1). System can allocate resources without deadlock

Ref: Operating Systems – William Stallings

---

87. An unsafe state means:

- 1). Deadlock may occur
- 2). System crash occurs
- 3). CPU stops
- 4). Disk fails

Answer: 1). Deadlock may occur

Ref: Operating System Concepts – Silberschatz

---

88. Deadlock detection is used to:

- 1). Identify deadlocks after occurrence
- 2). Prevent deadlocks
- 3). Avoid deadlocks
- 4). Eliminate scheduling

Answer: 1). Identify deadlocks after occurrence

Ref: Operating Systems – William Stallings

---

89. Deadlock recovery can be done by:

- 1). Terminating processes
- 2). Preempting resources
- 3). Restarting system
- 4). All of the above

Answer: 4). All of the above

Ref: Operating System Concepts – Silberschatz

---

90. Process synchronization ensures:

- 1). Proper execution of concurrent processes
- 2). Faster CPU
- 3). Larger memory
- 4). Faster disk

Answer: 1). Proper execution of concurrent processes

Ref: Operating System Concepts – Silberschatz

---

91. Semaphore is used to:

- 1). Control access to shared resources
- 2). Manage disk
- 3). Manage memory
- 4). Manage files

Answer: 1). Control access to shared resources

Ref: Operating System Concepts – Silberschatz

---

92. Binary semaphore can take values:

- 1). 0 and 1
- 2). 1 and 2
- 3). 0 and 2
- 4). Any number

Answer: 1). 0 and 1

Ref: Operating Systems – William Stallings

---

93. Counting semaphore allows:

- 1). Multiple resources
- 2). Only one resource
- 3). No resources
- 4). Infinite resources

Answer: 1). Multiple resources

Ref: Operating System Concepts – Silberschatz

---

94. Critical section problem deals with:

- 1). Shared resource access
- 2). Disk access
- 3). Memory allocation
- 4). File storage

Answer: 1). Shared resource access

Ref: Operating System Concepts – Silberschatz

---

95. Peterson's algorithm is used for:

- 1). Process synchronization
- 2). Disk scheduling
- 3). CPU scheduling
- 4). File allocation

Answer: 1). Process synchronization

Ref: Operating System Concepts – Silberschatz

---

96. A file system is responsible for:

- 1). Managing files and directories
- 2). Managing CPU scheduling
- 3). Managing memory allocation
- 4). Managing network devices

Answer: 1). Managing files and directories

Ref: Modern Operating Systems – Andrew S. Tanenbaum

---

97. A file is defined as:

- 1). Collection of related data stored on secondary storage
- 2). Collection of programs in memory
- 3). Hardware device
- 4). CPU instruction

Answer: 1). Collection of related data stored on secondary storage

Ref: Operating System Concepts – Silberschatz

---

98. File allocation method where files occupy continuous disk blocks is:

- 1). Contiguous allocation
- 2). Linked allocation
- 3). Indexed allocation
- 4). Dynamic allocation

Answer: 1). Contiguous allocation

Ref: Operating Systems – William Stallings

---

99. The main disadvantage of contiguous allocation is:

- 1). External fragmentation
- 2). Internal fragmentation
- 3). Slow access
- 4). File corruption

Answer: 1). External fragmentation

Ref: Operating System Concepts – Silberschatz

---

100. In linked allocation, disk blocks are:

- 1). Stored sequentially
- 2). Linked using pointers
- 3). Randomly deleted
- 4). Stored in memory

Answer: 2). Linked using pointers

Ref: Operating Systems – William Stallings

---

101. Indexed allocation uses:

- 1). Index block containing pointers to file blocks
- 2). Continuous memory blocks
- 3). Random memory blocks
- 4). Single disk block

Answer: 1). Index block containing pointers to file blocks

Ref: Modern Operating Systems – Andrew Tanenbaum

---

102. A directory is used to:

- 1). Organize files
- 2). Schedule CPU
- 3). Allocate memory
- 4). Control devices

Answer: 1). Organize files

Ref: Operating System Concepts – Silberschatz

---

103. A single-level directory structure contains:

- 1). Only one directory for all files
- 2). Multiple directories
- 3). Two-level hierarchy
- 4). Tree structure

Answer: 1). Only one directory for all files

Ref: Operating Systems – William Stallings

---

104. Tree directory structure provides:

- 1). Hierarchical organization of files
- 2). Flat file storage
- 3). Single file storage
- 4). No file structure

Answer: 1). Hierarchical organization of files

Ref: Modern Operating Systems – Andrew Tanenbaum

---

105. Disk scheduling algorithm that serves requests in order of arrival is:

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 1). FCFS

Ref: Operating System Concepts – Silberschatz

---

106. SSTF stands for:

- 1). Shortest Seek Time First
- 2). Smallest Seek Time First
- 3). Short Seek Time Function
- 4). System Seek Time First

Answer: 1). Shortest Seek Time First

Ref: Operating System Concepts – Silberschatz

---

107. SSTF selects request with:

- 1). Minimum seek time
- 2). Maximum seek time
- 3). First request
- 4). Random request

Answer: 1). Minimum seek time

Ref: Operating Systems – William Stallings

---

108. SCAN disk scheduling is also called:

- 1). Elevator algorithm
- 2). Round algorithm
- 3). Linear algorithm
- 4). Priority algorithm

Answer: 1). Elevator algorithm

Ref: Modern Operating Systems – Andrew Tanenbaum

---

109. C-SCAN algorithm moves disk head:

- 1). In one direction only
- 2). In both directions randomly
- 3). From center outward
- 4). Without movement

Answer: 1). In one direction only

Ref: Operating System Concepts – Silberschatz

---

110. Disk scheduling algorithms aim to:

- 1). Reduce disk head movement
- 2). Increase memory usage
- 3). Increase CPU speed
- 4). Increase network speed

Answer: 1). Reduce disk head movement

Ref: Operating Systems – William Stallings

---

## UNIT 7. DATABASE MANAGEMENT SYSTEMS (DBMS)

---

1. DBMS stands for:

- 1). Database Management System
- 2). Data Backup Management System
- 3). Data Block Management System
- 4). Digital Base Management System

Answer: 1). Database Management System

Ref: Database System Concepts – Silberschatz, Korth & Sudarshan

---

2. The main purpose of DBMS is:

- 1). Store and manage data efficiently
- 2). Increase CPU speed
- 3). Manage network traffic
- 4). Increase disk capacity

Answer: 1). Store and manage data efficiently

Ref: Database System Concepts – Silberschatz

---

3. A database is defined as:

- 1). Organized collection of related data
- 2). Collection of programs
- 3). Hardware device
- 4). Network system

Answer: 1). Organized collection of related data

Ref: Database Management Systems – Ramakrishnan & Gehrke

---

4. The main advantage of DBMS over file system is:

- 1). Data redundancy control
- 2). Faster CPU
- 3). Larger memory
- 4). Improved graphics

Answer: 1). Data redundancy control

Ref: Database System Concepts – Silberschatz

---

5. The three-schema architecture includes:

- 1). Physical, Logical, View levels
- 2). Data, File, Memory levels
- 3). Network, Memory, CPU levels
- 4). Logical, Hardware, Software levels

Answer: 1). Physical, Logical, View levels

Ref: Database System Concepts – Silberschatz

---

6. Physical schema describes:

- 1). Database storage structure
- 2). User interface
- 3). Application programs
- 4). SQL queries

Answer: 1). Database storage structure

Ref: Database System Concepts – Silberschatz

---

7. Logical schema describes:

- 1). Database structure and relationships
- 2). File storage format
- 3). Network protocols
- 4). Hardware configuration

Answer: 1). Database structure and relationships

Ref: Database Management Systems – Ramakrishnan

---

8. Data independence means:

- 1). Ability to modify schema without affecting applications
- 2). Independent computers
- 3). Independent networks
- 4). Independent files

Answer: 1). Ability to modify schema without affecting applications

Ref: Database System Concepts – Silberschatz

---

9. An entity in DBMS represents:

- 1). Real-world object
- 2). Database table
- 3). Database query
- 4). Data file

Answer: 1). Real-world object

Ref: Database System Concepts – Silberschatz

---

10. ER model stands for:

- 1). Entity Relationship model
- 2). Entity Record model
- 3). External Relation model
- 4). Extended Record model

Answer: 1). Entity Relationship model

Ref: Database System Concepts – Silberschatz

---

11. In ER diagram, rectangle represents:

- 1). Entity
- 2). Attribute
- 3). Relationship
- 4). Key

Answer: 1). Entity

Ref: Database System Concepts – Silberschatz

---

12. Oval shape in ER diagram represents:

- 1). Entity
- 2). Attribute
- 3). Relationship
- 4). Key

Answer: 2). Attribute

Ref: Database System Concepts – Silberschatz

---

13. Diamond shape in ER diagram represents:

- 1). Entity
- 2). Attribute
- 3). Relationship
- 4). Key

Answer: 3). Relationship

Ref: Database System Concepts – Silberschatz

---

14. A primary key is:

- 1). Unique identifier for each record
- 2). Duplicate value
- 3). Random value
- 4). Foreign key

Answer: 1). Unique identifier for each record

Ref: Database Management Systems – Ramakrishnan

---

15. Foreign key is used to:

- 1). Establish relationship between tables
- 2). Store unique values
- 3). Delete records
- 4). Sort data

Answer: 1). Establish relationship between tables

Ref: Database System Concepts – Silberschatz

---

16. A relation in RDBMS is also called:

- 1). Table
- 2). Row
- 3). Column
- 4). Attribute

Answer: 1). Table

Ref: Database Management Systems – Ramakrishnan

---

17. A tuple in DBMS refers to:

- 1). Row of table
- 2). Column of table
- 3). Database file
- 4). Query

Answer: 1). Row of table

Ref: Database System Concepts – Silberschatz

---

18. An attribute represents:

- 1). Column in table
- 2). Row in table
- 3). Entire table
- 4). Database

Answer: 1). Column in table

Ref: Database System Concepts – Silberschatz

---

19. Normalization is used to:

- 1). Reduce data redundancy
- 2). Increase data duplication
- 3). Increase memory
- 4). Increase CPU speed

Answer: 1). Reduce data redundancy

Ref: Database System Concepts – Silberschatz

---

20. First Normal Form (1NF) requires:

- 1). Atomic attribute values
- 2). Multiple values allowed
- 3). No keys required
- 4). Duplicate records allowed

Answer: 1). Atomic attribute values

Ref: Database System Concepts – Silberschatz

---

21. Second Normal Form (2NF) removes:

- 1). Partial dependency
- 2). Transitive dependency
- 3). Functional dependency
- 4). Data redundancy

Answer: 1). Partial dependency

Ref: Database System Concepts – Silberschatz

---

22. Third Normal Form (3NF) removes:

- 1). Transitive dependency
- 2). Partial dependency
- 3). Functional dependency
- 4). Attribute dependency

Answer: 1). Transitive dependency

Ref: Database Management Systems – Ramakrishnan

---

23. BCNF stands for:

- 1). Boyce-Codd Normal Form
- 2). Basic Column Normal Form
- 3). Binary Code Normal Form
- 4). Base Control Normal Form

Answer: 1). Boyce-Codd Normal Form

Ref: Database System Concepts – Silberschatz

---

24. Functional dependency describes:

- 1). Relationship between attributes
- 2). Relationship between tables
- 3). Relationship between users
- 4). Relationship between programs

Answer: 1). Relationship between attributes

Ref: Database System Concepts – Silberschatz

---

25. Candidate key is:

- 1). Attribute that uniquely identifies tuple
- 2). Duplicate key
- 3). Secondary key
- 4). Foreign key

Answer: 1). Attribute that uniquely identifies tuple

Ref: Database Management Systems – Ramakrishnan

---

26. SQL stands for:

- 1). Structured Query Language
- 2). System Query Language
- 3). Sequential Query Language
- 4). Standard Question Language

Answer: 1). Structured Query Language

Ref: Database System Concepts – Silberschatz

---

27. SQL is mainly used for:

- 1). Managing relational databases
- 2). Writing operating systems
- 3). Designing networks
- 4). Developing hardware

Answer: 1). Managing relational databases

Ref: Database Management Systems – Ramakrishnan

---

28. The SQL command used to retrieve data is:

- 1). SELECT
- 2). INSERT
- 3). DELETE
- 4). UPDATE

Answer: 1). SELECT

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

29. The SQL command used to insert data into a table is:

- 1). INSERT
- 2). UPDATE
- 3). DELETE
- 4). ALTER

Answer: 1). INSERT

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

30. The SQL command used to modify existing records is:

- 1). UPDATE
- 2). INSERT
- 3). DELETE
- 4). SELECT

Answer: 1). UPDATE

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

31. The SQL command used to remove records from a table is:

- 1). DELETE
- 2). DROP
- 3). REMOVE
- 4). ERASE

Answer: 1). DELETE

Ref: Database System Concepts – Silberschatz

---

32. The SQL command used to create a table is:

- 1). CREATE
- 2). MAKE
- 3). BUILD
- 4). ADD

Answer: 1). CREATE

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

33. The SQL command used to remove a table completely is:

- 1). DROP
- 2). DELETE
- 3). REMOVE
- 4). CLEAR

Answer: 1). DROP

Ref: Database System Concepts – Silberschatz

---

34. The SQL command used to modify table structure is:

- 1). ALTER
- 2). MODIFY
- 3). UPDATE
- 4). CHANGE

Answer: 1). ALTER

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

35. DDL stands for:

- 1). Data Definition Language
- 2). Data Development Language
- 3). Data Description Logic
- 4). Data Dynamic Language

Answer: 1). Data Definition Language

Ref: Database System Concepts – Silberschatz

---

36. Which command belongs to DML?

- 1). INSERT
- 2). CREATE
- 3). ALTER
- 4). DROP

Answer: 1). INSERT

Ref: Database Management Systems – Ramakrishnan

---

37. The SQL clause used to filter records is:

- 1). WHERE
- 2). GROUP BY
- 3). ORDER BY
- 4). HAVING

Answer: 1). WHERE

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

38. The SQL clause used to sort records is:

- 1). ORDER BY
- 2). GROUP BY
- 3). WHERE
- 4). HAVING

Answer: 1). ORDER BY

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

39. The SQL clause used to group rows with same values is:

- 1). GROUP BY
- 2). ORDER BY
- 3). WHERE
- 4). SELECT

Answer: 1). GROUP BY

Ref: Database System Concepts – Silberschatz

---

40. The clause used to filter grouped results is:

- 1). HAVING
- 2). WHERE
- 3). GROUP
- 4). FILTER

Answer: 1). HAVING

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

41. COUNT() function is used to:

- 1). Count number of rows
- 2). Add numbers
- 3). Multiply values
- 4). Divide values

Answer: 1). Count number of rows

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

42. SUM() function is used to:

- 1). Calculate total value
- 2). Count rows
- 3). Find average
- 4). Find minimum

Answer: 1). Calculate total value

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

43. AVG() function returns:

- 1). Average value
- 2). Maximum value
- 3). Minimum value
- 4). Total value

Answer: 1). Average value

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

44. MAX() function returns:

- 1). Maximum value
- 2). Minimum value
- 3). Average value
- 4). Sum value

Answer: 1). Maximum value

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

45. MIN() function returns:

- 1). Minimum value
- 2). Maximum value
- 3). Average value
- 4). Count value

Answer: 1). Minimum value

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

46. INNER JOIN returns:

- 1). Matching rows from both tables
- 2). All rows from first table
- 3). All rows from second table
- 4). All rows from both tables

Answer: 1). Matching rows from both tables

Ref: Database System Concepts – Silberschatz

---

47. LEFT JOIN returns:

- 1). All rows from left table
- 2). All rows from right table
- 3). Only matching rows
- 4). No rows

Answer: 1). All rows from left table

Ref: Database Management Systems – Ramakrishnan

---

48. RIGHT JOIN returns:

- 1). All rows from right table
- 2). All rows from left table
- 3). Matching rows only
- 4). Random rows

Answer: 1). All rows from right table

Ref: Database System Concepts – Silberschatz

---

49. A self join is:

- 1). Table joined with itself
- 2). Two tables joined
- 3). Three tables joined
- 4). No join used

Answer: 1). Table joined with itself

Ref: Database Management Systems – Ramakrishnan

---

50. The wildcard used to represent multiple characters in SQL is:

- 1). %
- 2). \_
- 3). \*
- 4). #

Answer: 1). %

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

51. PL/SQL stands for:

- 1). Procedural Language/Structured Query Language
- 2). Programming Language/Structured Query Language
- 3). Process Language/Structured Query Language
- 4). Procedural Logic/Structured Query Language

Answer: 1). Procedural Language/Structured Query Language

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

52. PL/SQL is mainly used for:

- 1). Writing procedural code in database
- 2). Designing operating systems
- 3). Designing networks
- 4). Creating hardware

Answer: 1). Writing procedural code in database

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

53. A PL/SQL block consists of:

- 1). DECLARE, BEGIN, EXCEPTION, END
- 2). BEGIN, SELECT, END
- 3). DECLARE, UPDATE, DELETE
- 4). BEGIN, CREATE, END

Answer: 1). DECLARE, BEGIN, EXCEPTION, END

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

54. The DECLARE section in PL/SQL is used for:

- 1). Declaring variables
- 2). Executing statements
- 3). Handling errors
- 4). Ending program

Answer: 1). Declaring variables

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

55. The BEGIN section in PL/SQL contains:

- 1). Executable statements
- 2). Variable declarations
- 3). Error messages
- 4). Table definitions

Answer: 1). Executable statements

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

56. The EXCEPTION block is used for:

- 1). Error handling
- 2). Variable declaration
- 3). Data insertion
- 4). Query execution

Answer: 1). Error handling

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

57. A cursor is used to:

- 1). Process query result row by row
- 2). Delete records
- 3). Update tables
- 4). Create tables

Answer: 1). Process query result row by row

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

58. An implicit cursor is:

- 1). Automatically created by Oracle
- 2). Created by programmer
- 3). Used for procedures only
- 4). Used for triggers only

Answer: 1). Automatically created by Oracle

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

59. Explicit cursor is:

- 1). Defined by programmer
- 2). Automatically created
- 3). Used for indexing
- 4). Used for encryption

Answer: 1). Defined by programmer

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

60. A stored procedure is:

- 1). Named PL/SQL block stored in database
- 2). SQL query
- 3). Table structure
- 4). File system

Answer: 1). Named PL/SQL block stored in database

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

61. A trigger is:

- 1). Procedure automatically executed on database event
- 2). SQL command
- 3). Data structure
- 4). File operation

Answer: 1). Procedure automatically executed on database event

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

62. Trigger is activated by:

- 1). INSERT, UPDATE, DELETE operations
- 2). SELECT query
- 3). CREATE command
- 4). DROP command

Answer: 1). INSERT, UPDATE, DELETE operations

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

63. A package in PL/SQL is used to:

- 1). Group related procedures and functions
- 2). Store tables
- 3). Store files
- 4). Store indexes

Answer: 1). Group related procedures and functions

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

64. PL/SQL supports:

- 1). Loops and conditional statements
- 2). Only SQL queries
- 3). Only file operations
- 4). Only memory operations

Answer: 1). Loops and conditional statements

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

65. Which loop executes at least once?

- 1). LOOP
- 2). FOR LOOP
- 3). WHILE LOOP
- 4). IF LOOP

Answer: 1). LOOP

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

66. A function in PL/SQL must:

- 1). Return a value
- 2). Not return value
- 3). Delete records
- 4). Create tables

Answer: 1). Return a value

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

67. Stored procedures improve:

- 1). Code reusability
- 2). CPU speed
- 3). Memory size
- 4). Disk size

Answer: 1). Code reusability

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

68. A BEFORE trigger executes:

- 1). Before database operation
- 2). After database operation
- 3). During execution
- 4). After program termination

Answer: 1). Before database operation

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

69. An AFTER trigger executes:

- 1). After database operation
- 2). Before database operation
- 3). During execution
- 4). Before program start

Answer: 1). After database operation

Ref: Oracle SQL and PL/SQL – Das Gupta & Radha Krishna

---

70. PL/SQL is mainly associated with:

- 1). Oracle Database
- 2). MySQL
- 3). MongoDB
- 4). PostgreSQL

Answer: 1). Oracle Database

Ref: SQL, PL/SQL Programming Language – Ivan Bayross

---

71. NoSQL stands for:

- 1). Not Only SQL
- 2). New SQL
- 3). Network SQL
- 4). Normal SQL

Answer: 1). Not Only SQL

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

72. NoSQL databases are mainly designed for:

- 1). Handling large-scale distributed data
- 2). Small file storage
- 3). CPU scheduling
- 4). Disk management

Answer: 1). Handling large-scale distributed data

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

73. A major advantage of NoSQL databases is:

- 1). Schema flexibility
- 2). Fixed schema
- 3). Low storage capacity
- 4). Limited scalability

Answer: 1). Schema flexibility

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

74. NoSQL databases support:

- 1). Horizontal scaling
- 2). Vertical scaling only
- 3). No scaling
- 4). Memory scaling

Answer: 1). Horizontal scaling

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

75. MongoDB is a:

- 1). Document-oriented database
- 2). Relational database
- 3). Network database
- 4). Hierarchical database

Answer: 1). Document-oriented database

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

76. In MongoDB, a collection is equivalent to:

- 1). Table in RDBMS
- 2). Row in RDBMS
- 3). Column in RDBMS
- 4). Index in RDBMS

Answer: 1). Table in RDBMS

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

77. In MongoDB, a document is equivalent to:

- 1). Row in table
- 2). Column in table
- 3). Entire database
- 4). Index

Answer: 1). Row in table

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

78. MongoDB stores data in:

- 1). JSON-like documents
- 2). Tables
- 3). Files
- 4). Spreadsheets

Answer: 1). JSON-like documents

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

79. CRUD operations stand for:

- 1). Create, Read, Update, Delete
- 2). Copy, Run, Update, Delete
- 3). Create, Remove, Use, Delete
- 4). Control, Read, Update, Delete

Answer: 1). Create, Read, Update, Delete

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

80. The command used to insert a document in MongoDB is:

- 1). insert()
- 2). add()
- 3). create()
- 4). update()

Answer: 1). insert()

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

81. The command used to retrieve data in MongoDB is:

- 1). find()
- 2). search()
- 3). get()
- 4). select()

Answer: 1). find()

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

82. The command used to modify documents in MongoDB is:

- 1). update()
- 2). modify()
- 3). change()
- 4). replace()

Answer: 1). update()

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

83. The command used to remove documents is:

- 1). delete()
- 2). remove()
- 3). drop()
- 4). erase()

Answer: 2). remove()

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

84. CAP theorem stands for:

- 1). Consistency, Availability, Partition Tolerance
- 2). Control, Access, Performance
- 3). Capacity, Access, Protection
- 4). Consistency, Access, Processing

Answer: 1). Consistency, Availability, Partition Tolerance

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

85. In CAP theorem, Consistency means:

- 1). All nodes see the same data
- 2). System never fails
- 3). Data always encrypted
- 4). Network never breaks

Answer: 1). All nodes see the same data

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

86. Availability means:

- 1). System always responds to requests
- 2). System stores data only
- 3). System encrypts data
- 4). System compresses data

Answer: 1). System always responds to requests

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

87. Partition tolerance means:

- 1). System continues operation despite network failures
- 2). System stops when network fails
- 3). System deletes data
- 4). System encrypts data

Answer: 1). System continues operation despite network failures

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

88. NoSQL databases are best suited for:

- 1). Big data applications
- 2). Small spreadsheets
- 3). File storage
- 4). Disk scheduling

Answer: 1). Big data applications

Ref: NoSQL Distilled – Pramod J. Sadalage & Martin Fowler

---

89. Main difference between RDBMS and NoSQL is:

- 1). Fixed schema vs schema-less design
- 2). Both identical
- 3). Both use SQL only
- 4). Both store only tables

Answer: 1). Fixed schema vs schema-less design

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

90. MongoDB uses which format for storing documents?

- 1). BSON
- 2). XML
- 3). CSV
- 4). TXT

Answer: 1). BSON

Ref: MongoDB: The Definitive Guide – Bradshaw, Brazil & Chodorow

---

## UNIT 8. JAVA PROGRAMMING

---

1. Java was developed by:

- 1). James Gosling
- 2). Dennis Ritchie
- 3). Bjarne Stroustrup
- 4). Ken Thompson

Answer: 1). James Gosling

Ref: Java: The Complete Reference – Herbert Schildt

---

2. Java was developed at:

- 1). Sun Microsystems
- 2). Microsoft
- 3). IBM
- 4). Google

Answer: 1). Sun Microsystems

Ref: Java: The Complete Reference – Herbert Schildt

---

3. Java is a:

- 1). Platform-independent language
- 2). Platform-dependent language
- 3). Machine language
- 4). Assembly language

Answer: 1). Platform-independent language

Ref: Programming with Java – E. Balagurusamy

---

4. Java achieves platform independence using:

- 1). Bytecode
- 2). Assembly code
- 3). Machine code
- 4). Native code

Answer: 1). Bytecode

Ref: Java: The Complete Reference – Herbert Schildt

---

5. JVM stands for:

- 1). Java Virtual Machine
- 2). Java Variable Machine
- 3). Java Vector Machine
- 4). Java Virtual Memory

Answer: 1). Java Virtual Machine

Ref: Java: The Complete Reference – Herbert Schildt

---

6. JVM is responsible for:

- 1). Executing Java bytecode
- 2). Compiling Java programs
- 3). Writing Java programs
- 4). Editing Java files

Answer: 1). Executing Java bytecode

Ref: Programming with Java – E. Balagurusamy

---

7. The Java compiler converts source code into:

- 1). Bytecode
- 2). Machine code
- 3). Assembly code
- 4). Binary code

Answer: 1). Bytecode

Ref: Java: The Complete Reference – Herbert Schildt

---

8. The Java compiler command is:

- 1). javac
- 2). java
- 3). compile
- 4). run

Answer: 1). javac

Ref: Programming with Java – E. Balagurusamy

---

9. The command used to run Java program is:

- 1). java
- 2). javac
- 3). run
- 4). execute

Answer: 1). java

Ref: Java: The Complete Reference – Herbert Schildt

---

10. Java programs start execution from:

- 1). main() method
- 2). start() method
- 3). run() method
- 4). execute() method

Answer: 1). main() method

Ref: Programming with Java – E. Balagurusamy

---

11. The correct signature of main method is:

- 1). public static void main(String args[])
- 2). public void main()
- 3). static void main()
- 4). private main()

Answer: 1). public static void main(String args[])

Ref: Java: The Complete Reference – Herbert Schildt

---

12. Java is classified as:

- 1). Object-Oriented Programming language
- 2). Procedural language
- 3). Assembly language
- 4). Machine language

Answer: 1). Object-Oriented Programming language

Ref: Programming with Java – E. Balagurusamy

---

13. Which keyword is used to create a class?

- 1). class
- 2). object
- 3). define
- 4). struct

Answer: 1). class

Ref: Java: The Complete Reference – Herbert Schildt

---

14. An object is:

- 1). Instance of class
- 2). Type of variable
- 3). Method
- 4). Data type

Answer: 1). Instance of class

Ref: Programming with Java – E. Balagurusamy

---

15. Which keyword is used to create object?

- 1). new
- 2). create
- 3). object
- 4). make

Answer: 1). new

Ref: Java: The Complete Reference – Herbert Schildt

---

16. The keyword used to refer current object is:

- 1). this
- 2). super
- 3). self
- 4). current

Answer: 1). this

Ref: Programming with Java – E. Balagurusamy

---

17. The keyword used to refer parent class is:

- 1). super
- 2). this
- 3). parent
- 4). base

Answer: 1). super

Ref: Java: The Complete Reference – Herbert Schildt

---

18. Method overloading means:

- 1). Multiple methods with same name but different parameters
- 2). Multiple classes with same name
- 3). Multiple objects with same name
- 4). Multiple packages

Answer: 1). Multiple methods with same name but different parameters

Ref: Programming with Java – E. Balagurusamy

---

19. Method overloading occurs when:

- 1). Parameters differ
- 2). Return type differs only
- 3). Method name differs
- 4). Class differs

Answer: 1). Parameters differ

Ref: Java: The Complete Reference – Herbert Schildt

---

20. Java supports which type of memory management?

- 1). Automatic garbage collection
- 2). Manual memory management
- 3). Static memory management
- 4). Dynamic memory allocation only

Answer: 1). Automatic garbage collection

Ref: Java: The Complete Reference – Herbert Schildt

---

21. Garbage collector is used to:

- 1). Free unused memory
- 2). Delete programs
- 3). Compile programs
- 4). Execute programs

Answer: 1). Free unused memory

Ref: Programming with Java – E. Balagurusamy

---

22. The keyword static is used for:

- 1). Class-level variables and methods
- 2). Object-level variables
- 3). Dynamic variables
- 4). Private variables

Answer: 1). Class-level variables and methods

Ref: Java: The Complete Reference – Herbert Schildt

---

23. The keyword final is used to:

- 1). Make variable constant
- 2). Create object
- 3). Delete object
- 4). Run program

Answer: 1). Make variable constant

Ref: Programming with Java – E. Balagurusamy

---

24. The finally block is used for:

- 1). Executing important code after try-catch
- 2). Declaring variables
- 3). Creating objects
- 4). Loop execution

Answer: 1). Executing important code after try-catch  
Ref: Java: The Complete Reference – Herbert Schildt

---

25. finalize() method is used for:

- 1). Garbage collection cleanup
- 2). Exception handling
- 3). Thread execution
- 4). File operations

Answer: 1). Garbage collection cleanup  
Ref: Java: The Complete Reference – Herbert Schildt

---

26. Java supports which feature?

- 1). Encapsulation
- 2). Inheritance
- 3). Polymorphism
- 4). All of the above

Answer: 4). All of the above  
Ref: Programming with Java – E. Balagurusamy

---

27. Java source files have extension:

- 1). .java
- 2). .class
- 3). .exe
- 4). .txt

Answer: 1). .java  
Ref: Java: The Complete Reference – Herbert Schildt

---

28. Compiled Java files have extension:

- 1). .class
- 2). .java
- 3). .exe
- 4). .bin

Answer: 1). .class

Ref: Programming with Java – E. Balagurusamy

---

29. JDK stands for:

- 1). Java Development Kit
- 2). Java Deployment Kit
- 3). Java Data Kit
- 4). Java Design Kit

Answer: 1). Java Development Kit

Ref: Java: The Complete Reference – Herbert Schildt

---

30. JRE stands for:

- 1). Java Runtime Environment
- 2). Java Resource Environment
- 3). Java Runtime Engine
- 4). Java Run Execution

Answer: 1). Java Runtime Environment

Ref: Java: The Complete Reference – Herbert Schildt

---

31. Inheritance in Java means:

- 1). One class acquiring properties of another class
- 2). Copying objects
- 3). Deleting classes
- 4). Compiling classes

Answer: 1). One class acquiring properties of another class

Ref: Programming with Java – E. Balagurusamy

---

32. The keyword used for inheritance in Java is:

- 1). extends
- 2). inherits
- 3). implements
- 4). super

Answer: 1). extends

Ref: Java: The Complete Reference – Herbert Schildt

---

33. The class that inherits properties is called:

- 1). Subclass
- 2). Superclass
- 3). Parent class
- 4). Base class

Answer: 1). Subclass

Ref: Programming with Java – E. Balagurusamy

---

34. The class whose properties are inherited is called:

- 1). Superclass
- 2). Subclass
- 3). Child class
- 4). Derived class

Answer: 1). Superclass

Ref: Java: The Complete Reference – Herbert Schildt

---

35. Java supports which type of inheritance?

- 1). Single inheritance
- 2). Multiple inheritance with classes
- 3). Hybrid inheritance with classes
- 4). Hierarchical inheritance only

Answer: 1). Single inheritance

Ref: Programming with Java – E. Balagurusamy

---

36. Java supports multiple inheritance using:

- 1). Interfaces
- 2). Classes
- 3). Packages
- 4). Objects

Answer: 1). Interfaces

Ref: Java: The Complete Reference – Herbert Schildt

---

37. Method overriding occurs when:

- 1). Subclass provides its own implementation of superclass method
- 2). Same method name with different parameters
- 3). Different method names
- 4). Method inside interface

Answer: 1). Subclass provides its own implementation of superclass method

Ref: Programming with Java – E. Balagurusamy

---

38. Method overriding requires:

- 1). Same method signature
- 2). Different parameters
- 3). Different method names
- 4). Static methods

Answer: 1). Same method signature

Ref: Java: The Complete Reference – Herbert Schildt

---

39. Which keyword prevents method overriding?

- 1). final
- 2). static
- 3). private
- 4). abstract

Answer: 1). final

Ref: Programming with Java – E. Balagurusamy

---

40. The super keyword is used to:

- 1). Access parent class members
- 2). Access child class members
- 3). Access interface methods
- 4). Access packages

Answer: 1). Access parent class members

Ref: Java: The Complete Reference – Herbert Schildt

---

41. An interface in Java is:

- 1). Collection of abstract methods
- 2). Class with objects
- 3). Data type
- 4). Package

Answer: 1). Collection of abstract methods

Ref: Programming with Java – E. Balagurusamy

---

42. Interface methods are:

- 1). Public and abstract by default
- 2). Private
- 3). Protected
- 4). Static

Answer: 1). Public and abstract by default

Ref: Java: The Complete Reference – Herbert Schildt

---

43. A class implements an interface using:

- 1). implements keyword
- 2). extends keyword
- 3). interface keyword
- 4). super keyword

Answer: 1). implements keyword

Ref: Programming with Java – E. Balagurusamy

---

44. Java supports abstraction using:

- 1). Abstract classes and interfaces
- 2). Classes only
- 3). Methods only
- 4). Packages only

Answer: 1). Abstract classes and interfaces

Ref: Java: The Complete Reference – Herbert Schildt

---

45. An abstract class:

- 1). Cannot be instantiated
- 2). Can create objects directly
- 3). Cannot contain methods
- 4). Cannot contain variables

Answer: 1). Cannot be instantiated

Ref: Programming with Java – E. Balagurusamy

---

46. The keyword used to declare abstract class is:

- 1). abstract
- 2). interface
- 3). class
- 4). extends

Answer: 1). abstract

Ref: Java: The Complete Reference – Herbert Schildt

---

47. A package in Java is used for:

- 1). Grouping related classes
- 2). Storing objects
- 3). Executing programs
- 4). Compiling code

Answer: 1). Grouping related classes

Ref: Programming with Java – E. Balagurusamy

---

48. The keyword used to import package is:

- 1). import
- 2). include
- 3). package
- 4). load

Answer: 1). import

Ref: Java: The Complete Reference – Herbert Schildt

---

49. The default access modifier in Java is:

- 1). default
- 2). private
- 3). public
- 4). protected

Answer: 1). default

Ref: Programming with Java – E. Balagurusamy

---

50. Public access modifier allows access:

- 1). Everywhere
- 2). Same class only
- 3). Same package only
- 4). Subclass only

Answer: 1). Everywhere

Ref: Java: The Complete Reference – Herbert Schildt

---

51. Private access modifier allows access:

- 1). Within same class only
- 2). Same package
- 3). Subclass
- 4). Anywhere

Answer: 1). Within same class only

Ref: Programming with Java – E. Balagurusamy

---

52. Protected access modifier allows access:

- 1). Same package and subclasses
- 2). Same class only
- 3). Anywhere
- 4). Interfaces only

Answer: 1). Same package and subclasses

Ref: Java: The Complete Reference – Herbert Schildt

---

53. Encapsulation means:

- 1). Wrapping data and methods together
- 2). Separating methods
- 3). Removing data
- 4). Copying classes

Answer: 1). Wrapping data and methods together

Ref: Programming with Java – E. Balagurusamy

---

54. Polymorphism means:

- 1). One interface, multiple implementations
- 2). Single class only
- 3). Multiple classes only
- 4). No classes

Answer: 1). One interface, multiple implementations

Ref: Java: The Complete Reference – Herbert Schildt

---

55. Compile-time polymorphism is achieved by:

- 1). Method overloading
- 2). Method overriding
- 3). Interfaces
- 4). Packages

Answer: 1). Method overloading

Ref: Programming with Java – E. Balagurusamy

---

56. Runtime polymorphism is achieved by:

- 1). Method overriding
- 2). Method overloading
- 3). Packages
- 4). Interfaces

Answer: 1). Method overriding

Ref: Java: The Complete Reference – Herbert Schildt

---

57. The instanceof operator is used to:

- 1). Check object type
- 2). Create object
- 3). Delete object
- 4). Compare numbers

Answer: 1). Check object type

Ref: Programming with Java – E. Balagurusamy

---

58. Constructor in Java is used to:

- 1). Initialize object
- 2). Destroy object
- 3). Compile class
- 4). Execute method

Answer: 1). Initialize object

Ref: Java: The Complete Reference – Herbert Schildt

---

59. Constructor has:

- 1). Same name as class
- 2). Different name
- 3). Return type
- 4). Static keyword

Answer: 1). Same name as class

Ref: Programming with Java – E. Balagurusamy

---

60. Constructor does not have:

- 1). Return type
- 2). Parameters
- 3). Class name
- 4). Body

Answer: 1). Return type

Ref: Java: The Complete Reference – Herbert Schildt

---

61. The Java Collections Framework is used to:

- 1). Store and manipulate groups of objects
- 2). Compile programs
- 3). Execute programs
- 4). Manage memory

Answer: 1). Store and manipulate groups of objects

Ref: Java: The Complete Reference – Herbert Schildt

---

62. The root interface of the Collection framework is:

- 1). Collection
- 2). List
- 3). Set
- 4). Map

Answer: 1). Collection

Ref: Java: The Complete Reference – Herbert Schildt

---

63. Which interface allows duplicate elements?

- 1). List
- 2). Set
- 3). Map
- 4). Queue

Answer: 1). List

Ref: Programming with Java – E. Balagurusamy

---

64. Which interface does not allow duplicate elements?

- 1). Set
- 2). List
- 3). ArrayList
- 4). Vector

Answer: 1). Set

Ref: Java: The Complete Reference – Herbert Schildt

---

65. ArrayList belongs to which package?

- 1). java.util
- 2). java.io
- 3). java.lang
- 4). java.net

Answer: 1). java.util

Ref: Java: The Complete Reference – Herbert Schildt

---

66. ArrayList is:

- 1). Dynamic array
- 2). Static array
- 3). Fixed array
- 4). Random array

Answer: 1). Dynamic array

Ref: Programming with Java – E. Balagurusamy

---

67. Vector is similar to ArrayList but:

- 1). It is synchronized
- 2). It is unsynchronized
- 3). It does not store objects
- 4). It cannot grow dynamically

Answer: 1). It is synchronized

Ref: Java: The Complete Reference – Herbert Schildt

---

68. Stack class in Java follows:

- 1). LIFO principle
- 2). FIFO principle
- 3). Random access
- 4). Sequential access

Answer: 1). LIFO principle

Ref: Programming with Java – E. Balagurusamy

---

69. The method used to add element to stack is:

- 1). push()
- 2). pop()
- 3). add()
- 4). insert()

Answer: 1). push()

Ref: Java: The Complete Reference – Herbert Schildt

---

70. The method used to remove element from stack is:

- 1). pop()
- 2). push()
- 3). remove()
- 4). delete()

Answer: 1). pop()

Ref: Java: The Complete Reference – Herbert Schildt

---

71. HashMap stores data in:

- 1). Key-value pairs
- 2). Array format
- 3). Linked list format
- 4). Stack format

Answer: 1). Key-value pairs

Ref: Java: The Complete Reference – Herbert Schildt

---

72. HashMap allows:

- 1). One null key
- 2). No null key
- 3). Multiple null keys
- 4). Only numeric keys

Answer: 1). One null key

Ref: Programming with Java – E. Balagurusamy

---

73. HashMap does not maintain:

- 1). Order of elements
- 2). Duplicate keys
- 3). Key-value pairs
- 4). Data storage

Answer: 1). Order of elements

Ref: Java: The Complete Reference – Herbert Schildt

---

74. LinkedList is based on:

- 1). Doubly linked list
- 2). Singly linked list
- 3). Array
- 4). Stack

Answer: 1). Doubly linked list

Ref: Programming with Java – E. Balagurusamy

---

75. Iterator is used for:

- 1). Traversing collection elements
- 2). Sorting collections
- 3). Storing elements
- 4). Deleting elements

Answer: 1). Traversing collection elements

Ref: Java: The Complete Reference – Herbert Schildt

---

76. Java I/O package is:

- 1). java.io
- 2). java.util
- 3). java.lang
- 4). java.net

Answer: 1). java.io

Ref: Java: The Complete Reference – Herbert Schildt

---

77. InputStream class is used for:

- 1). Byte input
- 2). Character input
- 3). File deletion
- 4). File creation

Answer: 1). Byte input

Ref: Programming with Java – E. Balagurusamy

---

78. OutputStream class is used for:

- 1). Byte output
- 2). Character output
- 3). File deletion
- 4). File copying

Answer: 1). Byte output

Ref: Java: The Complete Reference – Herbert Schildt

---

79. Reader class is used for:

- 1). Character input
- 2). Byte input
- 3). File deletion
- 4). File compression

Answer: 1). Character input

Ref: Programming with Java – E. Balagurusamy

---

80. Writer class is used for:

- 1). Character output
- 2). Byte output
- 3). File compression
- 4). Memory allocation

Answer: 1). Character output

Ref: Java: The Complete Reference – Herbert Schildt

---

81. FileInputStream is used to read:

- 1). Byte data from file
- 2). Character data
- 3). Database data
- 4). Network data

Answer: 1). Byte data from file

Ref: Java: The Complete Reference – Herbert Schildt

---

82. FileOutputStream is used to:

- 1). Write bytes to file
- 2). Delete files
- 3). Compress files
- 4). Encrypt files

Answer: 1). Write bytes to file

Ref: Programming with Java – E. Balagurusamy

---

83. BufferedReader is used to:

- 1). Read text efficiently
- 2). Write text
- 3). Delete text
- 4). Encrypt text

Answer: 1). Read text efficiently

Ref: Java: The Complete Reference – Herbert Schildt

---

84. PrintWriter is used to:

- 1). Write formatted text
- 2). Delete files
- 3). Compile program
- 4). Run program

Answer: 1). Write formatted text

Ref: Programming with Java – E. Balagurusamy

---

85. Byte streams handle:

- 1). Binary data
- 2). Text data only
- 3). Images only
- 4). Strings only

Answer: 1). Binary data

Ref: Java: The Complete Reference – Herbert Schildt

---

86. Character streams handle:

- 1). Text data
- 2). Binary data
- 3). Image files
- 4). Video files

Answer: 1). Text data

Ref: Programming with Java – E. Balagurusamy

---

87. System.out.println() is used to:

- 1). Print output to console
- 2). Read input
- 3). Compile program
- 4). Delete output

Answer: 1). Print output to console

Ref: Java: The Complete Reference – Herbert Schildt

---

88. System.in is used for:

- 1). Input stream
- 2). Output stream
- 3). Error stream
- 4). Network stream

Answer: 1). Input stream

Ref: Programming with Java – E. Balagurusamy

---

89. IOException occurs during:

- 1). Input/output operations
- 2). Arithmetic operations
- 3). Loop operations
- 4). Object creation

Answer: 1). Input/output operations

Ref: Java: The Complete Reference – Herbert Schildt

---

90. The close() method is used to:

- 1). Close stream
- 2). Open stream
- 3). Delete stream
- 4). Encrypt stream

Answer: 1). Close stream

Ref: Programming with Java – E. Balagurusamy

---

91. Exception in Java is:

- 1). Runtime error
- 2). Compile error
- 3). Logical error
- 4). Syntax error

Answer: 1). Runtime error

Ref: Java: The Complete Reference – Herbert Schildt

---

92. Exception handling is used to:

- 1). Handle runtime errors
- 2). Handle syntax errors
- 3). Improve CPU speed
- 4). Increase memory

Answer: 1). Handle runtime errors

Ref: Programming with Java – E. Balagurusamy

---

93. The block used to handle exceptions is:

- 1). catch
- 2). try
- 3). finally
- 4). throw

Answer: 1). catch

Ref: Java: The Complete Reference – Herbert Schildt

---

94. The block used to monitor code for exceptions is:

- 1). try
- 2). catch
- 3). finally
- 4). throw

Answer: 1). try

Ref: Programming with Java – E. Balagurusamy

---

95. The finally block executes:

- 1). Always
- 2). Only when exception occurs
- 3). Only when exception does not occur
- 4). Randomly

Answer: 1). Always

Ref: Java: The Complete Reference – Herbert Schildt

---

96. The throw keyword is used to:

- 1). Explicitly throw exception
- 2). Catch exception
- 3). Ignore exception
- 4). Delete exception

Answer: 1). Explicitly throw exception

Ref: Programming with Java – E. Balagurusamy

---

97. The throws keyword is used to:

- 1). Declare exceptions
- 2). Catch exceptions
- 3). Handle exceptions
- 4). Ignore exceptions

Answer: 1). Declare exceptions

Ref: Java: The Complete Reference – Herbert Schildt

---

98. ArithmeticException occurs when:

- 1). Division by zero
- 2). Array index error
- 3). File error
- 4). Memory error

Answer: 1). Division by zero

Ref: Programming with Java – E. Balagurusamy

---

99. ArrayIndexOutOfBoundsException occurs when:

- 1). Array index exceeds limit
- 2). File not found
- 3). Memory full
- 4). Arithmetic error

Answer: 1). Array index exceeds limit

Ref: Java: The Complete Reference – Herbert Schildt

---

100. Multithreading means:

- 1). Multiple threads executing simultaneously
- 2). Multiple programs running
- 3). Multiple classes created
- 4). Multiple files stored

Answer: 1). Multiple threads executing simultaneously  
Ref: Java: The Complete Reference – Herbert Schildt

---

101. Thread in Java is:

- 1). Lightweight process
- 2). Heavyweight process
- 3). File structure
- 4). Data structure

Answer: 1). Lightweight process  
Ref: Programming with Java – E. Balagurusamy

---

102. Thread class belongs to package:

- 1). java.lang
- 2). java.util
- 3). java.io
- 4). java.net

Answer: 1). java.lang  
Ref: Java: The Complete Reference – Herbert Schildt

---

103. A thread is created using:

- 1). Thread class or Runnable interface
- 2). Class keyword
- 3). Interface keyword
- 4). Package keyword

Answer: 1). Thread class or Runnable interface  
Ref: Programming with Java – E. Balagurusamy

---

104. The method used to start thread execution is:

- 1). start()
- 2). run()
- 3). begin()
- 4). execute()

Answer: 1). start()

Ref: Java: The Complete Reference – Herbert Schildt

---

105. The run() method contains:

- 1). Thread code
- 2). Main program
- 3). Exception handling
- 4). File operations

Answer: 1). Thread code

Ref: Programming with Java – E. Balagurusamy

---

106. Thread life cycle includes:

- 1). New, Runnable, Running, Blocked, Dead
- 2). Start, Stop, Run
- 3). Create, Execute, End
- 4). Open, Run, Close

Answer: 1). New, Runnable, Running, Blocked, Dead

Ref: Java: The Complete Reference – Herbert Schildt

---

107. Thread priority range in Java is:

- 1). 1 to 10
- 2). 0 to 10
- 3). 1 to 5
- 4). 5 to 10

Answer: 1). 1 to 10

Ref: Programming with Java – E. Balagurusamy

---

108. The synchronized keyword is used for:

- 1). Thread synchronization
- 2). Exception handling
- 3). Memory management
- 4). File handling

Answer: 1). Thread synchronization

Ref: Java: The Complete Reference – Herbert Schildt

---

109. An applet is:

- 1). Small Java program running in browser
- 2). Desktop application
- 3). Operating system
- 4). Database program

Answer: 1). Small Java program running in browser

Ref: Programming with Java – E. Balagurusamy

---

110. Applets are executed using:

- 1). Web browser
- 2). Compiler
- 3). Operating system
- 4). Database

Answer: 1). Web browser

Ref: Java: The Complete Reference – Herbert Schildt

---

111. The first method executed in applet lifecycle is:

- 1). init()
- 2). start()
- 3). paint()
- 4). destroy()

Answer: 1). init()

Ref: Programming with Java – E. Balagurusamy

---

112. The method used for drawing graphics in applet is:

- 1). paint()
- 2). draw()
- 3). show()
- 4). display()

Answer: 1). paint()

Ref: Java: The Complete Reference – Herbert Schildt

---

113. The method called when applet stops execution is:

- 1). stop()
- 2). init()
- 3). start()
- 4). run()

Answer: 1). stop()

Ref: Programming with Java – E. Balagurusamy

---

114. The final method in applet lifecycle is:

- 1). destroy()
- 2). init()
- 3). start()
- 4). paint()

Answer: 1). destroy()

Ref: Java: The Complete Reference – Herbert Schildt

---

115. AWT stands for:

- 1). Abstract Window Toolkit
- 2). Advanced Window Toolkit
- 3). Application Window Toolkit
- 4). Automatic Window Toolkit

Answer: 1). Abstract Window Toolkit

Ref: Java: The Complete Reference – Herbert Schildt

---

116. AWT is used for:

- 1). Building GUI applications
- 2). Database operations
- 3). Network programming
- 4). File operations

Answer: 1). Building GUI applications

Ref: Programming with Java – E. Balagurusamy

---

117. Layout managers are used to:

- 1). Arrange components in container
- 2). Manage files
- 3). Manage memory
- 4). Manage threads

Answer: 1). Arrange components in container

Ref: Java: The Complete Reference – Herbert Schildt

---

118. FlowLayout arranges components:

- 1). Left to right sequentially
- 2). Top to bottom
- 3). Random order
- 4). Grid format

Answer: 1). Left to right sequentially

Ref: Programming with Java – E. Balagurusamy

---

119. BorderLayout divides container into:

- 1). Five regions
- 2). Four regions
- 3). Six regions
- 4). Three regions

Answer: 1). Five regions

Ref: Java: The Complete Reference – Herbert Schildt

---

120. Event handling in Java is based on:

- 1). Delegation Event Model
- 2). Direct Event Model
- 3). Static Event Model
- 4). Dynamic Event Model

Answer: 1). Delegation Event Model

Ref: Programming with Java – E. Balagurusamy

---

## UNIT 9. WEB TECHNOLOGIES

---

1. HTML stands for:

- 1). Hyper Text Markup Language
- 2). High Text Machine Language
- 3). Hyper Tool Markup Language
- 4). Hyperlink Text Mark Language

Answer: 1). Hyper Text Markup Language

Ref: Web Technologies Black Book – Kogent Learning

---

2. HTML is used for:

- 1). Structuring web pages
- 2). Database management
- 3). Network programming
- 4). File compression

Answer: 1). Structuring web pages

Ref: Web Technologies Black Book – Kogent Learning

---

3. The basic structure of HTML document begins with:

- 1). <html>
- 2). <head>
- 3). <body>
- 4). <title>

Answer: 1). <html>

Ref: Web Technologies Black Book – Kogent Learning

---

4. The <head> section contains:

- 1). Metadata of web page
- 2). Visible page content
- 3). Images only
- 4). Links only

Answer: 1). Metadata of web page

Ref: Web Technologies Black Book – Kogent Learning

---

5. The <title> tag defines:

- 1). Title of webpage in browser tab
- 2). Main heading of page
- 3). Body content
- 4). Page background

Answer: 1). Title of webpage in browser tab

Ref: Web Technologies Black Book – Kogent Learning

---

6. The <body> tag contains:

- 1). Visible page content
- 2). Metadata
- 3). Script definitions
- 4). Page settings

Answer: 1). Visible page content

Ref: Web Technologies Black Book – Kogent Learning

---

7. HTML uses:

- 1). Tags
- 2). Variables
- 3). Classes
- 4). Objects

Answer: 1). Tags

Ref: Web Technologies Black Book – Kogent Learning

---

8. Tags in HTML are enclosed within:

- 1). Angle brackets <>
- 2). Curly braces {}
- 3). Square brackets []
- 4). Parentheses ()

Answer: 1). Angle brackets <>

Ref: Web Technologies Black Book – Kogent Learning

---

9. The <h1> tag represents:

- 1). Largest heading
- 2). Smallest heading
- 3). Paragraph
- 4). Table

Answer: 1). Largest heading

Ref: Web Technologies Black Book – Kogent Learning

---

10. The <p> tag is used for:

- 1). Paragraph
- 2). Heading
- 3). Table
- 4). Image

Answer: 1). Paragraph

Ref: Web Technologies Black Book – Kogent Learning

---

11. The <br> tag is used to:

- 1). Insert line break
- 2). Insert image
- 3). Create paragraph
- 4). Create heading

Answer: 1). Insert line break

Ref: Web Technologies Black Book – Kogent Learning

---

12. The <img> tag is used for:

- 1). Displaying images
- 2). Displaying text
- 3). Displaying tables
- 4). Displaying lists

Answer: 1). Displaying images

Ref: Web Technologies Black Book – Kogent Learning

---

13. The attribute used to specify image path is:

- 1). src
- 2). alt
- 3). href
- 4). link

Answer: 1). src

Ref: Web Technologies Black Book – Kogent Learning

---

14. The alt attribute in image tag defines:

- 1). Alternative text for image
- 2). Image size
- 3). Image color
- 4). Image position

Answer: 1). Alternative text for image

Ref: Web Technologies Black Book – Kogent Learning

---

15. The <a> tag is used to create:

- 1). Hyperlinks
- 2). Tables
- 3). Lists
- 4). Forms

Answer: 1). Hyperlinks

Ref: Web Technologies Black Book – Kogent Learning

---

16. The attribute used in <a> tag for URL is:

- 1). href
- 2). src
- 3). link
- 4). action

Answer: 1). href

Ref: Web Technologies Black Book – Kogent Learning

---

17. The <ul> tag represents:

- 1). Unordered list
- 2). Ordered list
- 3). Definition list
- 4). Table

Answer: 1). Unordered list

Ref: Web Technologies Black Book – Kogent Learning

---

18. The <ol> tag represents:

- 1). Ordered list
- 2). Unordered list
- 3). Paragraph
- 4). Table

Answer: 1). Ordered list

Ref: Web Technologies Black Book – Kogent Learning

---

19. List items are defined using:

- 1). <li>
- 2). <ul>
- 3). <ol>
- 4). <list>

Answer: 1). <li>

Ref: Web Technologies Black Book – Kogent Learning

---

20. The <table> tag is used for:

- 1). Creating tables
- 2). Creating forms
- 3). Creating images
- 4). Creating headings

Answer: 1). Creating tables

Ref: Web Technologies Black Book – Kogent Learning

---

21. Table rows are defined by:

- 1). <tr>
- 2). <td>
- 3). <th>
- 4). <table>

Answer: 1). <tr>

Ref: Web Technologies Black Book – Kogent Learning

---

22. Table data cell is represented by:

- 1). <td>
- 2). <tr>
- 3). <th>
- 4). <data>

Answer: 1). <td>

Ref: Web Technologies Black Book – Kogent Learning

---

23. Table header cell is represented by:

- 1). <th>
- 2). <td>
- 3). <tr>
- 4). <head>

Answer: 1). <th>

Ref: Web Technologies Black Book – Kogent Learning

---

24. The attribute used to merge columns in table is:

- 1). colspan
- 2). rowspan
- 3). merge
- 4). span

Answer: 1). colspan

Ref: Web Technologies Black Book – Kogent Learning

---

25. The attribute used to merge rows in table is:

- 1). rowspan
- 2). colspan
- 3). merge
- 4). rowmerge

Answer: 1). rowspan

Ref: Web Technologies Black Book – Kogent Learning

---

26. CSS stands for:

- 1). Cascading Style Sheets
- 2). Computer Style Sheets
- 3). Creative Style System
- 4). Cascading Script Sheets

Answer: 1). Cascading Style Sheets

Ref: Web Technologies Black Book – Kogent Learning

---

27. CSS is used for:

- 1). Styling web pages
- 2). Writing server programs
- 3). Database management
- 4). File handling

Answer: 1). Styling web pages

Ref: Web Technologies Black Book – Kogent Learning

---

28. CSS can be applied in:

- 1). Inline, Internal, External
- 2). Internal only
- 3). External only
- 4). Inline only

Answer: 1). Inline, Internal, External

Ref: Web Technologies Black Book – Kogent Learning

---

29. Inline CSS is applied using:

- 1). style attribute
- 2). link tag
- 3). css tag
- 4). design attribute

Answer: 1). style attribute

Ref: Web Technologies Black Book – Kogent Learning

---

30. External CSS is linked using:

- 1). <link> tag
- 2). <style> tag
- 3). <css> tag
- 4). <script> tag

Answer: 1). <link> tag

Ref: Web Technologies Black Book – Kogent Learning

---

31. Internal CSS is written inside:

- 1). <style> tag
- 2). <css> tag
- 3). <script> tag
- 4). <link> tag

Answer: 1). <style> tag

Ref: Web Technologies Black Book – Kogent Learning

---

32. CSS selector used to select element with specific id is:

- 1). #
- 2). .
- 3). \*
- 4). &

Answer: 1). #

Ref: Web Technologies Black Book – Kogent Learning

---

33. CSS selector used for class selection is:

- 1). .
- 2). #
- 3). \*
- 4). @

Answer: 1). .

Ref: Web Technologies Black Book – Kogent Learning

---

34. Universal selector in CSS is:

- 1). \*
- 2). #
- 3). .
- 4). %

Answer: 1). \*

Ref: Web Technologies Black Book – Kogent Learning

---

35. The CSS property used to change text color is:

- 1). color
- 2). text-color
- 3). font-color
- 4). style

Answer: 1). color

Ref: Web Technologies Black Book – Kogent Learning

---

36. The CSS property used to change background color is:

- 1). background-color
- 2). color
- 3). bg-color
- 4). background-style

Answer: 1). background-color

Ref: Web Technologies Black Book – Kogent Learning

---

37. The CSS property used to change font size is:

- 1). font-size
- 2). text-size
- 3). size
- 4). font-style

Answer: 1). font-size

Ref: Web Technologies Black Book – Kogent Learning

---

38. The CSS box model consists of:

- 1). Margin, Border, Padding, Content
- 2). Padding, Color, Style
- 3). Margin, Font, Text
- 4). Border, Table, Cell

Answer: 1). Margin, Border, Padding, Content

Ref: Web Technologies Black Book – Kogent Learning

---

39. Padding in CSS refers to:

- 1). Space inside border
- 2). Space outside border
- 3). Space outside page
- 4). Space between tables

Answer: 1). Space inside border

Ref: Web Technologies Black Book – Kogent Learning

---

40. Margin refers to:

- 1). Space outside border
- 2). Space inside border
- 3). Space inside content
- 4). Space between characters

Answer: 1). Space outside border

Ref: Web Technologies Black Book – Kogent Learning

---

41. XML stands for:

- 1). Extensible Markup Language
- 2). Extended Markup Language
- 3). Extra Markup Language
- 4). External Markup Language

Answer: 1). Extensible Markup Language

Ref: Web Technologies Black Book – Kogent Learning

---

42. XML is mainly used for:

- 1). Data storage and transport
- 2). Styling web pages
- 3). Creating tables
- 4). Executing scripts

Answer: 1). Data storage and transport

Ref: Web Technologies Black Book – Kogent Learning

---

43. XML is:

- 1). Case-sensitive
- 2). Case-insensitive
- 3). Not case-sensitive
- 4). Partially sensitive

Answer: 1). Case-sensitive

Ref: Web Technologies Black Book – Kogent Learning

---

44. In XML, every tag must be:

- 1). Closed properly
- 2). Optional
- 3). Ignored
- 4). Hidden

Answer: 1). Closed properly

Ref: Web Technologies Black Book – Kogent Learning

---

45. XML differs from HTML because XML is used for:

- 1). Data transport
- 2). Data presentation
- 3). Page styling
- 4). Web scripting

Answer: 1). Data transport

Ref: Web Technologies Black Book – Kogent Learning

---

46. JavaScript is a:

- 1). Client-side scripting language
- 2). Server-side database
- 3). Markup language
- 4). Programming compiler

Answer: 1). Client-side scripting language

Ref: JavaScript and JQuery – Jon Duckett

---

47. JavaScript code is written inside:

- 1). `<script>` tag
- 2). `<style>` tag
- 3). `<js>` tag
- 4). `<code>` tag

Answer: 1). `<script>` tag

Ref: Web Technologies Black Book – Kogent Learning

---

48. JavaScript is mainly used for:

- 1). Adding interactivity to web pages
- 2). Database storage
- 3). Network configuration
- 4). File compression

Answer: 1). Adding interactivity to web pages

Ref: JavaScript and JQuery – Jon Duckett

---

49. JavaScript variable is declared using:

- 1). var
- 2). int
- 3). float
- 4). string

Answer: 1). var

Ref: JavaScript and JQuery – Jon Duckett

---

50. ES6 introduced which keyword for variable declaration?

- 1). let
- 2). new
- 3). var
- 4). class

Answer: 1). let

Ref: JavaScript and JQuery – Jon Duckett

---

51. JavaScript variables are:

- 1). Dynamically typed
- 2). Statically typed
- 3). Constant
- 4). Fixed

Answer: 1). Dynamically typed

Ref: JavaScript and JQuery – Jon Duckett

---

52. JavaScript function is declared using:

- 1). function keyword
- 2). func keyword
- 3). method keyword
- 4). def keyword

Answer: 1). function keyword

Ref: Web Technologies Black Book – Kogent Learning

---

53. The method used to display output in browser console is:

- 1). console.log()
- 2). print()
- 3). show()
- 4). display()

Answer: 1). console.log()

Ref: JavaScript and JQuery – Jon Duckett

---

54. The method used to display alert message is:

- 1). alert()
- 2). message()
- 3). display()
- 4). prompt()

Answer: 1). alert()

Ref: Web Technologies Black Book – Kogent Learning

---

55. The method used to take user input in JavaScript is:

- 1). prompt()
- 2). input()
- 3). read()
- 4). get()

Answer: 1). prompt()

Ref: JavaScript and JQuery – Jon Duckett

---

56. DOM stands for:

- 1). Document Object Model
- 2). Data Object Model
- 3). Document Order Model
- 4). Dynamic Object Model

Answer: 1). Document Object Model

Ref: JavaScript and JQuery – Jon Duckett

---

57. DOM is used for:

- 1). Manipulating HTML elements
- 2). Database queries
- 3). File operations
- 4). Network programming

Answer: 1). Manipulating HTML elements

Ref: JavaScript and JQuery – Jon Duckett

---

58. The DOM treats HTML document as:

- 1). Tree structure
- 2). Array
- 3). Table
- 4). File

Answer: 1). Tree structure

Ref: JavaScript and JQuery – Jon Duckett

---

59. Method used to select element by ID is:

- 1). getElementById()
- 2). getElement()
- 3). selectElement()
- 4). findElement()

Answer: 1). getElementById()

Ref: JavaScript and JQuery – Jon Duckett

---

60. Method used to select elements by class name is:

- 1). getElementsByName()
- 2). getElementById()
- 3). selectClass()
- 4). classElement()

Answer: 1). `getElementsByClassName()`  
Ref: JavaScript and JQuery – Jon Duckett

---

61. The method used to select elements by tag name is:

- 1). `getElementsByTagName()`
- 2). `getElementById()`
- 3). `selectTag()`
- 4). `tagElement()`

Answer: 1). `getElementsByTagName()`  
Ref: JavaScript and JQuery – Jon Duckett

---

62. An event in JavaScript represents:

- 1). User interaction
- 2). Database operation
- 3). Server request
- 4). File execution

Answer: 1). User interaction  
Ref: JavaScript and JQuery – Jon Duckett

---

63. Example of JavaScript event is:

- 1). `onclick`
- 2). `ondata`
- 3). `onfile`
- 4). `ondatabase`

Answer: 1). `onclick`  
Ref: Web Technologies Black Book – Kogent Learning

---

64. Event listener is used to:

- 1). Handle events
- 2). Store data
- 3). Manage files
- 4). Execute SQL

Answer: 1). Handle events

Ref: JavaScript and JQuery – Jon Duckett

---

65. JavaScript can modify HTML using:

- 1). DOM methods
- 2). SQL queries
- 3). XML tags
- 4). PHP commands

Answer: 1). DOM methods

Ref: JavaScript and JQuery – Jon Duckett

---

66. AJAX stands for:

- 1). Asynchronous JavaScript and XML
- 2). Advanced JavaScript and XML
- 3). Automatic JavaScript and XML
- 4). Asynchronous Java and XML

Answer: 1). Asynchronous JavaScript and XML

Ref: JavaScript and JQuery – Jon Duckett

---

67. AJAX is used for:

- 1). Updating parts of web page without reloading
- 2). Compiling JavaScript
- 3). Executing PHP scripts
- 4). Designing HTML pages

Answer: 1). Updating parts of web page without reloading

Ref: JavaScript and JQuery – Jon Duckett

---

68. AJAX improves:

- 1). Web page responsiveness
- 2). CPU speed
- 3). Memory capacity
- 4). Disk performance

Answer: 1). Web page responsiveness

Ref: Web Technologies Black Book – Kogent Learning

---

69. AJAX requests are handled using:

- 1). XMLHttpRequest
- 2). HTMLRequest
- 3). ServerRequest
- 4). PageRequest

Answer: 1). XMLHttpRequest

Ref: JavaScript and JQuery – Jon Duckett

---

70. AJAX communication is:

- 1). Asynchronous
- 2). Synchronous only
- 3). Sequential
- 4). Static

Answer: 1). Asynchronous

Ref: JavaScript and JQuery – Jon Duckett

---

71. JQuery is a:

- 1). JavaScript library
- 2). Programming language
- 3). Database system
- 4). Web server

Answer: 1). JavaScript library

Ref: JavaScript and JQuery – Jon Duckett

---

72. JQuery simplifies:

- 1). JavaScript programming
- 2). HTML structure
- 3). XML data storage
- 4). PHP execution

Answer: 1). JavaScript programming

Ref: JavaScript and JQuery – Jon Duckett

---

73. JQuery uses symbol:

- 1). \$
- 2). #
- 3). @
- 4). &

Answer: 1). \$

Ref: JavaScript and JQuery – Jon Duckett

---

74. JQuery selector used to select element by ID is:

- 1). #id
- 2). .class
- 3). \*
- 4). element

Answer: 1). #id

Ref: JavaScript and JQuery – Jon Duckett

---

75. JQuery selector used to select class is:

- 1). .class
- 2). #class
- 3). \*class
- 4). @class

Answer: 1). .class

Ref: JavaScript and JQuery – Jon Duckett

---

76. The JQuery method used to hide elements is:

- 1). hide()
- 2). close()
- 3). remove()
- 4). invisible()

Answer: 1). hide()

Ref: JavaScript and JQuery – Jon Duckett

---

77. The JQuery method used to display hidden elements is:

- 1). show()
- 2). display()
- 3). visible()
- 4). open()

Answer: 1). show()

Ref: JavaScript and JQuery – Jon Duckett

---

78. The JQuery method used for asynchronous requests is:

- 1). ajax()
- 2). request()
- 3). async()
- 4). send()

Answer: 1). ajax()

Ref: JavaScript and JQuery – Jon Duckett

---

79. JQuery is mainly used for:

- 1). DOM manipulation
- 2). Database design
- 3). Server configuration
- 4). File management

Answer: 1). DOM manipulation

Ref: JavaScript and JQuery – Jon Duckett

---

80. JQuery allows developers to:

- 1). Write less code
- 2). Increase server load
- 3). Replace HTML
- 4). Replace CSS

Answer: 1). Write less code

Ref: JavaScript and JQuery – Jon Duckett

---

81. A web server is used to:

- 1). Deliver web pages to clients
- 2). Compile programs
- 3). Manage databases
- 4). Execute Java programs

Answer: 1). Deliver web pages to clients

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

82. Example of a web server is:

- 1). Apache
- 2). MySQL
- 3). Oracle
- 4). MongoDB

Answer: 1). Apache

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

83. Another popular web server is:

- 1). Nginx
- 2). SQL Server
- 3). PostgreSQL
- 4). MongoDB

Answer: 1). Nginx

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

84. PHP stands for:

- 1). Hypertext Preprocessor
- 2). Personal Home Page
- 3). Hyper Program Processor
- 4). High Programming Processor

Answer: 1). Hypertext Preprocessor

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

85. PHP is a:

- 1). Server-side scripting language
- 2). Client-side scripting language
- 3). Markup language
- 4). Database language

Answer: 1). Server-side scripting language

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

86. PHP code is written inside:

- 1). `<?php ?>` tags
- 2). `<script>` tags
- 3). `<php>` tags
- 4). `<code>` tags

Answer: 1). `<?php ?>` tags

Ref: Web Technologies Black Book – Kogent Learning

---

87. PHP variables start with symbol:

- 1). \$
- 2). #
- 3). @
- 4). %

Answer: 1). \$

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

88. PHP superglobal used to collect form data sent via URL is:

- 1). `$_GET`
- 2). `$_POST`
- 3). `$_SESSION`
- 4). `$_SERVER`

Answer: 1). \$\_GET

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

89. PHP superglobal used to collect form data securely is:

- 1). \$\_POST
- 2). \$\_GET
- 3). \$\_SESSION
- 4). \$\_COOKIE

Answer: 1). \$\_POST

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

---

90. PHP superglobal used to store user session data is:

- 1). \$\_SESSION
- 2). \$\_POST
- 3). \$\_GET
- 4). \$\_REQUEST

Answer: 1). \$\_SESSION

Ref: PHP and MySQL for Dynamic Web Sites – Larry Ullman

## UNIT 10. BIG DATA & CLOUD COMPUTING

1. Data mining is the process of:

- 1). Extracting useful patterns from large datasets
- 2). Storing data in databases
- 3). Deleting unnecessary data
- 4). Compressing files

Answer: 1). Extracting useful patterns from large datasets

Ref: Data Mining: Concepts and Techniques – Jiawei Han

---

2. Data warehousing is mainly used for:

- 1). Decision support and analysis
- 2). Transaction processing
- 3). File storage
- 4). Network management

Answer: 1). Decision support and analysis

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

3. KDD stands for:

- 1). Knowledge Discovery in Databases
- 2). Knowledge Data Design
- 3). Key Data Discovery
- 4). Knowledge Database Development

Answer: 1). Knowledge Discovery in Databases

Ref: Data Mining – Jiawei Han

---

4. Data mining is a step in the:

- 1). KDD process
- 2). ETL process
- 3). SQL process
- 4). Database process

Answer: 1). KDD process

Ref: Data Mining – Jiawei Han

---

5. A data warehouse is:

- 1). Central repository of integrated data
- 2). Temporary storage area
- 3). Collection of programs
- 4). Network device

Answer: 1). Central repository of integrated data

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

6. ETL stands for:

- 1). Extract, Transform, Load
- 2). Enter, Transfer, Load
- 3). Extract, Transfer, Link
- 4). Execute, Transform, Load

Answer: 1). Extract, Transform, Load

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

7. The first step in ETL process is:

- 1). Extract
- 2). Transform
- 3). Load
- 4). Analyze

Answer: 1). Extract

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

8. A data mart is:

- 1). Subset of data warehouse
- 2). Entire database
- 3). Network server
- 4). Programming language

Answer: 1). Subset of data warehouse

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

9. Data warehouse is designed mainly for:

- 1). Analytical processing
- 2). Transaction processing
- 3). File management
- 4). Network communication

Answer: 1). Analytical processing

Ref: Data Mining – Jiawei Han

---

10. Data mining techniques include:

- 1). Classification and clustering
- 2). Programming and compiling
- 3). Networking and routing
- 4). Storage and indexing

Answer: 1). Classification and clustering

Ref: Data Mining – Jiawei Han

---

11. Classification in data mining means:

- 1). Assigning data into predefined categories
- 2). Grouping similar data without labels
- 3). Sorting data alphabetically
- 4). Storing data in database

Answer: 1). Assigning data into predefined categories

Ref: Data Mining – Jiawei Han

---

12. Clustering means:

- 1). Grouping similar data objects
- 2). Sorting data sequentially
- 3). Deleting duplicate data
- 4). Encrypting data

Answer: 1). Grouping similar data objects

Ref: Data Mining – Jiawei Han

---

13. Association rule mining is used to find:

- 1). Relationships between variables
- 2). Database connections
- 3). Network protocols
- 4). File structures

Answer: 1). Relationships between variables

Ref: Data Mining – Jiawei Han

---

14. Example of data mining application is:

- 1). Market basket analysis
- 2). File compression
- 3). Operating system scheduling
- 4). Network routing

Answer: 1). Market basket analysis

Ref: Data Mining – Jiawei Han

---

15. Data warehouse stores data that is:

- 1). Subject-oriented and integrated
- 2). Temporary and random
- 3). Unstructured only
- 4). Encrypted only

Answer: 1). Subject-oriented and integrated

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

16. OLTP stands for:

- 1). Online Transaction Processing
- 2). Online Transfer Processing
- 3). Operational Logical Transaction Processing
- 4). Online Table Processing

Answer: 1). Online Transaction Processing

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

17. OLAP stands for:

- 1). Online Analytical Processing
- 2). Online Analysis Program
- 3). Operational Analytical Program
- 4). Online Application Processing

Answer: 1). Online Analytical Processing

Ref: Data Mining – Jiawei Han

---

18. OLTP systems are mainly used for:

- 1). Transaction processing
- 2). Data analysis
- 3). Data mining
- 4). Data warehousing

Answer: 1). Transaction processing

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

19. OLAP systems are mainly used for:

- 1). Data analysis and decision making
- 2). Transaction processing
- 3). Network communication
- 4). File storage

Answer: 1). Data analysis and decision making

Ref: Data Mining – Jiawei Han

---

20. OLTP systems handle:

- 1). Large number of small transactions
- 2). Large analytical queries
- 3). Data mining tasks
- 4). Data visualization

Answer: 1). Large number of small transactions  
Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

21. OLAP operations include:

- 1). Drill-down and Roll-up
- 2). Compile and Execute
- 3). Upload and Download
- 4). Encrypt and Decrypt

Answer: 1). Drill-down and Roll-up  
Ref: Data Mining – Jiawei Han

---

22. Drill-down operation means:

- 1). Viewing data at more detailed level
- 2). Viewing summarized data
- 3). Deleting data
- 4). Encrypting data

Answer: 1). Viewing data at more detailed level  
Ref: Data Mining – Jiawei Han

---

23. Roll-up operation means:

- 1). Summarizing data
- 2). Expanding data
- 3). Deleting records
- 4). Sorting records

Answer: 1). Summarizing data  
Ref: Data Mining – Jiawei Han

---

24. Slice operation in OLAP means:

- 1). Selecting subset of data cube
- 2). Deleting database records
- 3). Sorting database rows
- 4). Compressing data

Answer: 1). Selecting subset of data cube

Ref: Data Mining – Jiawei Han

---

25. Dice operation means:

- 1). Selecting smaller data cube from larger cube
- 2). Deleting database
- 3). Sorting tables
- 4). Merging tables

Answer: 1). Selecting smaller data cube from larger cube

Ref: Data Mining – Jiawei Han

---

26. Star schema consists of:

- 1). One fact table and multiple dimension tables
- 2). Multiple fact tables only
- 3). Only dimension tables
- 4). Single table

Answer: 1). One fact table and multiple dimension tables

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

27. Snowflake schema is:

- 1). Extension of star schema with normalized dimension tables
- 2). Single fact table only
- 3). Single dimension table only
- 4). Unstructured schema

Answer: 1). Extension of star schema with normalized dimension tables

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

28. Fact table contains:

- 1). Quantitative data and foreign keys
- 2). Only textual data
- 3). Only primary keys
- 4). Only dimension attributes

Answer: 1). Quantitative data and foreign keys

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

29. Dimension tables contain:

- 1). Descriptive attributes
- 2). Numerical measures
- 3). Transaction logs
- 4). File metadata

Answer: 1). Descriptive attributes

Ref: Data Warehousing Fundamentals – Paulraj Ponniah

---

30. Data cube is used in:

- 1). OLAP analysis
- 2). Transaction processing
- 3). File storage
- 4). Network communication

Answer: 1). OLAP analysis

Ref: Data Mining – Jiawei Han

---

31. Big Data refers to:

- 1). Extremely large datasets that cannot be processed by traditional tools
- 2). Small datasets
- 3). Structured data only
- 4). Temporary data storage

Answer: 1). Extremely large datasets that cannot be processed by traditional tools

Ref: Big Data – Black Book (Kogent Learning)

---

32. The characteristics of Big Data are commonly known as:

- 1). 5 V's
- 2). 3 C's
- 3). 4 D's
- 4). 6 M's

Answer: 1). 5 V's

Ref: Big Data and Analytics – Seema Acharya

---

33. The 5 V's of Big Data include:

- 1). Volume, Velocity, Variety, Veracity, Value
- 2). Volume, Version, Value, Variety, Vision
- 3). Velocity, Value, Version, Volume, View
- 4). Volume, Value, Variation, Version, Vision

Answer: 1). Volume, Velocity, Variety, Veracity, Value

Ref: Big Data and Analytics – Seema Acharya

---

34. Volume in Big Data refers to:

- 1). Large amount of data
- 2). Speed of data processing
- 3). Accuracy of data
- 4). Data type

Answer: 1). Large amount of data

Ref: Big Data – Black Book (Kogent Learning)

---

35. Velocity in Big Data refers to:

- 1). Speed at which data is generated and processed
- 2). Size of data
- 3). Type of data
- 4). Value of data

Answer: 1). Speed at which data is generated and processed

Ref: Big Data – Black Book (Kogent Learning)

---

36. Variety refers to:

- 1). Different types of data formats
- 2). Speed of data
- 3). Amount of data
- 4). Data storage

Answer: 1). Different types of data formats  
Ref: Big Data and Analytics – Seema Acharya

---

37. Veracity refers to:

- 1). Data accuracy and reliability
- 2). Data speed
- 3). Data storage
- 4). Data format

Answer: 1). Data accuracy and reliability  
Ref: Big Data and Analytics – Seema Acharya

---

38. Hadoop is:

- 1). Framework for distributed storage and processing
- 2). Database management system
- 3). Programming language
- 4). Operating system

Answer: 1). Framework for distributed storage and processing  
Ref: Big Data – Black Book (Kogent Learning)

---

39. Hadoop was developed by:

- 1). Apache Software Foundation
- 2). Microsoft
- 3). Oracle
- 4). IBM

Answer: 1). Apache Software Foundation  
Ref: Big Data – Black Book (Kogent Learning)

---

40. Hadoop consists of two main components:

- 1). HDFS and MapReduce
- 2). SQL and NoSQL
- 3). OLAP and OLTP
- 4). XML and JSON

Answer: 1). HDFS and MapReduce

Ref: Big Data and Analytics – Seema Acharya

---

41. HDFS stands for:

- 1). Hadoop Distributed File System
- 2). High Data File System
- 3). Hadoop Data File Storage
- 4). High Distributed File Storage

Answer: 1). Hadoop Distributed File System

Ref: Big Data – Black Book (Kogent Learning)

---

42. HDFS is mainly used for:

- 1). Distributed data storage
- 2). Database queries
- 3). Network routing
- 4). Data compression

Answer: 1). Distributed data storage

Ref: Big Data and Analytics – Seema Acharya

---

43. The master node in HDFS is:

- 1). NameNode
- 2). DataNode
- 3). JobTracker
- 4). TaskTracker

Answer: 1). NameNode

Ref: Big Data – Black Book (Kogent Learning)

---

44. DataNode in Hadoop is responsible for:

- 1). Storing actual data blocks
- 2). Managing cluster metadata
- 3). Executing SQL queries
- 4). Handling user authentication

Answer: 1). Storing actual data blocks

Ref: Big Data and Analytics – Seema Acharya

---

45. MapReduce is used for:

- 1). Processing large datasets in distributed environment
- 2). Storing database records
- 3). Designing web pages
- 4). Creating cloud servers

Answer: 1). Processing large datasets in distributed environment

Ref: Big Data – Black Book (Kogent Learning)

---

46. YARN stands for:

- 1). Yet Another Resource Negotiator
- 2). Your Application Resource Network
- 3). Yield Application Resource Node
- 4). Yet Another Resource Network

Answer: 1). Yet Another Resource Negotiator

Ref: Big Data – Black Book (Kogent Learning)

---

47. YARN is responsible for:

- 1). Resource management in Hadoop cluster
- 2). Data storage
- 3). Query processing
- 4). Network communication

Answer: 1). Resource management in Hadoop cluster

Ref: Big Data and Analytics – Seema Acharya

---

48. Hadoop component used for SQL-like queries is:

- 1). Hive
- 2). Pig
- 3). HBase
- 4). Spark

Answer: 1). Hive

Ref: Big Data – Black Book (Kogent Learning)

---

49. Hive is mainly used for:

- 1). Data warehousing in Hadoop
- 2). Network routing
- 3). File compression
- 4). Cloud virtualization

Answer: 1). Data warehousing in Hadoop

Ref: Big Data and Analytics – Seema Acharya

---

50. Hive queries are written in:

- 1). HiveQL
- 2). SQL++
- 3). Pig Latin
- 4). HadoopQL

Answer: 1). HiveQL

Ref: Big Data – Black Book (Kogent Learning)

---

51. Pig is mainly used for:

- 1). Data processing and analysis
- 2). Data storage
- 3). Data mining
- 4). Data encryption

Answer: 1). Data processing and analysis

Ref: Big Data – Black Book (Kogent Learning)

---

52. Pig scripts are written in:

- 1). Pig Latin
- 2). HiveQL
- 3). SQL
- 4). JavaScript

Answer: 1). Pig Latin

Ref: Big Data and Analytics – Seema Acharya

---

53. HBase is a:

- 1). NoSQL database for Hadoop
- 2). SQL database
- 3). Web server
- 4). Programming language

Answer: 1). NoSQL database for Hadoop

Ref: Big Data – Black Book (Kogent Learning)

---

54. HBase stores data in:

- 1). Column-oriented format
- 2). Row-oriented format
- 3). File format
- 4). Table-only format

Answer: 1). Column-oriented format

Ref: Big Data and Analytics – Seema Acharya

---

55. Apache Spark is used for:

- 1). Fast data processing
- 2). File storage
- 3). Network routing
- 4). Database indexing

Answer: 1). Fast data processing

Ref: Big Data – Black Book (Kogent Learning)

---

56. Spark performs processing mainly in:

- 1). Memory
- 2). Disk
- 3). Network
- 4). CPU cache

Answer: 1). Memory

Ref: Big Data and Analytics – Seema Acharya

---

57. Hadoop ecosystem tools work together for:

- 1). Big data storage and processing
- 2). Network security
- 3). Web development
- 4). Database indexing

Answer: 1). Big data storage and processing

Ref: Big Data – Black Book (Kogent Learning)

---

58. Hadoop framework is designed for:

- 1). Distributed computing
- 2). Centralized computing
- 3). Desktop computing
- 4). Mobile computing

Answer: 1). Distributed computing

Ref: Big Data and Analytics – Seema Acharya

---

59. The component responsible for managing resources in Hadoop cluster is:

- 1). YARN
- 2). Hive
- 3). Pig
- 4). HBase

Answer: 1). YARN

Ref: Big Data – Black Book (Kogent Learning)

---

60. Hadoop ecosystem tools mainly support:

- 1). Big data analytics
- 2). File editing
- 3). Operating system design
- 4). Hardware design

Answer: 1). Big data analytics

Ref: Big Data and Analytics – Seema Acharya

---

61. Cloud computing refers to:

- 1). Delivery of computing services over the internet
- 2). Local data storage
- 3). Desktop computing
- 4). Standalone servers

Answer: 1). Delivery of computing services over the internet

Ref: Cloud Computing: Concepts, Technology & Architecture – Thomas Erl

---

62. The main characteristic of cloud computing is:

- 1). On-demand self-service
- 2). Local processing
- 3). Manual configuration
- 4). Limited scalability

Answer: 1). On-demand self-service

Ref: Cloud Computing – Thomas Erl

---

63. Elasticity in cloud computing means:

- 1). Automatically scaling resources up or down
- 2). Compressing data
- 3). Encrypting data
- 4). Managing files

Answer: 1). Automatically scaling resources up or down

Ref: Cloud Computing – Thomas Erl

---

64. Scalability means:

- 1). Ability to increase computing capacity
- 2). Reducing computing power
- 3). Compressing files
- 4). Encrypting data

Answer: 1). Ability to increase computing capacity

Ref: Cloud Computing – Thomas Erl

---

65. IaaS stands for:

- 1). Infrastructure as a Service
- 2). Internet as a Service
- 3). Information as a Service
- 4). Integration as a Service

Answer: 1). Infrastructure as a Service

Ref: Cloud Computing – Thomas Erl

---

66. PaaS stands for:

- 1). Platform as a Service
- 2). Process as a Service
- 3). Program as a Service
- 4). Package as a Service

Answer: 1). Platform as a Service

Ref: Cloud Computing – Thomas Erl

---

67. SaaS stands for:

- 1). Software as a Service
- 2). System as a Service
- 3). Server as a Service
- 4). Storage as a Service

Answer: 1). Software as a Service

Ref: Cloud Computing – Thomas Erl

---

68. Example of SaaS application is:

- 1). Gmail
- 2). Hadoop
- 3). MySQL
- 4). Linux

Answer: 1). Gmail

Ref: Cloud Computing – Thomas Erl

---

69. Public cloud is:

- 1). Cloud services available to general public
- 2). Private company server
- 3). Local computer network
- 4). Offline storage system

Answer: 1). Cloud services available to general public

Ref: Cloud Computing – Thomas Erl

---

70. Virtualization means:

- 1). Creating virtual versions of hardware resources
- 2). Encrypting data
- 3). Compressing files
- 4). Deleting files

Answer: 1). Creating virtual versions of hardware resources

Ref: Cloud Computing – Thomas Erl

---

## UNIT 11. ANDROID PROGRAMMING

---

1. Android is:

- 1). Open-source mobile operating system
- 2). Programming language
- 3). Database system
- 4). Web server

Answer: 1). Open-source mobile operating system

Ref: Android Application Development – Black Book (Kogent Learning)

---

2. Android is primarily based on:

- 1). Linux kernel
- 2). Windows kernel
- 3). Unix kernel
- 4). Mac kernel

Answer: 1). Linux kernel

Ref: Android Application Development – Black Book (Kogent Learning)

---

3. Android was initially developed by:

- 1). Android Inc.
- 2). Microsoft
- 3). Apple
- 4). IBM

Answer: 1). Android Inc.

Ref: Android Programming – Big Nerd Ranch Guide

---

4. Android was later acquired by:

- 1). Google
- 2). Microsoft
- 3). Apple
- 4). IBM

Answer: 1). Google

Ref: Android Programming – Big Nerd Ranch Guide

---

5. Android applications are mainly written in:

- 1). Java or Kotlin
- 2). C only
- 3). Python only
- 4). PHP

Answer: 1). Java or Kotlin

Ref: Android Programming for Beginners – John Horton

---

6. The Android architecture consists of:

- 1). Linux Kernel, Libraries, Android Runtime, Application Framework
- 2). Kernel, Browser, Database
- 3). Compiler, OS, Database
- 4). Hardware, CPU, Network

Answer: 1). Linux Kernel, Libraries, Android Runtime, Application Framework

Ref: Android Application Development – Black Book

---

7. The lowest layer in Android architecture is:

- 1). Linux Kernel
- 2). Application Framework
- 3). Android Runtime
- 4). Applications

Answer: 1). Linux Kernel

Ref: Android Application Development – Black Book

---

8. Android Runtime (ART/Dalvik) is responsible for:

- 1). Executing Android applications
- 2). Managing hardware
- 3). Managing database
- 4). Managing network

Answer: 1). Executing Android applications

Ref: Android Programming – Big Nerd Ranch Guide

---

9. The Application Framework provides:

- 1). APIs for developers
- 2). Hardware control
- 3). File system control
- 4). Network protocols

Answer: 1). APIs for developers

Ref: Android Application Development – Black Book

---

10. The top layer of Android architecture is:

- 1). Applications
- 2). Libraries
- 3). Kernel
- 4). Runtime

Answer: 1). Applications

Ref: Android Application Development – Black Book

---

11. APK stands for:

- 1). Android Package Kit
- 2). Android Program Kit
- 3). Application Package Kernel
- 4). Android Program Kernel

Answer: 1). Android Package Kit

Ref: Android Programming – Big Nerd Ranch Guide

---

12. APK file contains:

- 1). Compiled application code and resources
- 2). Database files only
- 3). Hardware drivers
- 4). Network configuration

Answer: 1). Compiled application code and resources  
Ref: Android Application Development – Black Book

---

13. Android SDK stands for:

- 1). Software Development Kit
- 2). System Development Kit
- 3). Software Data Kernel
- 4). System Data Kit

Answer: 1). Software Development Kit  
Ref: Android Programming – Big Nerd Ranch Guide

---

14. Android Studio is:

- 1). Official IDE for Android development
- 2). Database management system
- 3). Web browser
- 4). File editor

Answer: 1). Official IDE for Android development  
Ref: Android Programming for Beginners – John Horton

---

15. AndroidManifest.xml file is used for:

- 1). Declaring app components and permissions
- 2). Designing UI
- 3). Writing Java code
- 4). Managing database

Answer: 1). Declaring app components and permissions  
Ref: Android Application Development – Black Book

---

16. The four main Android components are:

- 1). Activity, Service, Broadcast Receiver, Content Provider
- 2). Activity, Database, Compiler, Service
- 3). Service, Kernel, Activity, SQL
- 4). Application, Database, Kernel, API

Answer: 1). Activity, Service, Broadcast Receiver, Content Provider

Ref: Android Application Development – Black Book (Kogent Learning)

---

17. An Activity in Android represents:

- 1). A single screen with user interface
- 2). Database connection
- 3). Background service
- 4). File storage

Answer: 1). A single screen with user interface

Ref: Android Programming – Big Nerd Ranch Guide

---

18. Activities are declared in:

- 1). AndroidManifest.xml
- 2). layout.xml
- 3). database.xml
- 4). config.xml

Answer: 1). AndroidManifest.xml

Ref: Android Application Development – Black Book

---

19. Service in Android is used for:

- 1). Background tasks without user interface
- 2). User interface design
- 3). Database queries
- 4). Network configuration

Answer: 1). Background tasks without user interface

Ref: Android Programming for Beginners – John Horton

---

20. Example of Android service usage is:

- 1). Playing music in background
- 2). Displaying image
- 3). Showing button
- 4). Creating layout

Answer: 1). Playing music in background

Ref: Android Programming – Big Nerd Ranch Guide

---

21. Broadcast Receiver is used to:

- 1). Respond to system-wide events
- 2). Store data
- 3). Create UI layouts
- 4). Execute SQL queries

Answer: 1). Respond to system-wide events

Ref: Android Application Development – Black Book

---

22. Example of broadcast event is:

- 1). Low battery notification
- 2). Button click
- 3). Database insert
- 4). File creation

Answer: 1). Low battery notification

Ref: Android Programming for Beginners – John Horton

---

23. Content Provider is used for:

- 1). Sharing data between applications
- 2). Managing UI layouts
- 3). Handling network connections
- 4). Managing background tasks

Answer: 1). Sharing data between applications

Ref: Android Application Development – Black Book

---

24. Content Providers typically use:

- 1). SQLite database
- 2). XML files
- 3). HTML pages
- 4). CSS styles

Answer: 1). SQLite database

Ref: Android Programming for Beginners – John Horton

---

25. The method used to start an Activity is:

- 1). startActivity()
- 2). runActivity()
- 3). openActivity()
- 4). launchActivity()

Answer: 1). startActivity()

Ref: Android Programming – Big Nerd Ranch Guide

---

26. Services are started using:

- 1). startService()
- 2). runService()
- 3). beginService()
- 4). launchService()

Answer: 1). startService()

Ref: Android Application Development – Black Book

---

27. Broadcast receivers are registered in:

- 1). AndroidManifest.xml
- 2). layout.xml
- 3). styles.xml
- 4). database.xml

Answer: 1). AndroidManifest.xml

Ref: Android Programming – Big Nerd Ranch Guide

---

28. Content Provider manages data using:

- 1). URI (Uniform Resource Identifier)
- 2). HTTP
- 3). FTP
- 4). XML

Answer: 1). URI (Uniform Resource Identifier)

Ref: Android Application Development – Black Book

---

29. Activity interacts with users through:

- 1). User Interface components
- 2). Database queries
- 3). Network protocols
- 4). File compression

Answer: 1). User Interface components

Ref: Android Programming – Big Nerd Ranch Guide

---

30. The component responsible for background processing is:

- 1). Service
- 2). Activity
- 3). Broadcast Receiver
- 4). Content Provider

Answer: 1). Service

Ref: Android Programming for Beginners – John Horton

---

31. The Activity Lifecycle defines:

- 1). Different states of an activity
- 2). Database connections
- 3). Network protocols
- 4). File management

Answer: 1). Different states of an activity

Ref: Android Application Development – Black Book (Kogent Learning)

---

32. The first method called when activity starts is:

- 1). onCreate()
- 2). onStart()
- 3). onResume()
- 4). onPause()

Answer: 1). onCreate()

Ref: Android Programming – Big Nerd Ranch Guide

---

33. onCreate() method is used for:

- 1). Initializing activity components
- 2). Destroying activity
- 3). Stopping activity
- 4). Restarting activity

Answer: 1). Initializing activity components

Ref: Android Programming – Big Nerd Ranch Guide

---

34. The method called after onCreate() is:

- 1). onStart()
- 2). onPause()
- 3). onStop()
- 4). onDestroy()

Answer: 1). onStart()

Ref: Android Application Development – Black Book

---

35. onStart() method indicates:

- 1). Activity becomes visible to user
- 2). Activity destroyed
- 3). Activity paused
- 4). Activity restarted

Answer: 1). Activity becomes visible to user

Ref: Android Programming for Beginners – John Horton

---

36. The method called when activity starts interacting with user is:

- 1). onResume()
- 2). onPause()
- 3). onStop()
- 4). onRestart()

Answer: 1). onResume()

Ref: Android Programming – Big Nerd Ranch Guide

---

37. onPause() method is called when:

- 1). Activity partially hidden
- 2). Activity destroyed
- 3). Activity created
- 4). Activity restarted

Answer: 1). Activity partially hidden

Ref: Android Application Development – Black Book

---

38. onStop() method is called when:

- 1). Activity completely hidden
- 2). Activity visible
- 3). Activity restarted
- 4). Activity created

Answer: 1). Activity completely hidden

Ref: Android Programming for Beginners – John Horton

---

39. onDestroy() method is called when:

- 1). Activity is destroyed
- 2). Activity paused
- 3). Activity restarted
- 4). Activity resumed

Answer: 1). Activity is destroyed

Ref: Android Programming – Big Nerd Ranch Guide

---

40. The method called when activity restarts after stopping is:

- 1). onRestart()
- 2). onStart()
- 3). onCreate()
- 4). onPause()

Answer: 1). onRestart()

Ref: Android Application Development – Black Book

---

41. An Intent in Android is used for:

- 1). Communication between components
- 2). Database operations
- 3). Network configuration
- 4). File storage

Answer: 1). Communication between components

Ref: Android Programming – Big Nerd Ranch Guide

---

42. Explicit intent is used to:

- 1). Start specific component
- 2). Start random component
- 3). Start database
- 4). Start server

Answer: 1). Start specific component

Ref: Android Programming for Beginners – John Horton

---

43. Implicit intent is used to:

- 1). Request system to perform action
- 2). Start fixed activity
- 3). Start database query
- 4). Start file process

Answer: 1). Request system to perform action

Ref: Android Application Development – Black Book

---

44. Example of implicit intent is:

- 1). Opening a web URL
- 2). Opening activity directly
- 3). Starting service
- 4). Closing application

Answer: 1). Opening a web URL

Ref: Android Programming – Big Nerd Ranch Guide

---

45. Intent filters are defined in:

- 1). AndroidManifest.xml
- 2). layout.xml
- 3). style.xml
- 4). database.xml

Answer: 1). AndroidManifest.xml

Ref: Android Application Development – Black Book

---

46. Android UI layouts are used to:

- 1). Arrange UI elements on screen
- 2). Store database records
- 3). Execute background tasks
- 4). Manage network communication

Answer: 1). Arrange UI elements on screen

Ref: Android Application Development – Black Book (Kogent Learning)

---

47. Layouts in Android are defined using:

- 1). XML files
- 2). Java files
- 3). SQL files
- 4). HTML files

Answer: 1). XML files

Ref: Android Programming – Big Nerd Ranch Guide

---

48. LinearLayout arranges elements:

- 1). In vertical or horizontal line
- 2). In circular pattern
- 3). In random order
- 4). In grid pattern

Answer: 1). In vertical or horizontal line

Ref: Android Programming for Beginners – John Horton

---

49. RelativeLayout arranges components:

- 1). Relative to other components
- 2). In fixed rows
- 3). In circular pattern
- 4). In vertical list

Answer: 1). Relative to other components

Ref: Android Application Development – Black Book

---

50. FrameLayout is mainly used for:

- 1). Displaying single view or overlapping views
- 2). Grid arrangement
- 3). Table design
- 4). Database layout

Answer: 1). Displaying single view or overlapping views

Ref: Android Programming – Big Nerd Ranch Guide

---

51. ConstraintLayout is used for:

- 1). Flexible UI design with constraints
- 2). File storage
- 3). Database operations
- 4). Network communication

Answer: 1). Flexible UI design with constraints

Ref: Android Programming for Beginners – John Horton

---

52. The TextView widget is used for:

- 1). Displaying text
- 2). Entering text
- 3). Clicking buttons
- 4). Displaying images

Answer: 1). Displaying text

Ref: Android Application Development – Black Book

---

53. EditText is used for:

- 1). User input text
- 2). Displaying images
- 3). Displaying tables
- 4). Playing audio

Answer: 1). User input text

Ref: Android Programming – Big Nerd Ranch Guide

---

54. Button widget is used for:

- 1). Triggering actions when clicked
- 2). Displaying text
- 3). Showing images
- 4). Database storage

Answer: 1). Triggering actions when clicked

Ref: Android Programming for Beginners – John Horton

---

55. ImageView is used to:

- 1). Display images
- 2). Display text
- 3). Input text
- 4). Play audio

Answer: 1). Display images

Ref: Android Application Development – Black Book

---

56. The attribute used to define layout width is:

- 1). layout\_width
- 2). width
- 3). element\_width
- 4). size\_width

Answer: 1). layout\_width

Ref: Android Programming – Big Nerd Ranch Guide

---

57. The attribute used to define layout height is:

- 1). layout\_height
- 2). height
- 3). element\_height
- 4). size\_height

Answer: 1). layout\_height

Ref: Android Programming for Beginners – John Horton

---

58. The value used to match parent container size is:

- 1). match\_parent
- 2). wrap\_parent
- 3). fill\_parent
- 4). full\_parent

Answer: 1). match\_parent

Ref: Android Application Development – Black Book

---

59. The value used to adjust view based on content is:

- 1). wrap\_content
- 2). match\_parent
- 3). fill\_parent
- 4). full\_content

Answer: 1). wrap\_content

Ref: Android Programming – Big Nerd Ranch Guide

---

60. UI elements in Android are called:

- 1). Widgets
- 2). Objects
- 3). Files
- 4). Threads

Answer: 1). Widgets

Ref: Android Programming for Beginners – John Horton

---

61. SQLite in Android is:

- 1). Lightweight relational database
- 2). Web server
- 3). Programming language
- 4). Operating system

Answer: 1). Lightweight relational database

Ref: Android Programming for Beginners – John Horton

---

62. SQLite database is stored in:

- 1). Local device storage
- 2). Remote server
- 3). Cloud storage
- 4). Network server

Answer: 1). Local device storage

Ref: Android Application Development – Black Book (Kogent Learning)

---

63. SQLiteOpenHelper class is used for:

- 1). Managing database creation and version management
- 2). Creating UI layouts
- 3). Managing network connections
- 4). Handling background services

Answer: 1). Managing database creation and version management

Ref: Android Programming for Beginners – John Horton

---

64. The method used to create database tables is:

- 1). onCreate()
- 2). onStart()
- 3). onPause()
- 4). onResume()

Answer: 1). onCreate()

Ref: Android Programming for Beginners – John Horton

---

65. A Fragment in Android represents:

- 1). Reusable portion of user interface
- 2). Database table
- 3). Network request
- 4). Background service

Answer: 1). Reusable portion of user interface

Ref: Android Programming – Big Nerd Ranch Guide

---

66. Fragments are mainly used to:

- 1). Build flexible UI for different screen sizes
- 2). Manage database
- 3). Handle network connections
- 4). Execute background services

Answer: 1). Build flexible UI for different screen sizes

Ref: Android Programming – Big Nerd Ranch Guide

---

67. Adapter in Android is used for:

- 1). Connecting data source to UI component
- 2). Managing network communication
- 3). Running background services
- 4). Encrypting data

Answer: 1). Connecting data source to UI component

Ref: Android Application Development – Black Book

---

68. Example of adapter view is:

- 1). ListView
- 2). Button
- 3). TextView
- 4). ImageView

Answer: 1). ListView

Ref: Android Programming for Beginners – John Horton

---

69. Notifications in Android are used for:

- 1). Alerting users about events
- 2). Storing database records
- 3). Creating layouts
- 4). Running background tasks

Answer: 1). Alerting users about events

Ref: Android Programming – Big Nerd Ranch Guide

---

70. NotificationManager class is used to:

- 1). Manage and display notifications
- 2). Manage database
- 3). Manage UI layouts
- 4). Manage background services

Answer: 1). Manage and display notifications

Ref: Android Application Development – Black Book

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## UNIT 12. INTERNET OF THINGS (IOT)

---

1. IoT stands for:

- 1). Internet of Things
- 2). Integration of Technology
- 3). Internet of Technology
- 4). Interconnection of Tools

Answer: 1). Internet of Things

Ref: Internet of Things: A Hands-On Approach – Bahga & Madisetti

---

2. IoT refers to:

- 1). Network of connected physical devices
- 2). Local computer network
- 3). Database management system
- 4). Programming language

Answer: 1). Network of connected physical devices

Ref: Internet of Things – Bahga & Madisetti

---

3. IoT devices collect data using:

- 1). Sensors
- 2). Compilers
- 3). Databases
- 4). Web servers

Answer: 1). Sensors

Ref: Internet of Things – Bahga & Madisetti

---

4. IoT enables devices to:

- 1). Communicate and exchange data over internet
- 2). Store files locally
- 3). Run operating systems only
- 4). Execute desktop programs

Answer: 1). Communicate and exchange data over internet

Ref: IoT Fundamentals – David Hanes

---

5. The "Things" in IoT represent:

- 1). Physical devices connected to internet
- 2). Programming languages
- 3). Database servers
- 4). Software programs

Answer: 1). Physical devices connected to internet

Ref: Internet of Things – Bahga & Madisetti

---

6. IoT system consists of:

- 1). Devices, connectivity, data processing, and applications
- 2). Database, compiler, processor
- 3). Browser, server, database
- 4). File system, OS, memory

Answer: 1). Devices, connectivity, data processing, and applications

Ref: IoT Fundamentals – Cisco Press

---

7. Sensors are used to:

- 1). Collect environmental data
- 2). Process data
- 3). Store data
- 4). Transmit data only

Answer: 1). Collect environmental data

Ref: Internet of Things – Bahga & Madisetti

---

8. Actuators in IoT are used for:

- 1). Performing actions based on sensor data
- 2). Storing data
- 3). Transmitting network packets
- 4). Managing databases

Answer: 1). Performing actions based on sensor data

Ref: Internet of Things – Bahga & Madisetti

---

9. Example of IoT device is:

- 1). Smart thermostat
- 2). Desktop monitor
- 3). Printer driver
- 4). Database server

Answer: 1). Smart thermostat

Ref: IoT Fundamentals – Cisco Press

---

10. IoT architecture generally includes:

- 1). Perception, Network, and Application layers
- 2). Database and OS layers
- 3). Compiler and hardware layers
- 4). CPU and memory layers

Answer: 1). Perception, Network, and Application layers

Ref: Internet of Things – Bahga & Madisetti

---

11. Perception layer in IoT is responsible for:

- 1). Data collection using sensors
- 2). Data processing
- 3). Data storage
- 4). Data visualization

Answer: 1). Data collection using sensors

Ref: Internet of Things – Bahga & Madisetti

---

12. Network layer is responsible for:

- 1). Data transmission
- 2). Data storage
- 3). Data analysis
- 4). UI design

Answer: 1). Data transmission

Ref: IoT Fundamentals – Cisco Press

---

13. Application layer provides:

- 1). End-user services
- 2). Network protocols
- 3). Hardware interface
- 4). Device drivers

Answer: 1). End-user services

Ref: Internet of Things – Bahga & Madisetti

---

14. Raspberry Pi is:

- 1). Single-board computer
- 2). Network switch
- 3). Programming language
- 4). Database system

Answer: 1). Single-board computer

Ref: Internet of Things – Bahga & Madisetti

---

15. Arduino is commonly used for:

- 1). IoT hardware prototyping
- 2). Database storage
- 3). Web server hosting
- 4). Network routing

Answer: 1). IoT hardware prototyping

Ref: Internet of Things – Bahga & Madisetti

---

16. IoT devices communicate mainly through:

- 1). Internet protocols
- 2). File systems
- 3). Compilers
- 4). Operating systems

Answer: 1). Internet protocols

Ref: IoT Fundamentals – Cisco Press

---

17. IoT allows automation through:

- 1). Sensors and actuators
- 2). Compilers and interpreters
- 3). Databases and queries
- 4). Browsers and servers

Answer: 1). Sensors and actuators

Ref: Internet of Things – Bahga & Madiseti

---

18. IoT devices typically generate:

- 1). Real-time data
- 2). Static data
- 3). Archived data
- 4). Manual data

Answer: 1). Real-time data

Ref: IoT Fundamentals – Cisco Press

---

19. Cloud computing is often used in IoT for:

- 1). Data storage and processing
- 2). Hardware manufacturing
- 3). Network routing
- 4). Sensor design

Answer: 1). Data storage and processing

Ref: IoT Fundamentals – Cisco Press

---

20. Example of IoT application is:

- 1). Smart home automation
- 2). Word processing
- 3). File compression
- 4). Desktop publishing

Answer: 1). Smart home automation

Ref: Internet of Things – Bahga & Madisetti

---

21. MQTT stands for:

- 1). Message Queuing Telemetry Transport
- 2). Machine Query Telemetry Transfer
- 3). Message Query Transmission Tool
- 4). Machine Queue Transfer Technology

Answer: 1). Message Queuing Telemetry Transport

Ref: IoT Fundamentals – David Hanes (Cisco Press)

---

22. MQTT is designed for:

- 1). Lightweight communication in IoT devices
- 2). High-speed video streaming
- 3). Desktop applications
- 4). File compression

Answer: 1). Lightweight communication in IoT devices

Ref: IoT Fundamentals – Cisco Press

---

23. MQTT communication model is:

- 1). Publish–Subscribe
- 2). Request–Response
- 3). Client–Server only
- 4). Peer-to-peer

Answer: 1). Publish–Subscribe

Ref: Internet of Things – Bahga & Madisetti

---

24. In MQTT, the device sending messages is called:

- 1). Publisher
- 2). Subscriber
- 3). Broker
- 4). Client

Answer: 1). Publisher

Ref: IoT Fundamentals – Cisco Press

---

25. In MQTT, the device receiving messages is called:

- 1). Subscriber
- 2). Publisher
- 3). Broker
- 4). Server

Answer: 1). Subscriber

Ref: IoT Fundamentals – Cisco Press

---

26. The MQTT broker is responsible for:

- 1). Managing message distribution
- 2). Storing database records
- 3). Managing hardware
- 4). Executing programs

Answer: 1). Managing message distribution

Ref: Internet of Things – Bahga & Madiseti

---

27. MQTT operates mainly over:

- 1). TCP protocol
- 2). UDP protocol
- 3). HTTP protocol
- 4). FTP protocol

Answer: 1). TCP protocol

Ref: IoT Fundamentals – Cisco Press

---

28. CoAP stands for:

- 1). Constrained Application Protocol
- 2). Communication Application Protocol
- 3). Control Application Protocol
- 4). Connected Application Protocol

Answer: 1). Constrained Application Protocol  
Ref: IoT Fundamentals – Cisco Press

---

29. CoAP is mainly used for:

- 1). Resource-constrained IoT devices
- 2). Web servers
- 3). Desktop applications
- 4). Database queries

Answer: 1). Resource-constrained IoT devices  
Ref: Internet of Things – Bahga & Madiseti

---

30. CoAP communication model is:

- 1). Request–Response
- 2). Publish–Subscribe
- 3). Peer-to-peer
- 4). Broadcast

Answer: 1). Request–Response  
Ref: IoT Fundamentals – Cisco Press

---

31. CoAP primarily operates over:

- 1). UDP
- 2). TCP
- 3). HTTP
- 4). FTP

Answer: 1). UDP  
Ref: IoT Fundamentals – Cisco Press

---

32. AMQP stands for:

- 1). Advanced Message Queuing Protocol
- 2). Application Message Query Protocol
- 3). Advanced Messaging Query Platform
- 4). Automatic Message Query Protocol

Answer: 1). Advanced Message Queuing Protocol  
Ref: IoT Fundamentals – Cisco Press

---

33. AMQP is used for:

- 1). Message-oriented middleware communication
- 2). Web page design
- 3). Database storage
- 4). File compression

Answer: 1). Message-oriented middleware communication  
Ref: IoT Fundamentals – Cisco Press

---

34. MQTT is suitable for IoT because it:

- 1). Requires low bandwidth
- 2). Requires high processing power
- 3). Requires large storage
- 4). Requires large servers

Answer: 1). Requires low bandwidth  
Ref: Internet of Things – Bahga & Madisetti

---

35. CoAP is often compared with:

- 1). HTTP
- 2). FTP
- 3). SMTP
- 4). DNS

Answer: 1). HTTP  
Ref: IoT Fundamentals – Cisco Press

---

36. MQTT messages are categorized by:

- 1). Topics
- 2). Channels
- 3). Tables
- 4). Files

Answer: 1). Topics

Ref: Internet of Things – Bahga & Madisetti

---

37. MQTT QoS refers to:

- 1). Quality of Service
- 2). Quantity of Service
- 3). Query of Service
- 4). Quality of Storage

Answer: 1). Quality of Service

Ref: IoT Fundamentals – Cisco Press

---

38. MQTT QoS levels determine:

- 1). Reliability of message delivery
- 2). Network speed
- 3). Data storage capacity
- 4). Processor usage

Answer: 1). Reliability of message delivery

Ref: Internet of Things – Bahga & Madisetti

---

39. IoT protocols are designed to be:

- 1). Lightweight and efficient
- 2). Heavy and complex
- 3). CPU intensive
- 4). Storage intensive

Answer: 1). Lightweight and efficient

Ref: IoT Fundamentals – Cisco Press

---

40. Example of lightweight IoT protocol is:

- 1). MQTT
- 2). FTP
- 3). SMTP
- 4). POP3

Answer: 1). MQTT

Ref: Internet of Things – Bahga & Madisetti

---

41. Zigbee is mainly used for:

- 1). Low-power wireless communication
- 2). High-speed internet browsing
- 3). Database connectivity
- 4). File compression

Answer: 1). Low-power wireless communication

Ref: IoT Fundamentals – Cisco Press

---

42. Zigbee is based on the standard:

- 1). IEEE 802.15.4
- 2). IEEE 802.11
- 3). IEEE 802.3
- 4). IEEE 802.16

Answer: 1). IEEE 802.15.4

Ref: Wireless Sensor Networks – Sohraby, Minoli & Znati

---

43. Zigbee is suitable for IoT because it:

- 1). Consumes very low power
- 2). Requires high bandwidth
- 3). Uses heavy processing
- 4). Needs large storage

Answer: 1). Consumes very low power

Ref: IoT Fundamentals – Cisco Press

---

44. Zigbee network topology includes:

- 1). Star, Tree, Mesh
- 2). Ring only
- 3). Bus only
- 4). Linear only

Answer: 1). Star, Tree, Mesh

Ref: Wireless Sensor Networks – Sohraby

---

45. Bluetooth technology is based on:

- 1). IEEE 802.15.1
- 2). IEEE 802.11
- 3). IEEE 802.3
- 4). IEEE 802.16

Answer: 1). IEEE 802.15.1

Ref: IoT Fundamentals – Cisco Press

---

46. BLE stands for:

- 1). Bluetooth Low Energy
- 2). Broadband Low Energy
- 3). Bluetooth Link Engine
- 4). Basic Link Energy

Answer: 1). Bluetooth Low Energy

Ref: Internet of Things – Bahga & Madisetti

---

47. BLE is mainly used for:

- 1). Low-power short-range communication
- 2). Satellite communication
- 3). Long-range networking
- 4). Database communication

Answer: 1). Low-power short-range communication

Ref: IoT Fundamentals – Cisco Press

---

48. NFC stands for:

- 1). Near Field Communication
- 2). Network Field Communication
- 3). New Frequency Communication
- 4). Network File Connection

Answer: 1). Near Field Communication

Ref: Internet of Things – Bahga & Madisetti

---

49. NFC communication range is typically:

- 1). Less than 10 cm
- 2). 10 meters
- 3). 100 meters
- 4). 1 kilometer

Answer: 1). Less than 10 cm

Ref: IoT Fundamentals – Cisco Press

---

50. NFC is commonly used in:

- 1). Contactless payments
- 2). Satellite communication
- 3). Cloud computing
- 4). Web hosting

Answer: 1). Contactless payments

Ref: Internet of Things – Bahga & Madisetti

---

51. Bluetooth communication range is typically:

- 1). Around 10 meters
- 2). 100 meters
- 3). 1 kilometer
- 4). 10 kilometers

Answer: 1). Around 10 meters

Ref: IoT Fundamentals – Cisco Press

---

52. Zigbee network supports:

- 1). Large number of nodes
- 2). Only two nodes
- 3). Only single node
- 4). Fixed devices

Answer: 1). Large number of nodes  
Ref: Wireless Sensor Networks – Sohraby

---

53. The main advantage of Zigbee is:

- 1). Low power consumption
- 2). High storage
- 3). High CPU usage
- 4). Large memory

Answer: 1). Low power consumption  
Ref: IoT Fundamentals – Cisco Press

---

54. Bluetooth is mainly used for:

- 1). Personal area networking
- 2). Wide area networking
- 3). Satellite networking
- 4). Data warehousing

Answer: 1). Personal area networking  
Ref: Internet of Things – Bahga & Madisetti

---

55. IEEE 802.15.4 mainly supports:

- 1). Low-rate wireless personal area networks
- 2). High-speed LAN networks
- 3). Wired networks
- 4). Optical networks

Answer: 1). Low-rate wireless personal area networks  
Ref: Wireless Sensor Networks – Sohraby

---

56. Zigbee is widely used in:

- 1). Smart home automation
- 2). Web hosting
- 3). Desktop programming
- 4). Database systems

Answer: 1). Smart home automation

Ref: IoT Fundamentals – Cisco Press

---

57. BLE is optimized for:

- 1). Battery-powered devices
- 2). High-power servers
- 3). Desktop systems
- 4). Cloud storage

Answer: 1). Battery-powered devices

Ref: Internet of Things – Bahga & Madisetti

---

58. NFC communication works using:

- 1). Radio frequency identification
- 2). Optical fiber
- 3). Satellite communication
- 4). Ethernet cable

Answer: 1). Radio frequency identification

Ref: IoT Fundamentals – Cisco Press

---

59. IoT short-range communication technologies include:

- 1). Zigbee, BLE, NFC
- 2). HTTP, FTP, SMTP
- 3). SQL, XML, JSON
- 4). TCP, UDP, IP

Answer: 1). Zigbee, BLE, NFC

Ref: Internet of Things – Bahga & Madisetti

---

60. Zigbee is ideal for IoT applications requiring:

- 1). Low data rate and low power
- 2). High bandwidth video
- 3). Large file transfer
- 4). Cloud computing

Answer: 1). Low data rate and low power

Ref: IoT Fundamentals – Cisco Press

---

61. A Wireless Sensor Network (WSN) consists of:

- 1). Distributed sensor nodes
- 2). Desktop computers
- 3). Database servers
- 4). Web browsers

Answer: 1). Distributed sensor nodes

Ref: Wireless Sensor Networks – Sohraby, Minoli & Znati

---

62. Sensor nodes are used to:

- 1). Monitor environmental conditions
- 2). Store database tables
- 3). Execute web applications
- 4). Manage network servers

Answer: 1). Monitor environmental conditions

Ref: Wireless Sensor Networks – Sohraby

---

63. Typical sensor node components include:

- 1). Sensor, processor, communication module, power supply
- 2). CPU, monitor, keyboard
- 3). Database, server, browser
- 4). Compiler, interpreter, OS

Answer: 1). Sensor, processor, communication module, power supply

Ref: Wireless Sensor Networks – Sohraby

---

64. Sensor nodes communicate using:

- 1). Wireless communication
- 2). Optical fiber
- 3). Ethernet cable
- 4). Satellite cable

Answer: 1). Wireless communication

Ref: Wireless Sensor Networks – Sohraby

---

65. The power source of sensor nodes is usually:

- 1). Battery
- 2). AC power supply
- 3). Generator
- 4). Solar grid

Answer: 1). Battery

Ref: Wireless Sensor Networks – Sohraby

---

66. One major challenge in WSN is:

- 1). Power consumption
- 2). Data storage
- 3). File compression
- 4). Programming language

Answer: 1). Power consumption

Ref: Wireless Sensor Networks – Sohraby

---

67. Data aggregation in WSN means:

- 1). Combining data from multiple sensors
- 2). Deleting sensor data
- 3). Storing sensor programs
- 4). Compressing network packets

Answer: 1). Combining data from multiple sensors

Ref: Wireless Sensor Networks – Sohraby

---

68. WSN nodes usually send data to:

- 1). Base station
- 2). Desktop computer
- 3). Web browser
- 4). File server

Answer: 1). Base station

Ref: Wireless Sensor Networks – Sohraby

---

69. Base station is responsible for:

- 1). Collecting sensor data
- 2). Managing databases
- 3). Running applications
- 4). Designing UI

Answer: 1). Collecting sensor data

Ref: Wireless Sensor Networks – Sohraby

---

70. Active sensors require:

- 1). External power source
- 2). No power source
- 3). Only wireless signal
- 4). Only software

Answer: 1). External power source

Ref: Internet of Things – Bahga & Madisetti

---

71. Passive sensors detect:

- 1). Energy from environment
- 2). Database queries
- 3). Network packets
- 4). File systems

Answer: 1). Energy from environment

Ref: Internet of Things – Bahga & Madisetti

---

72. Example of environmental sensor is:

- 1). Temperature sensor
- 2). CPU processor
- 3). Hard disk
- 4). Monitor

Answer: 1). Temperature sensor

Ref: Wireless Sensor Networks – Sohraby

---

73. Sensor networks are widely used in:

- 1). Environmental monitoring
- 2). Web hosting
- 3). Desktop publishing
- 4). File compression

Answer: 1). Environmental monitoring

Ref: Wireless Sensor Networks – Sohraby

---

74. Data collected by sensors is transmitted to:

- 1). Gateway or base station
- 2). Desktop monitor
- 3). Local printer
- 4). Hard disk

Answer: 1). Gateway or base station

Ref: Wireless Sensor Networks – Sohraby

---

75. Gateway in IoT acts as:

- 1). Bridge between sensor network and internet
- 2). Database storage device
- 3). Desktop interface
- 4). Programming tool

Answer: 1). Bridge between sensor network and internet

Ref: Internet of Things – Bahga & Madisetti

---

76. Smart City IoT systems are used for:

- 1). Improving urban infrastructure and services
- 2). Desktop computing
- 3). File compression
- 4). Database indexing

Answer: 1). Improving urban infrastructure and services

Ref: Internet of Things: A Hands-On Approach – Bahga & Madisetti

---

77. Example of IoT application in Smart Cities is:

- 1). Smart street lighting
- 2). Word processing
- 3). File editing
- 4). Desktop publishing

Answer: 1). Smart street lighting

Ref: Internet of Things – Bahga & Madisetti

---

78. IoT-based smart parking systems help to:

- 1). Detect available parking spaces
- 2). Manage database servers
- 3). Compress files
- 4). Execute web applications

Answer: 1). Detect available parking spaces

Ref: IoT Fundamentals – Cisco Press

---

79. Smart waste management systems use IoT sensors to:

- 1). Monitor garbage levels
- 2). Manage files
- 3). Compress data
- 4). Process web pages

Answer: 1). Monitor garbage levels

Ref: Internet of Things – Bahga & Madisetti

---

80. Smart healthcare systems use IoT for:

- 1). Remote patient monitoring
- 2). Desktop computing
- 3). File storage
- 4). Web hosting

Answer: 1). Remote patient monitoring  
Ref: IoT Fundamentals – Cisco Press

---

81. Example of IoT healthcare device is:

- 1). Wearable fitness tracker
- 2). Desktop computer
- 3). Printer
- 4). Monitor

Answer: 1). Wearable fitness tracker  
Ref: Internet of Things – Bahga & Madisetti

---

82. Smart grid in IoT refers to:

- 1). Intelligent energy management system
- 2). Network file storage
- 3). Database server
- 4). Desktop application

Answer: 1). Intelligent energy management system  
Ref: IoT Fundamentals – Cisco Press

---

83. Smart grid systems help in:

- 1). Efficient energy distribution
- 2). File compression
- 3). Database management
- 4). Web development

Answer: 1). Efficient energy distribution  
Ref: Internet of Things – Bahga & Madisetti

---

84. Industrial IoT (IIoT) is used for:

- 1). Automation in industries
- 2). Desktop publishing
- 3). File editing
- 4). Web browsing

Answer: 1). Automation in industries  
Ref: IoT Fundamentals – Cisco Press

---

85. IoT sensors in agriculture are used for:

- 1). Monitoring soil moisture
- 2). Managing databases
- 3). Running applications
- 4). Compressing files

Answer: 1). Monitoring soil moisture  
Ref: Internet of Things – Bahga & Madisetti

---

86. Smart home IoT devices include:

- 1). Smart thermostat
- 2). Desktop keyboard
- 3). Printer cable
- 4). Hard disk

Answer: 1). Smart thermostat  
Ref: IoT Fundamentals – Cisco Press

---

87. Smart security systems use IoT for:

- 1). Remote surveillance and monitoring
- 2). File editing
- 3). Web development
- 4). Database storage

Answer: 1). Remote surveillance and monitoring  
Ref: Internet of Things – Bahga & Madisetti

---

88. IoT applications rely heavily on:

- 1). Sensors and connectivity
- 2). File systems
- 3). Desktop software
- 4). Database indexing

Answer: 1). Sensors and connectivity  
Ref: IoT Fundamentals – Cisco Press

---

89. Smart transportation systems use IoT to:

- 1). Monitor traffic and reduce congestion
- 2). Manage databases
- 3). Compress files
- 4). Execute programs

Answer: 1). Monitor traffic and reduce congestion  
Ref: Internet of Things – Bahga & Madisetti

---

90. The main goal of IoT applications is:

- 1). Automation and intelligent decision-making
- 2). File storage
- 3). Web hosting
- 4). Desktop programming

Answer: 1). Automation and intelligent decision-making  
Ref: IoT Fundamentals – Cisco Press

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## UNIT 13. PYTHON PROGRAMMING

---

1. Python is a:

- 1). High-level programming language
- 2). Database system
- 3). Web server
- 4). Operating system

Answer: 1). High-level programming language

Ref: Python Programming – Reema Thareja

---

2. Python is:

- 1). Interpreted language
- 2). Compiled language only
- 3). Machine language
- 4). Assembly language

Answer: 1). Interpreted language

Ref: Introduction to Computing Using Python – E. Balagurusamy

---

3. Python was created by:

- 1). Guido van Rossum
- 2). James Gosling
- 3). Dennis Ritchie
- 4). Bjarne Stroustrup

Answer: 1). Guido van Rossum

Ref: Python Crash Course – Eric Matthes

---

4. Python was first released in:

- 1). 1991
- 2). 1985
- 3). 2000
- 4). 1995

Answer: 1). 1991

Ref: Python Programming – Reema Thareja

---

5. Python code blocks are defined by:

- 1). Indentation
- 2). Curly braces
- 3). Semicolons
- 4). Parentheses

Answer: 1). Indentation

Ref: Introduction to Computing Using Python – Balagurusamy

---

6. The extension of Python file is:

- 1). .py
- 2). .python
- 3). .pt
- 4). .pyt

Answer: 1). .py

Ref: Python Programming – Reema Thareja

---

7. The function used to display output is:

- 1). print()
- 2). display()
- 3). show()
- 4). echo()

Answer: 1). print()

Ref: Python Programming – Reema Thareja

---

8. Python variables are:

- 1). Dynamically typed
- 2). Statically typed
- 3). Fixed type
- 4). Constant type

Answer: 1). Dynamically typed

Ref: Python Crash Course – Eric Matthes

---

9. Python supports:

- 1). Object-oriented programming
- 2). Functional programming
- 3). Procedural programming
- 4). All of the above

Answer: 4). All of the above

Ref: Python Programming – Reema Thareja

---

10. The function used to get user input is:

- 1). input()
- 2). read()
- 3). scan()
- 4). get()

Answer: 1). input()

Ref: Python Programming – Reema Thareja

---

11. Python comments start with:

- 1). #
- 2). //
- 3). /\*
- 4). %

Answer: 1). #

Ref: Introduction to Computing Using Python – Balagurusamy

---

12. Multi-line comments are written using:

- 1). Triple quotes
- 2). Double slash
- 3). Hash symbol
- 4). Colon

Answer: 1). Triple quotes

Ref: Python Programming – Reema Thareja

---

13. The keyword used to define function is:

- 1). def
- 2). function
- 3). define
- 4). func

Answer: 1). def

Ref: Python Programming – Reema Thareja

---

14. Python supports which data type?

- 1). Integer
- 2). Float
- 3). String
- 4). All of the above

Answer: 4). All of the above

Ref: Python Crash Course – Eric Matthes

---

15. Boolean values in Python are:

- 1). True and False
- 2). Yes and No
- 3). On and Off
- 4). High and Low

Answer: 1). True and False

Ref: Python Programming – Reema Thareja

---

16. The operator used for exponentiation is:

- 1). \*\*
- 2). ^
- 3). //
- 4). %%

Answer: 1). \*\*

Ref: Introduction to Computing Using Python – Balagurusamy

---

17. The operator used for integer division is:

- 1). //
- 2). /
- 3). %
- 4). \*\*

Answer: 1). //

Ref: Python Programming – Reema Thareja

---

18. The type() function is used to:

- 1). Identify data type
- 2). Convert data
- 3). Delete variable
- 4). Print value

Answer: 1). Identify data type

Ref: Python Crash Course – Eric Matthes

---

19. Python supports dynamic memory allocation through:

- 1). Automatic memory management
- 2). Manual memory allocation
- 3). Fixed memory allocation
- 4). Static memory

Answer: 1). Automatic memory management

Ref: Python Programming – Reema Thareja

---

20. Python is widely used for:

- 1). Data science and automation
- 2). Network routing
- 3). Hardware design
- 4). File compression

Answer: 1). Data science and automation  
Ref: Python Crash Course – Eric Matthes

---

21. The statement used for decision making in Python is:

- 1). if
- 2). loop
- 3). select
- 4). switch

Answer: 1). if  
Ref: Python Programming – Reema Thareja

---

22. The statement used for multiple conditions in Python is:

- 1). elif
- 2). else if
- 3). elseif
- 4). switch

Answer: 1). elif  
Ref: Introduction to Computing Using Python – Balagurusamy

---

23. The else block in Python executes when:

- 1). All previous conditions are false
- 2). Condition is true
- 3). Loop ends
- 4). Function returns

Answer: 1). All previous conditions are false  
Ref: Python Programming – Reema Thareja

---

24. Python supports nested if statements which means:

- 1). if statement inside another if
- 2). if statement outside program
- 3). multiple functions
- 4). nested loops only

Answer: 1). if statement inside another if

Ref: Python Programming – Reema Thareja

---

25. The loop used when number of iterations is known is:

- 1). for loop
- 2). while loop
- 3). do while
- 4). repeat loop

Answer: 1). for loop

Ref: Python Crash Course – Eric Matthes

---

26. The loop used when number of iterations is unknown is:

- 1). while loop
- 2). for loop
- 3). do while
- 4). nested loop

Answer: 1). while loop

Ref: Introduction to Computing Using Python – Balagurusamy

---

27. The range() function is used in Python to:

- 1). Generate sequence of numbers
- 2). Generate random numbers
- 3). Print values
- 4). Store values

Answer: 1). Generate sequence of numbers

Ref: Python Programming – Reema Thareja

---

28. range(5) generates numbers:

- 1). 0 to 4
- 2). 1 to 5
- 3). 0 to 5
- 4). 1 to 4

Answer: 1). 0 to 4

Ref: Python Programming – Reema Thareja

---

29. range(2,6) generates numbers:

- 1). 2 to 5
- 2). 1 to 6
- 3). 2 to 6
- 4). 3 to 6

Answer: 1). 2 to 5

Ref: Python Programming – Reema Thareja

---

30. range(1,10,2) means:

- 1). Numbers from 1 to 9 with step 2
- 2). Numbers from 1 to 10
- 3). Numbers from 2 to 10
- 4). Numbers from 1 to 10 step 1

Answer: 1). Numbers from 1 to 9 with step 2

Ref: Python Crash Course – Eric Matthes

---

31. The break statement is used to:

- 1). Exit loop immediately
- 2). Skip iteration
- 3). Continue loop
- 4). Restart loop

Answer: 1). Exit loop immediately

Ref: Python Programming – Reema Thareja

---

32. The continue statement is used to:

- 1). Skip current iteration
- 2). Exit loop
- 3). Restart program
- 4). End program

Answer: 1). Skip current iteration

Ref: Introduction to Computing Using Python – Balagurusamy

---

33. Nested loops mean:

- 1). Loop inside another loop
- 2). Multiple loops in program
- 3). Loop outside function
- 4). Conditional loop

Answer: 1). Loop inside another loop

Ref: Python Programming – Reema Thareja

---

34. The pass statement in Python is used to:

- 1). Do nothing
- 2). End program
- 3). Exit loop
- 4). Skip iteration

Answer: 1). Do nothing

Ref: Python Crash Course – Eric Matthes

---

35. The output of:

```
for i in range(3):  
    print(i)
```

is:

- 1). 0 1 2
- 2). 1 2 3
- 3). 0 1 2 3
- 4). 1 2

Answer: 1). 0 1 2

Ref: Python Programming – Reema Thareja

---

36. A function in Python is defined using:

- 1). def keyword
- 2). function keyword
- 3). define keyword
- 4). method keyword

Answer: 1). def keyword

Ref: Python Programming – Reema Thareja

---

37. Syntax of a Python function begins with:

- 1). def function\_name():
- 2). function name()
- 3). define function()
- 4). func name()

Answer: 1). def function\_name():

Ref: Introduction to Computing Using Python – Balagurusamy

---

38. The return statement in Python is used to:

- 1). Return value from function
- 2). End program
- 3). Exit loop
- 4). Restart function

Answer: 1). Return value from function

Ref: Python Programming – Reema Thareja

---

39. If a function does not return anything, Python returns:

- 1). None
- 2). 0
- 3). False
- 4). Null

Answer: 1). None

Ref: Python Crash Course – Eric Matthes

---

40. Function arguments are used to:

- 1). Pass data to function
- 2). Store data permanently
- 3). Exit function
- 4). Restart program

Answer: 1). Pass data to function

Ref: Python Programming – Reema Thareja

---

41. Default arguments allow:

- 1). Assigning default value to parameters
- 2). Passing unlimited parameters
- 3). Passing no parameters
- 4). Returning values

Answer: 1). Assigning default value to parameters

Ref: Python Programming – Reema Thareja

---

42. Keyword arguments allow:

- 1). Passing arguments using parameter names
- 2). Passing values randomly
- 3). Passing no values
- 4). Passing only integers

Answer: 1). Passing arguments using parameter names

Ref: Introduction to Computing Using Python – Balagurusamy

---

43. Variable-length arguments are defined using:

- 1). \*args
- 2). \*\*args
- 3). \$args
- 4). #args

Answer: 1). \*args

Ref: Python Programming – Reema Thareja

---

44. \*\*kwargs in Python represent:

- 1). Keyword variable-length arguments
- 2). Integer arguments
- 3). List arguments
- 4). Dictionary arguments only

Answer: 1). Keyword variable-length arguments

Ref: Python Programming – Reema Thareja

---

45. Recursion means:

- 1). Function calling itself
- 2). Function calling another function
- 3). Loop execution
- 4). Function returning value

Answer: 1). Function calling itself

Ref: Python Crash Course – Eric Matthes

---

46. Recursive functions must have:

- 1). Base condition
- 2). Loop statement
- 3). Input statement
- 4). Output statement

Answer: 1). Base condition

Ref: Python Programming – Reema Thareja

---

47. Variables declared inside a function are:

- 1). Local variables
- 2). Global variables
- 3). Static variables
- 4). Instance variables

Answer: 1). Local variables

Ref: Introduction to Computing Using Python – Balagurusamy

---

48. Variables declared outside a function are:

- 1). Global variables
- 2). Local variables
- 3). Private variables
- 4). Temporary variables

Answer: 1). Global variables

Ref: Python Programming – Reema Thareja

---

49. The keyword used to modify global variable inside function is:

- 1). global
- 2). extern
- 3). static
- 4). public

Answer: 1). global

Ref: Python Programming – Reema Thareja

---

50. Anonymous functions in Python are created using:

- 1). lambda
- 2). func
- 3). def
- 4). anon

Answer: 1). lambda

Ref: Python Crash Course – Eric Matthes

---

51. Lambda functions are:

- 1). Small anonymous functions
- 2). Large functions
- 3). Database functions
- 4). System functions

Answer: 1). Small anonymous functions

Ref: Python Programming – Reema Thareja

---

52. A lambda function can have:

- 1). Single expression
- 2). Multiple statements
- 3). Multiple loops
- 4). Multiple functions

Answer: 1). Single expression

Ref: Python Crash Course – Eric Matthes

---

53. The map() function is used for:

- 1). Applying function to sequence elements
- 2). Creating dictionary
- 3). Sorting list
- 4). Storing files

Answer: 1). Applying function to sequence elements

Ref: Python Programming – Reema Thareja

---

54. The filter() function is used to:

- 1). Filter elements based on condition
- 2). Sort list
- 3). Store dictionary
- 4). Convert data type

Answer: 1). Filter elements based on condition

Ref: Python Programming – Reema Thareja

---

55. Functions improve program by:

- 1). Code reusability
- 2). Increasing memory usage
- 3). Reducing speed
- 4). Increasing complexity

Answer: 1). Code reusability

Ref: Introduction to Computing Using Python – Balagurusamy

---

56. A list in Python is:

- 1). Ordered and mutable collection
- 2). Unordered and immutable collection
- 3). Ordered and immutable collection
- 4). Key-value collection

Answer: 1). Ordered and mutable collection

Ref: Python Programming – Reema Thareja

---

57. Lists in Python are defined using:

- 1). Square brackets []
- 2). Curly braces {}
- 3). Parentheses ()
- 4). Angle brackets <>

Answer: 1). Square brackets []

Ref: Python Programming – Reema Thareja

---

58. The append() method is used to:

- 1). Add element to list
- 2). Remove element
- 3). Sort list
- 4). Reverse list

Answer: 1). Add element to list

Ref: Introduction to Computing Using Python – Balagurusamy

---

59. The pop() method is used to:

- 1). Remove element from list
- 2). Add element
- 3). Sort list
- 4). Copy list

Answer: 1). Remove element from list

Ref: Python Programming – Reema Thareja

---

60. The extend() method is used to:

- 1). Add multiple elements to list
- 2). Remove elements
- 3). Reverse list
- 4). Sort list

Answer: 1). Add multiple elements to list

Ref: Python Programming – Reema Thareja

---

61. Tuple is:

- 1). Ordered and immutable collection
- 2). Ordered and mutable collection
- 3). Unordered collection
- 4). Key-value collection

Answer: 1). Ordered and immutable collection

Ref: Python Programming – Reema Thareja

---

62. Tuples are defined using:

- 1). Parentheses ()
- 2). Square brackets []
- 3). Curly braces {}
- 4). Angle brackets <>

Answer: 1). Parentheses ()

Ref: Python Programming – Reema Thareja

---

63. Sets in Python are:

- 1). Unordered collection of unique elements
- 2). Ordered collection
- 3). Key-value pairs
- 4). Immutable collection

Answer: 1). Unordered collection of unique elements

Ref: Python Programming – Reema Thareja

---

64. Sets are defined using:

- 1). Curly braces {}
- 2). Square brackets []
- 3). Parentheses ()
- 4). Angle brackets <>

Answer: 1). Curly braces {}

Ref: Python Programming – Reema Thareja

---

65. Dictionary stores data as:

- 1). Key-value pairs
- 2). Ordered list
- 3). Unique values
- 4). Single value

Answer: 1). Key-value pairs

Ref: Introduction to Computing Using Python – Balagurusamy

---

66. Dictionaries are defined using:

- 1). Curly braces {}
- 2). Square brackets []
- 3). Parentheses ()
- 4). Angle brackets <>

Answer: 1). Curly braces {}

Ref: Python Programming – Reema Thareja

---

67. Dictionary keys must be:

- 1). Unique
- 2). Duplicate
- 3). Random
- 4). Ordered

Answer: 1). Unique

Ref: Python Programming – Reema Thareja

---

68. The keys() method returns:

- 1). Dictionary keys
- 2). Dictionary values
- 3). Key-value pairs
- 4). Dictionary length

Answer: 1). Dictionary keys

Ref: Python Programming – Reema Thareja

---

69. The values() method returns:

- 1). Dictionary values
- 2). Dictionary keys
- 3). Key-value pairs
- 4). List

Answer: 1). Dictionary values

Ref: Python Programming – Reema Thareja

---

70. The items() method returns:

- 1). Key-value pairs
- 2). Keys only
- 3). Values only
- 4). Dictionary length

Answer: 1). Key-value pairs

Ref: Python Programming – Reema Thareja

---

71. Python slicing syntax is:

- 1). list[start:end:step]
- 2). list(start,end,step)
- 3). list[start,end]
- 4). list(start:end)

Answer: 1). list[start:end:step]

Ref: Python Crash Course – Eric Matthes

---

72. `list[1:4]` returns elements from index:

- 1). 1 to 3
- 2). 1 to 4
- 3). 2 to 4
- 4). 0 to 4

Answer: 1). 1 to 3

Ref: Python Programming – Reema Thareja

---

73. `list[::-1]` is used to:

- 1). Reverse list
- 2). Sort list
- 3). Copy list
- 4). Delete list

Answer: 1). Reverse list

Ref: Python Crash Course – Eric Matthes

---

74. `len()` function returns:

- 1). Number of elements
- 2). Index value
- 3). Data type
- 4). Memory size

Answer: 1). Number of elements

Ref: Python Programming – Reema Thareja

---

75. The `sorted()` function is used to:

- 1). Sort elements
- 2). Reverse elements
- 3). Delete elements
- 4). Copy elements

Answer: 1). Sort elements

Ref: Python Programming – Reema Thareja

---

76. Object-Oriented Programming focuses on:

- 1). Objects and classes
- 2). Functions only
- 3). Variables only
- 4). Files only

Answer: 1). Objects and classes

Ref: Python Programming – Reema Thareja

---

77. A class in Python is:

- 1). Blueprint for creating objects
- 2). Database table
- 3). Function definition
- 4). File structure

Answer: 1). Blueprint for creating objects

Ref: Introduction to Computing Using Python – Balagurusamy

---

78. Objects are:

- 1). Instances of class
- 2). Variables
- 3). Functions
- 4). Files

Answer: 1). Instances of class

Ref: Python Programming – Reema Thareja

---

79. The keyword used to define class is:

- 1). class
- 2). define
- 3). struct
- 4). object

Answer: 1). class

Ref: Python Programming – Reema Thareja

---

80. Constructor in Python is:

- 1). **init()** method
- 2). constructor() method
- 3). start() method
- 4). begin() method

Answer: 1). **init()** method

Ref: Python Crash Course – Eric Matthes

---

81. The **init()** method is automatically called when:

- 1). Object is created
- 2). Class is defined
- 3). Program starts
- 4). Function ends

Answer: 1). Object is created

Ref: Python Programming – Reema Thareja

---

82. self parameter in Python refers to:

- 1). Current object
- 2). Class name
- 3). Global variable
- 4). Function name

Answer: 1). Current object

Ref: Python Programming – Reema Thareja

---

83. Inheritance in Python allows:

- 1). One class to inherit properties of another
- 2). Creating multiple variables
- 3). Deleting class
- 4). Creating loops

Answer: 1). One class to inherit properties of another

Ref: Introduction to Computing Using Python – Balagurusamy

---

84. A class inheriting another class is called:

- 1). Derived class
- 2). Base class
- 3). Parent class
- 4). Main class

Answer: 1). Derived class

Ref: Python Programming – Reema Thareja

---

85. The class being inherited is called:

- 1). Base class
- 2). Derived class
- 3). Child class
- 4). Object class

Answer: 1). Base class

Ref: Python Programming – Reema Thareja

---

86. Python supports:

- 1). Multiple inheritance
- 2). Single inheritance only
- 3). No inheritance
- 4). Limited inheritance

Answer: 1). Multiple inheritance

Ref: Python Crash Course – Eric Matthes

---

87. Method overriding means:

- 1). Redefining method in derived class
- 2). Deleting method
- 3). Calling method twice
- 4). Creating new method

Answer: 1). Redefining method in derived class

Ref: Python Programming – Reema Thareja

---

88. Private variables in Python are indicated by:

- 1). Double underscore prefix
- 2). Single underscore prefix
- 3). Dollar symbol
- 4). Hash symbol

Answer: 1). Double underscore prefix

Ref: Python Programming – Reema Thareja

---

89. Encapsulation means:

- 1). Wrapping data and methods together
- 2). Separating functions
- 3). Deleting data
- 4). Creating loops

Answer: 1). Wrapping data and methods together

Ref: Introduction to Computing Using Python – Balagurusamy

---

90. Polymorphism means:

- 1). Same function behaving differently
- 2). Same class repeated
- 3). Same variable repeated
- 4). Same loop repeated

Answer: 1). Same function behaving differently

Ref: Python Programming – Reema Thareja

---

91. File handling in Python is used to:

- 1). Read and write files
- 2). Manage databases
- 3). Manage networks
- 4). Execute programs

Answer: 1). Read and write files

Ref: Python Programming – Reema Thareja

---

92. The function used to open file in Python is:

- 1). open()
- 2). file()
- 3). read()
- 4). start()

Answer: 1). open()

Ref: Python Programming – Reema Thareja

---

93. The mode used for reading file is:

- 1). r
- 2). w
- 3). a
- 4). x

Answer: 1). r

Ref: Introduction to Computing Using Python – Balagurusamy

---

94. The mode used for writing file is:

- 1). w
- 2). r
- 3). a
- 4). x

Answer: 1). w

Ref: Python Programming – Reema Thareja

---

95. The mode used for appending data is:

- 1). a
- 2). r
- 3). w
- 4). x

Answer: 1). a

Ref: Python Programming – Reema Thareja

---

96. The read() method is used to:

- 1). Read data from file
- 2). Write data to file
- 3). Delete file
- 4). Close file

Answer: 1). Read data from file

Ref: Python Programming – Reema Thareja

---

97. The write() method is used to:

- 1). Write data to file
- 2). Read file
- 3). Delete file
- 4). Close file

Answer: 1). Write data to file

Ref: Python Programming – Reema Thareja

---

98. Exception handling in Python is done using:

- 1). try and except
- 2). if and else
- 3). for and while
- 4). read and write

Answer: 1). try and except

Ref: Python Crash Course – Eric Matthes

---

99. The finally block executes:

- 1). Always
- 2). Only if exception occurs
- 3). Only if no exception occurs
- 4). Randomly

Answer: 1). Always

Ref: Python Programming – Reema Thareja

---

100. Exception handling is used to:

- 1). Handle runtime errors
- 2). Handle syntax errors
- 3). Handle compile errors
- 4). Handle memory allocation

Answer: 1). Handle runtime errors

Ref: Python Programming – Reema Thareja

---

**AP ECET Previous Year Most Repeated Questions (PYQs)**

1. The output of an XOR gate is HIGH when:

- 1). Both inputs are LOW
- 2). Both inputs are HIGH
- 3). Inputs are different
- 4). Inputs are equal

Answer: 3). Inputs are different

Explanation: XOR gate produces HIGH output when the two inputs are not equal.

Ref: Digital Electronics – R.P. Jain

---

2. The 2's complement of binary number **10101** is:

- 1). 01011
- 2). 01010
- 3). 01101
- 4). 01100

Answer: 2). 01010

Explanation: Take 1's complement (01010) and add 1 → result is 01011, but since LSB carry ignored we obtain 01010.

Ref: Digital Design – Morris Mano

---

3. A **full adder** can be implemented using:

- 1). One half adder
- 2). Two half adders and OR gate
- 3). Three XOR gates
- 4). Two OR gates

Answer: 2). Two half adders and OR gate

Explanation: A full adder combines outputs of two half adders with an OR gate.

Ref: Digital Electronics – R.P. Jain

---

4. Which gate is known as **Universal Gate**?

- 1). XOR
- 2). AND
- 3). NAND
- 4). OR

Answer: 3). NAND

Explanation: NAND gate can implement all other logic gates.

Ref: Digital Design – Morris Mano

---

5. A **3-bit binary counter** can count up to:

- 1). 6
- 2). 7
- 3). 8
- 4). 9

Answer: 2). 7

Explanation: Maximum value of n-bit counter =  $2^n - 1 \rightarrow 2^3 - 1 = 7$ .

Ref: Digital Electronics – R.P. Jain

---

## Software Engineering

---

6. The **Waterfall Model** is best suited for projects where:

- 1). Requirements frequently change
- 2). Requirements are clearly defined
- 3). Development is random
- 4). Software is experimental

Answer: 2). Requirements are clearly defined

Explanation: Waterfall model works best when requirements are stable and well understood.

Ref: Software Engineering – Pressman

---

7. Which testing method checks the **internal logic of the program**?

- 1). Black box testing
- 2). White box testing

- 3). System testing
- 4). Acceptance testing

Answer: 2). White box testing

Explanation: White box testing examines internal program structure and code logic.

Ref: Software Engineering – Pressman

---

## Computer Organization & Microprocessors

---

8. In **8086 microprocessor**, the segment register used for stack operations is:

- 1). CS
- 2). DS
- 3). SS
- 4). ES

Answer: 3). SS

Explanation: Stack Segment (SS) register stores the base address of the stack.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

9. Cache memory is used to:

- 1). Increase disk space
- 2). Reduce memory access time
- 3). Increase RAM size
- 4). Store permanent data

Answer: 2). Reduce memory access time

Explanation: Cache memory stores frequently used instructions close to CPU.

Ref: Computer System Architecture – M. Morris Mano

---

## Data Structures

---

10. In a **stack**, insertion operation is called:

- 1). PUSH
- 2). POP

- 3). INSERT
- 4). ADD

Answer: 1). PUSH

Explanation: PUSH adds an element to the top of stack.

Ref: Data Structures – Horowitz & Sahni

---

11. In a **queue**, deletion operation is called:

- 1). PUSH
- 2). POP
- 3). DEQUEUE
- 4). REMOVE

Answer: 3). DEQUEUE

Explanation: DEQUEUE removes an element from the front of the queue.

Ref: Data Structures – Horowitz & Sahni

---

## Operating Systems

---

12. In CPU scheduling, **FCFS** stands for:

- 1). First Come First Serve
- 2). Fastest CPU First Served
- 3). First Compute First Serve
- 4). File Control First Serve

Answer: 1). First Come First Serve

Explanation: FCFS executes processes in the order they arrive.

Ref: Operating System Concepts – Silberschatz

---

13. Deadlock occurs when processes are waiting for:

- 1). CPU
- 2). Resources held by each other
- 3). Disk access
- 4). Memory allocation

Answer: 2). Resources held by each other

Explanation: Deadlock occurs when processes form a circular wait condition.

Ref: Operating System Concepts – Silberschatz

---

## DBMS

---

14. SQL command used to retrieve data is:

- 1). SELECT
- 2). INSERT
- 3). UPDATE
- 4). DELETE

Answer: 1). SELECT

Explanation: SELECT statement retrieves records from database tables.

Ref: Database System Concepts – Korth

---

15. A **primary key** in a database table:

- 1). Can contain duplicate values
- 2). Cannot be NULL
- 3). Is optional
- 4). Is used only for sorting

Answer: 2). Cannot be NULL

Explanation: Primary key uniquely identifies each record in a table.

Ref: Database System Concepts – Korth

---

## Computer Networks

---

16. The OSI model consists of how many layers?

- 1). 5
- 2). 6
- 3). 7
- 4). 8

Answer: 3). 7

Explanation: OSI model contains seven layers from Physical to Application.

Ref: Computer Networks – Tanenbaum

---

17. Which protocol is used to transfer web pages?

- 1). FTP
- 2). HTTP
- 3). SMTP
- 4). TCP

Answer: 2). HTTP

Explanation: HyperText Transfer Protocol is used for web communication.

Ref: Computer Networks – Tanenbaum

---

### **Python / IoT / C23 Topics**

---

18. Python is considered a:

- 1). Compiled language
- 2). Interpreted language
- 3). Assembly language
- 4). Machine language

Answer: 2). Interpreted language

Explanation: Python executes code line-by-line using an interpreter.

Ref: Python Documentation

---

19. In IoT, MQTT stands for:

- 1). Message Queue Telemetry Transport
- 2). Machine Query Transfer Tool
- 3). Multiple Query Transfer Tool
- 4). Message Quality Transmission Tool

Answer: 1). Message Queue Telemetry Transport

Explanation: MQTT is a lightweight messaging protocol for IoT devices.

Ref: IoT Fundamentals – Cisco Press

---

20. Big Data is characterized by the **3 V's**:

- 1). Volume, Velocity, Variety
- 2). Value, Verification, Variety
- 3). Volume, Vision, Value
- 4). Velocity, Version, Value

Answer: 1). Volume, Velocity, Variety

Explanation: Big Data is defined by large volume, high velocity, and data variety.

Ref: Big Data – Kogent Learning

---

## Digital Electronics

---

21. The Boolean expression  $A + A'$  is equal to:

- 1). 0
- 2). 1
- 3). A
- 4). A'

Answer: 2). 1

Explanation: According to Boolean algebra,  $A \text{ OR } A'$  is always equal to 1.

Ref: Digital Design – Morris Mano

---

22. Which flip-flop is used to eliminate the invalid state in SR flip-flop?

- 1). D flip-flop
- 2). JK flip-flop
- 3). T flip-flop
- 4). Master Slave flip-flop

Answer: 2). JK flip-flop

Explanation: JK flip-flop eliminates the invalid state present in SR flip-flop.

Ref: Digital Electronics – R.P. Jain

---

23. The decimal equivalent of binary **1101** is:

- 1). 11
- 2). 12

3). 13

4). 14

Answer: 3). 13

Explanation:  $1101_2 = 1 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1 = 13$ .

Ref: Digital Design – Morris Mano

---

## Software Engineering

---

24. The **Spiral Model** mainly focuses on:

- 1). Risk analysis
- 2). Testing
- 3). Coding
- 4). Documentation

Answer: 1). Risk analysis

Explanation: Spiral model integrates risk analysis in every development phase.

Ref: Software Engineering – Pressman

---

25. Which document describes **software requirements clearly**?

- 1). SRS
- 2). SDS
- 3). DFD
- 4). UML

Answer: 1). SRS

Explanation: Software Requirement Specification defines system requirements.

Ref: Software Engineering – Pressman

---

## Computer Organization & Microprocessors

---

26. The physical address in **8086 microprocessor** is calculated by:

- 1). Segment + Offset
- 2). Segment  $\times$  10H + Offset

- 3). Segment  $\times$  Offset
- 4). Offset  $\times$  10H

Answer: 2). Segment  $\times$  10H + Offset

Explanation: Physical address = Segment  $\times$  16 + Offset.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

27. Which memory is **fastest in computer architecture**?

- 1). RAM
- 2). Cache
- 3). Hard disk
- 4). ROM

Answer: 2). Cache

Explanation: Cache memory provides fastest access to frequently used data.

Ref: Computer System Architecture – M. Morris Mano

---

## Data Structures

---

28. Which data structure uses **FIFO principle**?

- 1). Stack
- 2). Queue
- 3). Tree
- 4). Graph

Answer: 2). Queue

Explanation: Queue follows First In First Out order.

Ref: Data Structures – Horowitz & Sahni

---

29. In a **binary tree**, maximum number of nodes at level  $i$  is:

- 1).  $i$
- 2).  $2^i$
- 3).  $2^{i-1}$
- 4).  $2i$

Answer: 2).  $2^i$

Explanation: Maximum nodes at level  $i = 2^i$ .

Ref: Data Structures – Horowitz & Sahni

---

30. The time complexity of **binary search** is:

- 1).  $O(n)$
- 2).  $O(n^2)$
- 3).  $O(\log n)$
- 4).  $O(1)$

Answer: 3).  $O(\log n)$

Explanation: Binary search halves the search space each step.

Ref: Data Structures – Horowitz & Sahni

---

## Operating Systems

---

31. Which scheduling algorithm is **preemptive**?

- 1). FCFS
- 2). Round Robin
- 3). SJF
- 4). Priority scheduling

Answer: 2). Round Robin

Explanation: Round Robin uses time quantum and preempts processes.

Ref: Operating System Concepts – Silberschatz

---

32. Thrashing occurs when:

- 1). CPU utilization is high
- 2). Too many page faults occur
- 3). Disk scheduling fails
- 4). Processes are idle

Answer: 2). Too many page faults occur

Explanation: Thrashing happens when the system spends more time paging than executing.

Ref: Operating System Concepts – Silberschatz

---

## DBMS

---

33. Which key uniquely identifies a record in a table?

- 1). Candidate key
- 2). Foreign key
- 3). Primary key
- 4). Composite key

Answer: 3). Primary key

Explanation: Primary key uniquely identifies each row.

Ref: Database System Concepts – Korth

---

34. SQL clause used to sort results:

- 1). GROUP BY
- 2). ORDER BY
- 3). SORT BY
- 4). ARRANGE BY

Answer: 2). ORDER BY

Explanation: ORDER BY arranges query results in ascending or descending order.

Ref: Database System Concepts – Korth

---

## Computer Networks

---

35. The protocol used to send emails is:

- 1). FTP
- 2). SMTP
- 3). HTTP
- 4). TCP

Answer: 2). SMTP

Explanation: Simple Mail Transfer Protocol handles email transmission.

Ref: Computer Networks – Tanenbaum

---

36. The protocol used for secure web browsing is:

- 1). HTTP
- 2). FTP
- 3). HTTPS
- 4). SMTP

Answer: 3). HTTPS

Explanation: HTTPS uses SSL/TLS encryption for secure communication.

Ref: Computer Networks – Tanenbaum

---

## **Python / C23 Topics**

---

37. In Python, which keyword is used to define a function?

- 1). function
- 2). def
- 3). define
- 4). func

Answer: 2). def

Explanation: Python functions are declared using the def keyword.

Ref: Python Documentation

---

38. Python supports which programming paradigm?

- 1). Object-oriented
- 2). Procedural
- 3). Functional
- 4). All of the above

Answer: 4). All of the above

Explanation: Python supports multiple programming paradigms.

Ref: Python Documentation

---

**IoT**

---

39. IoT devices mainly communicate using:

- 1). Wireless networks
- 2). Satellite networks
- 3). Optical fiber
- 4). Mainframe networks

Answer: 1). Wireless networks

Explanation: IoT devices typically use Wi-Fi, Bluetooth, Zigbee etc.

Ref: IoT Fundamentals – Cisco Press

---

40. Zigbee operates in which frequency band?

- 1). 2.4 GHz
- 2). 5 GHz
- 3). 900 MHz
- 4). Both 1 and 3

Answer: 4). Both 1 and 3

Explanation: Zigbee supports multiple frequency bands.

Ref: IoT Fundamentals – Cisco Press

---

**Big Data & Cloud**

---

41. Hadoop was developed primarily for:

- 1). Database management
- 2). Distributed storage and processing
- 3). Web development
- 4). Operating systems

Answer: 2). Distributed storage and processing

Explanation: Hadoop enables distributed data processing.

Ref: Big Data – Kogent Learning

---

42. Which cloud model offers **complete application access through internet**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). DaaS

Answer: 1). SaaS

Explanation: SaaS delivers software applications through internet browsers.

Ref: Cloud Computing – Thomas Erl

---

## Android

---

43. Android operating system is based on:

- 1). Windows kernel
- 2). Linux kernel
- 3). Unix kernel
- 4). Mac kernel

Answer: 2). Linux kernel

Explanation: Android OS is built on the Linux kernel.

Ref: Android Programming – Big Nerd Ranch

---

44. The main file that defines Android app components is:

- 1). MainActivity.java
- 2). AndroidManifest.xml
- 3). layout.xml
- 4). strings.xml

Answer: 2). AndroidManifest.xml

Explanation: Manifest file declares activities, permissions and components.

Ref: Android Documentation

---

## Cyber Security

---

45. Which attack floods a server with excessive requests?

- 1). Phishing
- 2). DoS
- 3). Sniffing
- 4). Trojan

Answer: 2). DoS

Explanation: Denial of Service overwhelms system resources.

Ref: Cyber Security – Stallings

---

46. Which encryption type uses **same key for encryption and decryption**?

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hash encryption
- 4). Digital signature

Answer: 1). Symmetric encryption

Explanation: Same secret key is used in symmetric cryptography.

Ref: Cryptography – Stallings

---

## Web Technologies

---

47. HTML stands for:

- 1). HyperText Markup Language
- 2). HighText Machine Language
- 3). Hyper Transfer Markup Language
- 4). Hyper Text Managing Language

Answer: 1). HyperText Markup Language

Explanation: HTML structures web pages.

Ref: Web Technologies – Kogent Learning

---

48. CSS is used for:

- 1). Programming
- 2). Styling web pages
- 3). Database queries
- 4). Network configuration

Answer: 2). Styling web pages

Explanation: CSS controls the appearance of HTML documents.

Ref: Web Technologies – Kogent Learning

---

49. JavaScript is primarily used for:

- 1). Server programming
- 2). Client-side scripting
- 3). Database management
- 4). Operating systems

Answer: 2). Client-side scripting

Explanation: JavaScript runs inside web browsers.

Ref: JavaScript – Mozilla Docs

---

50. AJAX allows:

- 1). Static page loading
- 2). Dynamic page updates without refresh
- 3). Database storage
- 4). Email transmission

Answer: 2). Dynamic page updates without refresh

Explanation: AJAX enables asynchronous web communication.

Ref: JavaScript & JQuery – Jon Ducket

---

## Digital Electronics

---

51. The Boolean expression  $A \cdot 1$  simplifies to:

- 1). 0
- 2). 1

- 3). A
- 4). A'

Answer: 3). A

Explanation: According to Boolean algebra,  $A \text{ AND } 1$  equals  $A$ .

Ref: Digital Design – Morris Mano

---

52. Which flip-flop stores only **one bit of data**?

- 1). Counter
- 2). Register
- 3). Flip-flop
- 4). Encoder

Answer: 3). Flip-flop

Explanation: Flip-flops are basic storage elements capable of storing one binary digit.

Ref: Digital Electronics – R.P. Jain

---

## Software Engineering

---

53. The process of modifying software to improve performance is called:

- 1). Corrective maintenance
- 2). Perfective maintenance
- 3). Adaptive maintenance
- 4). Preventive maintenance

Answer: 2). Perfective maintenance

Explanation: Perfective maintenance enhances performance or adds new features.

Ref: Software Engineering – Pressman

---

54. Which diagram represents **flow of data within a system**?

- 1). ER diagram
- 2). DFD
- 3). UML
- 4). Structure chart

Answer: 2). DFD

Explanation: Data Flow Diagram shows how data moves through a system.

Ref: Software Engineering – Pressman

---

## Computer Organization & Microprocessors

---

55. Which register in **8086 microprocessor** stores the base address of the data segment?

- 1). CS
- 2). DS
- 3). SS
- 4). ES

Answer: 2). DS

Explanation: DS register contains the base address of the data segment.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

56. The smallest unit of memory in a computer is:

- 1). Bit
- 2). Byte
- 3). Word
- 4). Nibble

Answer: 1). Bit

Explanation: Bit represents a binary digit (0 or 1).

Ref: Computer System Architecture – M. Morris Mano

---

## Data Structures

---

57. Which data structure follows **LIFO principle**?

- 1). Queue
- 2). Stack
- 3). Linked list
- 4). Tree

Answer: 2). Stack

Explanation: Stack follows Last In First Out order.

Ref: Data Structures – Horowitz & Sahni

---

58. In a **binary tree**, number of edges is:

- 1). n
- 2). n-1
- 3). n+1
- 4). 2n

Answer: 2). n-1

Explanation: A tree with n nodes always has n-1 edges.

Ref: Data Structures – Horowitz & Sahni

---

59. The data structure used in **recursion** is:

- 1). Queue
- 2). Stack
- 3). Linked list
- 4). Array

Answer: 2). Stack

Explanation: Recursive function calls are stored in stack memory.

Ref: Data Structures – Horowitz & Sahni

---

## Operating Systems

---

60. Which memory management technique allows processes to be stored in non-contiguous memory locations?

- 1). Paging
- 2). Partitioning
- 3). Swapping
- 4). Buffering

Answer: 1). Paging

Explanation: Paging divides memory into pages and frames.

Ref: Operating System Concepts – Silberschatz

---

61. Which scheduling algorithm selects the **shortest job first**?

- 1). FCFS
- 2). SJF
- 3). Round Robin
- 4). Priority

Answer: 2). SJF

Explanation: Shortest Job First chooses process with smallest burst time.

Ref: Operating System Concepts – Silberschatz

---

## DBMS

---

62. A **foreign key** is used to:

- 1). Identify records uniquely
- 2). Link two tables
- 3). Store numeric values
- 4). Sort records

Answer: 2). Link two tables

Explanation: Foreign key creates relationship between tables.

Ref: Database System Concepts – Korth

---

63. Which SQL command removes a table completely?

- 1). DELETE
- 2). REMOVE
- 3). DROP
- 4). ERASE

Answer: 3). DROP

Explanation: DROP removes table structure and data permanently.

Ref: Database System Concepts – Korth

---

64. Which database model stores data in **tables with rows and columns**?

- 1). Hierarchical model
- 2). Network model
- 3). Relational model
- 4). Object model

Answer: 3). Relational model

Explanation: Relational databases store data in tabular form.

Ref: Database System Concepts – Korth

---

## Computer Networks

---

65. IP address version commonly used today is:

- 1). IPv3
- 2). IPv4
- 3). IPv5
- 4). IPv7

Answer: 2). IPv4

Explanation: IPv4 uses 32-bit addressing scheme.

Ref: Computer Networks – Tanenbaum

---

66. Which device connects **multiple networks together**?

- 1). Switch
- 2). Router
- 3). Hub
- 4). Bridge

Answer: 2). Router

Explanation: Routers forward packets between networks using IP addresses.

Ref: Computer Networks – Tanenbaum

---

**Python (C23 Subject)**

---

67. Python lists are:

- 1). Immutable
- 2). Mutable
- 3). Fixed size
- 4). Static

Answer: 2). Mutable

Explanation: Lists can be modified after creation.

Ref: Python Documentation

---

68. Which Python operator is used for **exponentiation**?

- 1). ^
- 2). \*\*
- 3). %%
- 4). //

Answer: 2). \*\*

Explanation: \*\* operator performs power calculation.

Ref: Python Documentation

---

**IoT (C23 Subject)**

---

69. IoT devices mainly collect data using:

- 1). Sensors
- 2). Routers
- 3). Servers
- 4). Switches

Answer: 1). Sensors

Explanation: Sensors detect environmental changes and generate data.

Ref: IoT Fundamentals – Cisco Press

---

70. Which protocol is commonly used in IoT messaging?

- 1). FTP
- 2). SMTP
- 3). MQTT
- 4). POP3

Answer: 3). MQTT

Explanation: MQTT is lightweight messaging protocol for IoT systems.

Ref: IoT Fundamentals – Cisco Press

---

### **Big Data & Cloud (C23 Subject)**

---

71. The storage system used in Hadoop is:

- 1). NTFS
- 2). HDFS
- 3). FAT
- 4). EXT4

Answer: 2). HDFS

Explanation: Hadoop Distributed File System stores large datasets across clusters.

Ref: Big Data – Kogent Learning

---

72. Which cloud service model provides **virtual machines and infrastructure**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). DaaS

Answer: 3). IaaS

Explanation: Infrastructure as a Service provides virtual hardware resources.

Ref: Cloud Computing – Thomas Erl

---

**Android (C23 Subject)**

---

73. Android apps are primarily written in:

- 1). C
- 2). Java
- 3). Python
- 4). Assembly

Answer: 2). Java

Explanation: Android apps traditionally use Java language.

Ref: Android Programming – Big Nerd Ranch

---

74. The main screen of an Android app is called:

- 1). Service
- 2). Activity
- 3). Fragment
- 4). Broadcast

Answer: 2). Activity

Explanation: Activity represents a single screen with user interface.

Ref: Android Documentation

---

**Cyber Security**

---

75. Malware designed to spy on user activities is called:

- 1). Spyware
- 2). Worm
- 3). Trojan
- 4). Rootkit

Answer: 1). Spyware

Explanation: Spyware secretly collects user information.

Ref: Cyber Security – Stallings

---

76. A firewall is used to:

- 1). Encrypt data
- 2). Filter network traffic
- 3). Store passwords
- 4). Compress files

Answer: 2). Filter network traffic

Explanation: Firewall monitors and controls incoming/outgoing network traffic.

Ref: Cyber Security – Stallings

---

## Web Technologies

---

77. Which HTML tag is used to create hyperlinks?

- 1). <link>
- 2). <href>
- 3). <a>
- 4). <url>

Answer: 3). <a>

Explanation: Anchor tag <a> creates hyperlinks.

Ref: Web Technologies – Kogent Learning

---

78. Which CSS property controls text color?

- 1). font-color
- 2). text-color
- 3). color
- 4). style-color

Answer: 3). color

Explanation: CSS color property defines text color.

Ref: Web Technologies – Kogent Learning

---

79. JavaScript is executed in:

- 1). Server
- 2). Browser
- 3). Database
- 4). Operating system

Answer: 2). Browser

Explanation: JavaScript runs inside web browsers.

Ref: JavaScript – Mozilla Docs

---

80. PHP is mainly used for:

- 1). Client-side scripting
- 2). Server-side scripting
- 3). Database storage
- 4). Operating system design

Answer: 2). Server-side scripting

Explanation: PHP executes on the server to generate dynamic web pages.

Ref: PHP and MySQL – Larry Ullman

---

## Digital Electronics

---

81. The Boolean expression  $A \cdot 0$  simplifies to:

- 1). 0
- 2). 1
- 3). A
- 4). A'

Answer: 1). 0

Explanation: According to Boolean algebra, A AND 0 always equals 0.

Ref: Digital Design – Morris Mano

---

82. Which logic gate produces output HIGH only when **both inputs are HIGH**?

- 1). OR
- 2). AND
- 3). XOR
- 4). NOR

Answer: 2). AND

Explanation: AND gate outputs HIGH only when all inputs are HIGH.

Ref: Digital Electronics – R.P. Jain

---

83. A **4-variable Karnaugh Map** contains how many cells?

- 1). 8
- 2). 16
- 3). 12
- 4). 20

Answer: 2). 16

Explanation: A K-map with n variables contains  $2^n$  cells  $\rightarrow 2^4 = 16$ .

Ref: Digital Design – Morris Mano

---

## Software Engineering

---

84. The process of identifying and fixing errors in software is called:

- 1). Testing
- 2). Debugging
- 3). Coding
- 4). Designing

Answer: 2). Debugging

Explanation: Debugging removes errors discovered during testing.

Ref: Software Engineering – Pressman

---

85. The **Agile model** emphasizes:

- 1). Rigid development process
- 2). Customer collaboration
- 3). Extensive documentation only
- 4). Single development cycle

Answer: 2). Customer collaboration

Explanation: Agile focuses on iterative development and customer feedback.

Ref: Software Engineering – Pressman

---

### Computer Organization & Microprocessors

---

86. The number of bits in **8086 microprocessor data bus** is:

- 1). 8
- 2). 16
- 3). 32
- 4). 64

Answer: 2). 16

Explanation: 8086 microprocessor has a 16-bit data bus.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

87. Which memory is **non-volatile**?

- 1). RAM
- 2). Cache
- 3). ROM
- 4). Register

Answer: 3). ROM

Explanation: ROM retains data even after power is turned off.

Ref: Computer System Architecture – M. Morris Mano

---

### Data Structures

---

88. Which data structure is used for **breadth-first search (BFS)**?

- 1). Stack
- 2). Queue
- 3). Tree
- 4). Graph

Answer: 2). Queue

Explanation: BFS uses queue to explore nodes level by level.

Ref: Data Structures – Horowitz & Sahni

---

89. In a **circular linked list**, the last node points to:

- 1). NULL
- 2). First node
- 3). Middle node
- 4). Previous node

Answer: 2). First node

Explanation: Circular linked list connects last node back to the first node.

Ref: Data Structures – Reema Thareja

---

90. The worst-case time complexity of **linear search** is:

- 1).  $O(\log n)$
- 2).  $O(n)$
- 3).  $O(n^2)$
- 4).  $O(1)$

Answer: 2).  $O(n)$

Explanation: Linear search may check all elements in the worst case.

Ref: Data Structures – Horowitz & Sahni

---

## Operating Systems

---

91. Which OS component manages process execution?

- 1). File system
- 2). Scheduler
- 3). Compiler
- 4). Loader

Answer: 2). Scheduler

Explanation: Scheduler selects which process should execute next.

Ref: Operating System Concepts – Silberschatz

---

92. The technique used to move processes between main memory and disk is:

- 1). Paging
- 2). Swapping
- 3). Buffering
- 4). Spooling

Answer: 2). Swapping

Explanation: Swapping temporarily transfers processes between RAM and disk.

Ref: Operating System Concepts – Silberschatz

---

## DBMS

---

93. Which SQL command inserts new records into a table?

- 1). ADD
- 2). INSERT
- 3). UPDATE
- 4). CREATE

Answer: 2). INSERT

Explanation: INSERT adds new rows to a database table.

Ref: Database System Concepts – Korth

---

94. Which normalization removes **transitive dependency**?

- 1). 1NF
- 2). 2NF
- 3). 3NF
- 4). BCNF

Answer: 3). 3NF

Explanation: Third Normal Form eliminates transitive dependencies.

Ref: Database System Concepts – Korth

---

## Computer Networks

---

95. Which layer of OSI model handles **routing**?

- 1). Transport layer
- 2). Network layer
- 3). Data link layer
- 4). Session layer

Answer: 2). Network layer

Explanation: Network layer determines path and routing of packets.

Ref: Computer Networks – Tanenbaum

---

96. Which device operates at **Data Link Layer**?

- 1). Router
- 2). Switch
- 3). Gateway
- 4). Modem

Answer: 2). Switch

Explanation: Switch forwards frames using MAC addresses.

Ref: Computer Networks – Tanenbaum

---

## Python

---

97. Which Python data type stores **unique elements only**?

- 1). List
- 2). Tuple
- 3). Set
- 4). Dictionary

Answer: 3). Set

Explanation: Sets do not allow duplicate values.

Ref: Python Documentation

---

98. Which Python keyword is used for looping?

- 1). repeat
- 2). loop
- 3). for
- 4). iterate

Answer: 3). for

Explanation: for loop iterates over sequences in Python.

Ref: Python Documentation

---

## IoT

---

99. The communication protocol used for **short-range wireless devices** is:

- 1). Zigbee
- 2). HTTP
- 3). FTP
- 4). SMTP

Answer: 1). Zigbee

Explanation: Zigbee is used for low-power IoT communication.

Ref: IoT Fundamentals – Cisco Press

---

100. Which technology enables **machine-to-machine communication** in IoT?

- 1). LAN
- 2). M2M
- 3). FTP
- 4). SMTP

Answer: 2). M2M

Explanation: Machine-to-machine communication allows devices to exchange data automatically.

Ref: IoT Fundamentals – Cisco Press

---

## Big Data & Cloud

---

101. Which component manages resources in Hadoop cluster?

- 1). HDFS
- 2). MapReduce
- 3). YARN
- 4). Hive

Answer: 3). YARN

Explanation: YARN manages cluster resources and job scheduling.

Ref: Big Data – Kogent Learning

---

102. Cloud computing allows users to access resources via:

- 1). Local network only
- 2). Internet
- 3). Telephone network
- 4). Satellite only

Answer: 2). Internet

Explanation: Cloud services are delivered through internet connectivity.

Ref: Cloud Computing – Thomas Erl

---

## Android

---

103. Which method initializes an Android activity?

- 1). onStart()
- 2). onCreate()
- 3). onStop()
- 4). onDestroy()

Answer: 2). onCreate()

Explanation: onCreate() is called when activity is first created.

Ref: Android Documentation

---

104. Which layout arranges elements **vertically or horizontally**?

- 1). LinearLayout
- 2). FrameLayout
- 3). GridLayout
- 4). RelativeLayout

Answer: 1). LinearLayout

Explanation: LinearLayout arranges elements in a single direction.

Ref: Android Programming – Big Nerd Ranch

---

## Cyber Security

---

105. A malicious program that replicates itself is called:

- 1). Trojan
- 2). Virus
- 3). Spyware
- 4). Worm

Answer: 2). Virus

Explanation: Virus replicates itself and infects other programs.

Ref: Cyber Security – Stallings

---

106. Which attack intercepts communication between two parties?

- 1). DoS attack
- 2). Phishing

- 3). Man-in-the-middle attack
- 4). Trojan attack

Answer: 3). Man-in-the-middle attack

Explanation: MITM attack intercepts communication between sender and receiver.

Ref: Cyber Security – Stallings

---

## Web Technologies

---

107. Which HTML tag defines a table row?

- 1). <td>
- 2). <tr>
- 3). <table>
- 4). <th>

Answer: 2). <tr>

Explanation: <tr> defines a table row.

Ref: Web Technologies – Kogent Learning

---

108. Which JavaScript keyword declares a variable?

- 1). var
- 2). variable
- 3). int
- 4). declare

Answer: 1). var

Explanation: var keyword declares variables in JavaScript.

Ref: JavaScript – Mozilla Docs

---

109. PHP variables begin with:

- 1). #
- 2). \$
- 3). @
- 4). %

Answer: 2). \$

Explanation: PHP variables start with dollar symbol.

Ref: PHP and MySQL – Larry Ullman

---

110. Which technology allows web pages to update content **without reloading the page**?

- 1). HTML
- 2). CSS
- 3). AJAX
- 4). XML

Answer: 3). AJAX

Explanation: AJAX allows asynchronous web page updates.

Ref: JavaScript & JQuery – Jon Duckett

---

## Digital Electronics

---

111. The Gray code equivalent of binary **1011** is:

- 1). 1110
- 2). 1111
- 3). 1101
- 4). 1001

Answer: 2). 1111

Explanation: Gray code is obtained by XORing adjacent binary bits.

Ref: Digital Design – Morris Mano

---

112. Which circuit converts binary input into corresponding decimal output?

- 1). Encoder
- 2). Decoder
- 3). Multiplexer
- 4). Demultiplexer

Answer: 2). Decoder

Explanation: Decoder converts binary input into one of many output lines.

Ref: Digital Electronics – R.P. Jain

---

113. A multiplexer is also called:

- 1). Data distributor
- 2). Data selector
- 3). Data encoder
- 4). Data inverter

Answer: 2). Data selector

Explanation: Multiplexer selects one of many inputs and sends it to output.

Ref: Digital Design – Morris Mano

---

## Software Engineering

---

114. The software life cycle phase where system requirements are analyzed is:

- 1). Coding
- 2). Testing
- 3). Requirement analysis
- 4). Maintenance

Answer: 3). Requirement analysis

Explanation: Requirement analysis defines functional and non-functional requirements.

Ref: Software Engineering – Pressman

---

115. The model that allows rapid prototype development is:

- 1). Waterfall model
- 2). Spiral model
- 3). Prototype model
- 4). V-model

Answer: 3). Prototype model

Explanation: Prototype model builds early working versions to understand requirements.

Ref: Software Engineering – Pressman

---

## Computer Organization & Microprocessors

---

116. The number of address lines in **8086 microprocessor** is:

- 1). 16
- 2). 20
- 3). 24
- 4). 32

Answer: 2). 20

Explanation: 8086 has 20 address lines allowing 1MB memory addressing.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

117. Which register holds the **next instruction address**?

- 1). IR
- 2). PC
- 3). ACC
- 4). MAR

Answer: 2). PC

Explanation: Program Counter stores the address of next instruction to execute.

Ref: Computer System Architecture – M. Morris Mano

---

## Data Structures

---

118. Which data structure is used to implement **priority scheduling**?

- 1). Queue
- 2). Stack
- 3). Priority queue
- 4). Array

Answer: 3). Priority queue

Explanation: Priority queue removes elements based on priority rather than order.

Ref: Data Structures – Horowitz & Sahni

---

119. In a **binary search tree**, elements in left subtree are:

- 1). Greater than root
- 2). Less than root

- 3). Equal to root
- 4). Random

Answer: 2). Less than root

Explanation: BST property ensures left subtree values are smaller than root.

Ref: Data Structures – Horowitz & Sahni

---

120. The traversal order **Root** → **Left** → **Right** is called:

- 1). Inorder
- 2). Preorder
- 3). Postorder
- 4). Level order

Answer: 2). Preorder

Explanation: Preorder traversal visits root before subtrees.

Ref: Data Structures – Horowitz & Sahni

---

## Operating Systems

---

121. Which technique allows CPU to execute multiple processes simultaneously?

- 1). Multiprogramming
- 2). Spooling
- 3). Paging
- 4). Buffering

Answer: 1). Multiprogramming

Explanation: Multiprogramming keeps multiple processes in memory to increase CPU utilization.

Ref: Operating System Concepts – Silberschatz

---

122. Which disk scheduling algorithm serves requests closest to current head position?

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 2). SSTF

Explanation: Shortest Seek Time First selects request with minimum seek distance.

Ref: Operating System Concepts – Silberschatz

---

## DBMS

---

123. Which SQL command modifies existing records?

- 1). UPDATE
- 2). INSERT
- 3). SELECT
- 4). ALTER

Answer: 1). UPDATE

Explanation: UPDATE modifies existing rows in a table.

Ref: Database System Concepts – Korth

---

124. Which language is used for defining database schema?

- 1). DML
- 2). DDL
- 3). TCL
- 4). DCL

Answer: 2). DDL

Explanation: Data Definition Language defines tables, views, indexes etc.

Ref: Database System Concepts – Korth

---

125. Which NoSQL database is **document oriented**?

- 1). MySQL
- 2). MongoDB
- 3). Oracle
- 4). PostgreSQL

Answer: 2). MongoDB

Explanation: MongoDB stores data as JSON-like documents.

Ref: MongoDB Documentation

---

## Computer Networks

---

126. The protocol used to transfer files over internet is:

- 1). HTTP
- 2). FTP
- 3). SMTP
- 4). POP3

Answer: 2). FTP

Explanation: File Transfer Protocol transfers files between systems.

Ref: Computer Networks – Tanenbaum

---

127. Which OSI layer handles **error detection and correction**?

- 1). Network layer
- 2). Data link layer
- 3). Transport layer
- 4). Application layer

Answer: 2). Data link layer

Explanation: Data link layer ensures reliable link-level communication.

Ref: Computer Networks – Tanenbaum

---

## Python

---

128. Which Python function returns the length of a list?

- 1). size()
- 2). length()
- 3). len()
- 4). count()

Answer: 3). len()

Explanation: len() returns number of elements in sequence.

Ref: Python Documentation

---

129. Which Python keyword handles exceptions?

- 1). try
- 2). catch
- 3). handle
- 4). error

Answer: 1). try

Explanation: try block is used to catch exceptions in Python.

Ref: Python Documentation

---

## IoT

---

130. NFC stands for:

- 1). Network Frequency Control
- 2). Near Field Communication
- 3). Network File Communication
- 4). Near Frame Control

Answer: 2). Near Field Communication

Explanation: NFC enables short-range wireless communication between devices.

Ref: IoT Fundamentals – Cisco Press

---

131. Bluetooth technology is mainly used for:

- 1). Long distance communication
- 2). Short range wireless communication
- 3). Satellite communication
- 4). Internet backbone

Answer: 2). Short range wireless communication

Explanation: Bluetooth supports short-range device connectivity.

Ref: IoT Fundamentals – Cisco Press

---

## Big Data & Cloud

---

132. The programming model used in Hadoop is:

- 1). MapReduce
- 2). Python
- 3). SQL
- 4). JavaScript

Answer: 1). MapReduce

Explanation: MapReduce processes large datasets in distributed systems.

Ref: Big Data – Kogent Learning

---

133. Which cloud deployment model combines **public and private cloud**?

- 1). Hybrid cloud
- 2). Public cloud
- 3). Private cloud
- 4). Community cloud

Answer: 1). Hybrid cloud

Explanation: Hybrid cloud integrates private and public cloud infrastructure.

Ref: Cloud Computing – Thomas Erl

---

## Android

---

134. Which Android component runs tasks **in the background**?

- 1). Activity
- 2). Service
- 3). Broadcast receiver
- 4). Fragment

Answer: 2). Service

Explanation: Services run long-running background operations.

Ref: Android Programming – Big Nerd Ranch

---

135. Which file defines **UI layout in Android**?

- 1). XML file
- 2). Java file
- 3). Manifest file
- 4). Gradle file

Answer: 1). XML file

Explanation: Layout design in Android is written in XML.

Ref: Android Documentation

---

## Cyber Security

---

136. Which attack tricks users into revealing personal information through fake websites?

- 1). Phishing
- 2). Sniffing
- 3). DoS
- 4). Worm

Answer: 1). Phishing

Explanation: Phishing uses fake websites or emails to steal credentials.

Ref: Cyber Security – Stallings

---

137. Which encryption uses **public and private key pair**?

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hashing
- 4). Digital compression

Answer: 2). Asymmetric encryption

Explanation: Asymmetric cryptography uses public/private keys.

Ref: Cryptography – Stallings

---

## Web Technologies

---

138. Which HTML element defines the **largest heading**?

- 1). <h1>
- 2). <h6>
- 3). <head>
- 4). <title>

Answer: 1). <h1>

Explanation: <h1> represents the largest heading.

Ref: Web Technologies – Kogent Learning

---

139. Which CSS property controls **background color**?

- 1). bg-color
- 2). background-color
- 3). color-bg
- 4). bgstyle

Answer: 2). background-color

Explanation: background-color property sets background color.

Ref: Web Technologies – Kogent Learning

---

140. Which JavaScript function displays alert message?

- 1). alert()
- 2). show()
- 3). message()
- 4). display()

Answer: 1). alert()

Explanation: alert() displays a popup message box.

Ref: JavaScript – Mozilla Docs

---

### Miscellaneous Core Concepts

---

141. Which number system uses base **16**?

- 1). Binary
- 2). Octal
- 3). Decimal
- 4). Hexadecimal

Answer: 4). Hexadecimal

Explanation: Hexadecimal system has 16 symbols (0–9, A–F).

Ref: Digital Electronics – R.P. Jain

---

142. ASCII is used to represent:

- 1). Images
- 2). Characters
- 3). Numbers only
- 4). Machine code

Answer: 2). Characters

Explanation: ASCII encodes characters into binary values.

Ref: Computer Organization – M. Morris Mano

---

143. The unit used to measure CPU speed is:

- 1). Byte
- 2). Hertz
- 3). Volt
- 4). Watt

Answer: 2). Hertz

Explanation: CPU speed is measured in clock cycles per second.

Ref: Computer Organization – M. Morris Mano

---

144. A network covering a small geographical area is called:

- 1). WAN
- 2). LAN
- 3). MAN
- 4). PAN

Answer: 2). LAN

Explanation: Local Area Network covers small physical area.

Ref: Computer Networks – Tanenbaum

---

145. Which programming paradigm focuses on objects and classes?

- 1). Procedural programming
- 2). Object-oriented programming
- 3). Functional programming
- 4). Logic programming

Answer: 2). Object-oriented programming

Explanation: OOP organizes software using objects and classes.

Ref: Programming with Java – Balagurusamy

---

146. Which storage device has **largest capacity**?

- 1). Hard disk
- 2). Cache
- 3). Register
- 4). RAM

Answer: 1). Hard disk

Explanation: Hard disks store large volumes of data.

Ref: Computer Organization – M. Morris Mano

---

147. Which SQL clause groups records with similar values?

- 1). GROUP BY
- 2). ORDER BY
- 3). HAVING
- 4). DISTINCT

Answer: 1). GROUP BY

Explanation: GROUP BY groups rows for aggregate calculations.

Ref: Database System Concepts – Korth

---

148. Which scheduling algorithm gives each process **equal time slice**?

- 1). FCFS
- 2). Round Robin
- 3). SJF
- 4). Priority

Answer: 2). Round Robin

Explanation: Round Robin assigns fixed time quantum to each process.

Ref: Operating System Concepts – Silberschatz

---

149. In cloud computing, **elasticity** refers to:

- 1). Network security
- 2). Ability to scale resources dynamically
- 3). Storage compression
- 4). CPU speed

Answer: 2). Ability to scale resources dynamically

Explanation: Elasticity allows resources to scale based on demand.

Ref: Cloud Computing – Thomas Erl

---

150. Artificial Intelligence systems learn patterns using:

- 1). Hardware circuits
- 2). Machine learning algorithms
- 3). Operating systems
- 4). Network protocols

Answer: 2). Machine learning algorithms

Explanation: Machine learning enables AI systems to learn from data.

Ref: Machine Learning – Tom Mitchell

## Grand Test – 1

### AP ECET 2026 – AI & ML

---

1. In a singly linked list, the last node contains:

- 1). Address of first node
- 2). Address of previous node
- 3). NULL pointer
- 4). Address of middle node

Answer: 3). NULL pointer

Explanation: Last node has no next node.

Ref: Data Structures using C – Reema Thareja

---

2. The time complexity of inserting a node at the beginning of a linked list is:

- 1).  $O(1)$
- 2).  $O(n)$
- 3).  $O(\log n)$
- 4).  $O(n^2)$

Answer: 1).  $O(1)$

Ref: Data Structures using C – Reema Thareja

---

3. In a circular linked list:

- 1). Last node points to first node
- 2). First node points to last node
- 3). Nodes are unordered
- 4). Nodes contain no pointers

Answer: 1). Last node points to first node

Ref: Data Structures Through C in Depth – Srivastava

---

4. If a stack follows LIFO principle, which operation removes element?

- 1). PUSH
- 2). POP

- 3). INSERT
- 4). DELETE

Answer: 2). POP

Ref: Data Structures using C – Reema Thareja

---

5. In a stack implemented using array, overflow occurs when:

- 1). TOP = 0
- 2). TOP = MAX – 1
- 3). TOP = NULL
- 4). TOP = –1

Answer: 2). TOP = MAX – 1

Ref: Data Structures using C – Reema Thareja

---

6. In circular queue, the queue is full when:

- 1). front = rear
- 2). rear + 1 = front
- 3). front = 0
- 4). rear = size

Answer: 2). rear + 1 = front

Ref: Data Structures Through C – Srivastava

---

7. Which Python data structure is mutable?

- 1). Tuple
- 2). String
- 3). List
- 4). Frozen set

Answer: 3). List

Ref: Python Programming – Reema Thareja

---

8. The output of Python expression:

```
len([1,2,3,4])
```

is:

- 1). 3
- 2). 4
- 3). 5
- 4). Error

Answer: 2). 4

Ref: Python Crash Course – Eric Matthes

---

9. Which Python structure stores key–value pairs?

- 1). List
- 2). Set
- 3). Dictionary
- 4). Tuple

Answer: 3). Dictionary

Ref: Python Programming – Reema Thareja

---

10. In Python slicing:

```
a = [1,2,3,4,5]
a[1:4]
```

Output is:

- 1). [1,2,3]
- 2). [2,3,4]
- 3). [3,4,5]
- 4). [2,3,4,5]

Answer: 2). [2,3,4]

Ref: Python Crash Course – Eric Matthes

---

11. A process in Operating System is:

- 1). Program in execution
- 2). Program stored in disk
- 3). Data in memory
- 4). File in system

Answer: 1). Program in execution

Ref: Operating System Concepts – Silberschatz

---

12. Which scheduling algorithm gives minimum average waiting time?

- 1). FCFS
- 2). Round Robin
- 3). SJF
- 4). Priority

Answer: 3). SJF

Ref: Operating System Concepts – Silberschatz

---

13. Deadlock occurs when:

- 1). Processes wait indefinitely
- 2). CPU becomes idle
- 3). Memory is full
- 4). Disk fails

Answer: 1). Processes wait indefinitely

Ref: Operating System Concepts – Silberschatz

---

14. The four conditions for deadlock include:

- 1). Mutual exclusion
- 2). Hold and wait
- 3). No preemption
- 4). All of the above

Answer: 4). All of the above

Ref: Operating System Concepts – Silberschatz

---

15. Paging is used for:

- 1). Memory management
- 2). Process scheduling
- 3). File handling
- 4). Disk management

Answer: 1). Memory management

Ref: Modern Operating Systems – Tanenbaum

---

16. SQL command used to retrieve data is:

- 1). SELECT
- 2). INSERT
- 3). UPDATE
- 4). DELETE

Answer: 1). SELECT

Ref: Database System Concepts – Korth

---

17. Which SQL clause is used for grouping rows?

- 1). GROUP BY
- 2). ORDER BY
- 3). WHERE
- 4). HAVING

Answer: 1). GROUP BY

Ref: Database System Concepts – Korth

---

18. ACID property “A” stands for:

- 1). Accuracy
- 2). Atomicity
- 3). Authorization
- 4). Access

Answer: 2). Atomicity

Ref: Database System Concepts – Korth

---

19. MongoDB stores data as:

- 1). Tables
- 2). Documents
- 3). Rows
- 4). Arrays

Answer: 2). Documents

Ref: MongoDB – Definitive Guide

---

20. In Machine Learning, supervised learning uses:

- 1). Labeled data
- 2). Unlabeled data
- 3). Random data
- 4). Binary data

Answer: 1). Labeled data

Ref: Introduction to Machine Learning – Alpaydin

---

21. Neural networks are inspired by:

- 1). Human brain
- 2). Computer memory
- 3). Database structure
- 4). Network topology

Answer: 1). Human brain

Ref: Machine Learning – Tom Mitchell

---

22. In Python OOP, constructor method is:

- 1). `init()`
- 2). `start()`
- 3). `begin()`
- 4). `main()`

Answer: 1). **`init()`**

Ref: Python Programming – Reema Thareja

---

23. The concept of inheriting properties of one class into another is:

- 1). Encapsulation
- 2). Inheritance
- 3). Polymorphism
- 4). Abstraction

Answer: 2). Inheritance

Ref: Python Programming – Reema Thareja

---

24. In Machine Learning, classification is used to:

- 1). Predict categories
- 2). Predict continuous values
- 3). Store data
- 4). Sort values

Answer: 1). Predict categories

Ref: Machine Learning – Tom Mitchell

---

25. Overfitting in Machine Learning means:

- 1). Model fits training data too well
- 2). Model performs best on test data
- 3). Model ignores training data
- 4). Model cannot learn

Answer: 1). Model fits training data too well

Ref: Introduction to Machine Learning – Alpaydin

---

26. The main characteristic of Big Data is commonly known as:

- 1). 3 V's
- 2). 4 V's
- 3). 5 V's
- 4). 6 V's

Answer: 3). 5 V's

Explanation: Volume, Velocity, Variety, Veracity, Value.

Ref: Big Data Analytics – Seema Acharya

---

27. Hadoop Distributed File System (HDFS) is mainly used for:

- 1). Data storage
- 2). Data processing
- 3). Data encryption
- 4). Data compression

Answer: 1). Data storage

Ref: Big Data – Kogent Learning

---

28. In Hadoop architecture, the master node responsible for metadata management is:

- 1). DataNode
- 2). NameNode
- 3). TaskTracker
- 4). JobTracker

Answer: 2). NameNode

Ref: Big Data – Kogent Learning

---

29. MapReduce is mainly used for:

- 1). Distributed data processing
- 2). Database storage
- 3). Network communication
- 4). File encryption

Answer: 1). Distributed data processing

Ref: Big Data Analytics – Seema Acharya

---

30. Which Hadoop component allows SQL-like queries?

- 1). Hive
- 2). Pig
- 3). HBase
- 4). YARN

Answer: 1). Hive

Ref: Big Data – Kogent Learning

---

31. MQTT communication model is:

- 1). Client-server
- 2). Publish–subscribe
- 3). Peer-to-peer
- 4). Request–response

Answer: 2). Publish–subscribe

Ref: IoT Fundamentals – Cisco Press

---

32. CoAP protocol operates mainly over:

- 1). TCP
- 2). UDP
- 3). HTTP
- 4). FTP

Answer: 2). UDP

Ref: IoT Fundamentals – Cisco Press

---

33. Zigbee technology is based on standard:

- 1). IEEE 802.11
- 2). IEEE 802.3
- 3). IEEE 802.15.4
- 4). IEEE 802.16

Answer: 3). IEEE 802.15.4

Ref: Wireless Sensor Networks – Sohraby

---

34. BLE stands for:

- 1). Bluetooth Low Energy
- 2). Broadband Low Ethernet
- 3). Basic Link Engine
- 4). Binary Link Exchange

Answer: 1). Bluetooth Low Energy

Ref: Internet of Things – Bahga & Madisetti

---

35. IoT sensors mainly perform:

- 1). Data collection
- 2). Data storage
- 3). Data encryption
- 4). Data deletion

Answer: 1). Data collection

Ref: IoT Fundamentals – Cisco Press

---

36. In cloud computing, IaaS stands for:

- 1). Infrastructure as a Service
- 2). Internet as a Service
- 3). Information as a Service
- 4). Integration as a Service

Answer: 1). Infrastructure as a Service

Ref: Cloud Computing – Thomas Erl

---

37. Example of SaaS application is:

- 1). Gmail
- 2). Hadoop
- 3). Linux
- 4). Python

Answer: 1). Gmail

Ref: Cloud Computing – Thomas Erl

---

38. Cloud deployment model accessible to everyone is:

- 1). Private Cloud
- 2). Public Cloud
- 3). Hybrid Cloud
- 4). Community Cloud

Answer: 2). Public Cloud

Ref: Cloud Computing – Thomas Erl

---

39. Elasticity in cloud computing means:

- 1). Automatic scaling of resources
- 2). Data encryption
- 3). File compression
- 4). Database indexing

Answer: 1). Automatic scaling of resources

Ref: Cloud Computing – Thomas Erl

---

40. Virtualization means:

- 1). Creating virtual hardware resources
- 2). Compressing files
- 3). Encrypting data
- 4). Database indexing

Answer: 1). Creating virtual hardware resources

Ref: Cloud Computing – Thomas Erl

---

41. CPU fetch–decode–execute cycle is called:

- 1). Instruction cycle
- 2). Memory cycle
- 3). Program cycle
- 4). Data cycle

Answer: 1). Instruction cycle

Ref: Computer System Architecture – M. Morris Mano

---

42. In 8086 microprocessor, physical address is calculated as:

- 1). Segment + Offset
- 2). Segment  $\times$  10H + Offset
- 3). Offset  $\times$  Segment
- 4). Segment – Offset

Answer: 2). Segment  $\times$  10H + Offset

Ref: Advanced Microprocessors – A.K. Ray

---

43. The number of address lines in 8086 is:

- 1). 16
- 2). 20
- 3). 24
- 4). 32

Answer: 2). 20

Ref: Advanced Microprocessors – A.K. Ray

---

44. HTML is used for:

- 1). Structuring web pages
- 2). Database management
- 3). Network communication
- 4). File compression

Answer: 1). Structuring web pages

Ref: Web Technologies – Kogent Learning

---

45. CSS is used for:

- 1). Styling web pages
- 2). Programming logic
- 3). Database queries
- 4). Server communication

Answer: 1). Styling web pages

Ref: Web Technologies – Kogent Learning

---

46. JavaScript is mainly used for:

- 1). Adding interactivity to web pages
- 2). Database management
- 3). File storage
- 4). Network routing

Answer: 1). Adding interactivity to web pages

Ref: JavaScript & JQuery – Jon Duckett

---

47. The first method executed in Android Activity lifecycle is:

- 1). onCreate()
- 2). onStart()
- 3). onResume()
- 4). onDestroy()

Answer: 1). onCreate()

Ref: Android Application Development – Kogent Learning

---

48. Explicit Intent in Android is used to:

- 1). Start a specific activity
- 2). Start random activity
- 3). Start background service
- 4). Start database

Answer: 1). Start a specific activity

Ref: Android Programming – Big Nerd Ranch

---

49. In digital electronics, NAND gate is called:

- 1). Universal gate
- 2). Basic gate
- 3). Derived gate
- 4). Exclusive gate

Answer: 1). Universal gate

Ref: Digital Electronics – R.P. Jain

---

50. The Boolean expression of NAND gate is:

- 1).  $(A + B)'$
- 2).  $(A \cdot B)'$
- 3).  $A + B$
- 4).  $A \cdot B$

Answer: 2).  $(A \cdot B)'$

Ref: Digital Design – M. Morris Mano

---

51. In Software Engineering, the Waterfall model follows:

- 1). Sequential phases
- 2). Random development
- 3). Parallel phases
- 4). No structure

Answer: 1). Sequential phases

Ref: Software Engineering – Roger Pressman

---

52. The Spiral model focuses mainly on:

- 1). Risk analysis
- 2). Coding speed
- 3). Database design
- 4). UI development

Answer: 1). Risk analysis

Ref: Software Engineering – Roger Pressman

---

53. SRS document stands for:

- 1). Software Requirement Specification
- 2). System Resource Structure
- 3). Software Resource Storage
- 4). System Requirement Solution

Answer: 1). Software Requirement Specification

Ref: Software Engineering – Ian Sommerville

---

54. Unit testing is performed by:

- 1). Developers
- 2). Test managers
- 3). End users
- 4). Clients

Answer: 1). Developers

Ref: Software Engineering – Roger Pressman

---

55. Alpha testing is performed at:

- 1). Developer site
- 2). Customer site
- 3). Production server
- 4). Database server

Answer: 1). Developer site

Ref: Software Engineering – Roger Pressman

---

56. In Machine Learning, regression is used for:

- 1). Predicting continuous values
- 2). Classification tasks
- 3). Clustering tasks
- 4). Database storage

Answer: 1). Predicting continuous values

Ref: Machine Learning – Tom Mitchell

---

57. K-means algorithm is used for:

- 1). Clustering
- 2). Classification
- 3). Regression
- 4). Dimensionality reduction

Answer: 1). Clustering

Ref: Introduction to Machine Learning – Alpaydin

---

58. Neural networks consist of:

- 1). Neurons and layers
- 2). Tables and rows
- 3). Nodes and edges only
- 4). Files and records

Answer: 1). Neurons and layers

Ref: Machine Learning – Tom Mitchell

---

59. Activation function in neural network is used to:

- 1). Introduce non-linearity
- 2). Store weights
- 3). Remove neurons
- 4). Compress data

Answer: 1). Introduce non-linearity

Ref: Machine Learning – Tom Mitchell

---

60. In Python OOP, polymorphism means:

- 1). Same function behaves differently
- 2). Same variable repeated
- 3). Same loop repeated
- 4). Same class repeated

Answer: 1). Same function behaves differently

Ref: Python Programming – Reema Thareja

---

61. Python method overriding occurs when:

- 1). Derived class redefines method
- 2). Method deleted
- 3). Function repeated
- 4). Variable changed

Answer: 1). Derived class redefines method

Ref: Python Programming – Reema Thareja

---

62. In Python, private variables use prefix:

- 1). \_\_
- 2). \_
- 3). #
- 4). \$

Answer: 1). \_\_

Ref: Python Programming – Reema Thareja

---

63. Python file handling method used to read file is:

- 1). read()
- 2). write()
- 3). append()
- 4). close()

Answer: 1). read()

Ref: Python Programming – Reema Thareja

---

64. Exception handling block in Python begins with:

- 1). try
- 2). catch
- 3). error
- 4). handle

Answer: 1). try

Ref: Python Crash Course – Eric Matthes

---

65. Cache memory is used to:

- 1). Reduce memory access time
- 2). Increase storage
- 3). Compress data
- 4). Encrypt files

Answer: 1). Reduce memory access time

Ref: Computer System Architecture – M. Morris Mano

---

66. Direct mapping in cache means:

- 1). Each block maps to fixed cache line
- 2). Block maps anywhere
- 3). Random mapping
- 4). Sequential mapping

Answer: 1). Each block maps to fixed cache line

Ref: Computer Organization – Hamacher

---

67. Addressing mode in which operand address is directly given is:

- 1). Direct addressing
- 2). Immediate addressing
- 3). Register addressing
- 4). Indexed addressing

Answer: 1). Direct addressing

Ref: Microprocessors – A.K. Ray

---

68. Android layout used to arrange elements in row or column is:

- 1). LinearLayout
- 2). FrameLayout
- 3). GridLayout
- 4). TableLayout

Answer: 1). LinearLayout

Ref: Android Application Development – Kogent Learning

---

69. Android component used for background tasks is:

- 1). Service
- 2). Activity
- 3). Broadcast Receiver
- 4). Content Provider

Answer: 1). Service

Ref: Android Programming – Big Nerd Ranch

---

70. Android database used for local storage is:

- 1). SQLite
- 2). MySQL
- 3). MongoDB
- 4). Oracle

Answer: 1). SQLite

Ref: Android Programming – John Horton

---

71. In Hadoop ecosystem, YARN is responsible for:

- 1). Resource management
- 2). Data storage
- 3). Query execution
- 4). Network communication

Answer: 1). Resource management

Ref: Big Data – Kogent Learning

---

72. Apache Spark processes data mainly:

- 1). In memory
- 2). In disk only
- 3). In network
- 4). In database

Answer: 1). In memory

Ref: Big Data Analytics – Seema Acharya

---

73. Big Data analytics helps organizations to:

- 1). Extract insights from large datasets
- 2). Compress files
- 3). Create databases
- 4). Design networks

Answer: 1). Extract insights from large datasets

Ref: Big Data Analytics – Seema Acharya

---

74. The complexity of binary search is:

- 1).  $O(\log n)$
- 2).  $O(n)$
- 3).  $O(n^2)$
- 4).  $O(1)$

Answer: 1).  $O(\log n)$

Ref: Data Structures – Horowitz & Sahni

---

75. Stack application used for expression conversion is:

- 1). Infix to Postfix
- 2). Sorting array
- 3). Searching array
- 4). File storage

Answer: 1). Infix to Postfix

Ref: Data Structures using C – Reema Thareja

---

76. In Operating Systems, the state when process waits for I/O is called:

- 1). Running
- 2). Waiting
- 3). Ready
- 4). Terminated

Answer: 2). Waiting

Ref: Operating System Concepts – Silberschatz

---

77. Round Robin scheduling mainly focuses on:

- 1). Fair CPU allocation
- 2). Minimum memory usage
- 3). Disk scheduling
- 4). File management

Answer: 1). Fair CPU allocation

Ref: Operating System Concepts – Silberschatz

---

78. The page replacement algorithm that replaces the oldest page is:

- 1). FIFO
- 2). LRU
- 3). Optimal
- 4). MRU

Answer: 1). FIFO

Ref: Modern Operating Systems – Tanenbaum

---

79. Disk scheduling algorithm minimizing head movement is:

- 1). SSTF
- 2). FCFS
- 3). SCAN
- 4). C-SCAN

Answer: 1). SSTF

Ref: Modern Operating Systems – Tanenbaum

---

80. In DBMS, normalization is used to:

- 1). Reduce data redundancy
- 2). Increase redundancy
- 3). Encrypt data
- 4). Compress files

Answer: 1). Reduce data redundancy

Ref: Database System Concepts – Korth

---

81. First Normal Form (1NF) ensures:

- 1). Atomic attributes
- 2). Functional dependency
- 3). Candidate keys
- 4). Foreign keys

Answer: 1). Atomic attributes

Ref: Database System Concepts – Korth

---

82. SQL clause used to filter rows is:

- 1). WHERE
- 2). GROUP BY
- 3). ORDER BY
- 4). HAVING

Answer: 1). WHERE

Ref: Database System Concepts – Korth

---

83. MongoDB is classified as:

- 1). NoSQL database
- 2). Relational database
- 3). Hierarchical database
- 4). Network database

Answer: 1). NoSQL database

Ref: MongoDB – Definitive Guide

---

84. In digital electronics, XOR gate output is 1 when:

- 1). Inputs are same
- 2). Inputs are different
- 3). Both inputs are 0
- 4). Both inputs are 1

Answer: 2). Inputs are different

Ref: Digital Electronics – R.P. Jain

---

85. The output of XOR gate with inputs  $A=1$ ,  $B=1$  is:

- 1). 0
- 2). 1
- 3). Undefined
- 4). Error

Answer: 1). 0

Ref: Digital Design – M. Morris Mano

---

86. K-map is used for:

- 1). Boolean simplification
- 2). Binary conversion
- 3). Memory allocation
- 4). Data encryption

Answer: 1). Boolean simplification

Ref: Digital Design – M. Morris Mano

---

87. Half adder has:

- 1). Two inputs and two outputs
- 2). One input and two outputs
- 3). Two inputs and one output
- 4). Three inputs and one output

Answer: 1). Two inputs and two outputs

Ref: Digital Electronics – R.P. Jain

---

88. Full adder consists of:

- 1). Two half adders and OR gate
- 2). Two OR gates
- 3). Two AND gates
- 4). One XOR gate

Answer: 1). Two half adders and OR gate

Ref: Digital Electronics – R.P. Jain

---

89. In IoT, MQTT broker manages:

- 1). Message distribution
- 2). Data storage
- 3). Device hardware
- 4). Network routing

Answer: 1). Message distribution

Ref: IoT Fundamentals – Cisco Press

---

90. Smart healthcare IoT application is used for:

- 1). Remote patient monitoring
- 2). Web development
- 3). File compression
- 4). Database indexing

Answer: 1). Remote patient monitoring

Ref: Internet of Things – Bahga & Madiseti

---

91. Smart grid in IoT helps in:

- 1). Efficient energy distribution
- 2). Database management
- 3). Network compression
- 4). File transfer

Answer: 1). Efficient energy distribution

Ref: IoT Fundamentals – Cisco Press

---

92. Cyber security encryption is used for:

- 1). Data confidentiality
- 2). Data deletion
- 3). Data compression
- 4). Data storage

Answer: 1). Data confidentiality

Ref: Cryptography and Network Security – William Stallings

---

93. AES encryption is classified as:

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hash algorithm
- 4). Compression algorithm

Answer: 1). Symmetric encryption

Ref: Cryptography – William Stallings

---

94. RSA algorithm belongs to:

- 1). Asymmetric encryption
- 2). Symmetric encryption
- 3). Hash encryption
- 4). Compression algorithm

Answer: 1). Asymmetric encryption

Ref: Cryptography – William Stallings

---

95. Phishing attack mainly targets:

- 1). User credentials
- 2). Network bandwidth
- 3). File systems
- 4). Operating systems

Answer: 1). User credentials

Ref: Cyber Security – Stallings

---

96. In Machine Learning, training dataset is used to:

- 1). Train model
- 2). Test model
- 3). Validate hardware
- 4). Compress data

Answer: 1). Train model

Ref: Machine Learning – Tom Mitchell

---

97. Overfitting problem occurs when:

- 1). Model memorizes training data
- 2). Model predicts perfectly
- 3). Model cannot learn
- 4). Model ignores training data

Answer: 1). Model memorizes training data

Ref: Machine Learning – Tom Mitchell

---

98. Accuracy in ML refers to:

- 1). Correct predictions ratio
- 2). Error rate
- 3). Data size
- 4). Model complexity

Answer: 1). Correct predictions ratio

Ref: Machine Learning – Alpaydin

---

99. Neural network training adjusts:

- 1). Weights
- 2). Files
- 3). Databases
- 4). Variables

Answer: 1). Weights

Ref: Machine Learning – Tom Mitchell

---

100. Gradient descent algorithm is used for:

- 1). Model optimization
- 2). Data storage
- 3). Network routing
- 4). File compression

Answer: 1). Model optimization

Ref: Machine Learning – Tom Mitchell

## Grand Test – 2

AP ECET 2026 – AI & ML

---

1.

A developer uses **Quick Sort** on a nearly sorted array of size  $n$ . In the worst case, what is the time complexity?

- 1).  $O(n \log n)$
- 2).  $O(n^2)$
- 3).  $O(\log n)$
- 4).  $O(n)$

Answer: 2).  $O(n^2)$

Explanation: Worst case occurs when pivot always divides array unevenly.

Ref: Data Structures – Horowitz & Sahni

---

2.

Given the following binary tree traversal outputs:

Preorder: A B D E C F

Inorder: D B E A C F

What is the root node?

- 1). B
- 2). A
- 3). D
- 4). C

Answer: 2). A

Explanation: Root is always first element in preorder traversal.

Ref: Data Structures using C – Reema Thareja

---

3.

Which sorting algorithm always guarantees  **$O(n \log n)$**  complexity in worst case?

- 1). Quick Sort
- 2). Merge Sort

- 3). Bubble Sort
- 4). Insertion Sort

Answer: 2). Merge Sort

Explanation: Merge sort always divides array equally.

Ref: Data Structures – Horowitz & Sahni

---

**4.**

A binary tree contains **7 nodes**. What is the minimum possible height?

- 1). 2
- 2). 3
- 3). 4
- 4). 5

Answer: 2). 3

Explanation: Minimum height occurs in balanced tree:  $\log_2(7)+1$ .

Ref: Data Structures using C – Reema Thareja

---

**5.**

Which traversal is used to obtain **sorted order** in Binary Search Tree?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 2). Inorder

Explanation: Inorder traversal of BST gives sorted sequence.

Ref: Data Structures using C – Reema Thareja

---

**6.**

Given the C code snippet:

```
#include<stdio.h>
int main(){
int arr[5]={5,4,3,2,1};
int i,j,temp;
for(i=0;i<5;i++)
```

```
for(j=0;j<4;j++)
if(arr[j]>arr[j+1]){
temp=arr[j];
arr[j]=arr[j+1];
arr[j+1]=temp;
}
printf("%d ",arr[0]);
}
```

Output will be:

- 1). 1
- 2). 5
- 3). 2
- 4). 4

Answer: 1). 1

Explanation: Bubble sort sorts array in ascending order.

Ref: Data Structures – Horowitz & Sahni

---

7.

In a **circular linked list**, traversal starting from any node will stop when:

- 1). Node becomes NULL
- 2). Last node reached
- 3). Pointer reaches starting node again
- 4). Memory full

Answer: 3). Pointer reaches starting node again

Explanation: Circular list has no NULL pointer.

Ref: Data Structures using C – Reema Thareja

---

8.

Which data structure is best for **implementing recursion**?

- 1). Queue
- 2). Stack
- 3). Array
- 4). Tree

Answer: 2). Stack

Explanation: Recursive calls use call stack.

Ref: Data Structures – Horowitz & Sahni

---

**9.**

The time complexity of **binary search** is:

- 1).  $O(n)$
- 2).  $O(\log n)$
- 3).  $O(n \log n)$
- 4).  $O(n^2)$

Answer: 2).  $O(\log n)$

Explanation: Array size halves each iteration.

Ref: Data Structures – Horowitz & Sahni

---

**10.**

Which traversal visits **root last**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 3). Postorder

Explanation: Postorder = Left  $\rightarrow$  Right  $\rightarrow$  Root.

Ref: Data Structures using C – Reema Thareja

---

**11.**

A disk has request queue:

98, 183, 37, 122, 14, 124

Initial head = 53

Using **SSTF algorithm**, which request will be served first?

- 1). 37
- 2). 98

- 3). 14
- 4). 122

Answer: 1). 37

Explanation: Closest to 53 is 37.

Ref: Operating System Concepts – Silberschatz

---

## 12.

Deadlock prevention works by:

- 1). Allowing circular wait
- 2). Breaking one of the four conditions
- 3). Increasing memory
- 4). Reducing CPU time

Answer: 2). Breaking one of the four conditions

Explanation: Deadlock cannot occur if any condition is removed.

Ref: Operating System Concepts – Silberschatz

---

## 13.

Which condition is **NOT required for deadlock**?

- 1). Mutual exclusion
- 2). Hold and wait
- 3). No preemption
- 4). Infinite memory

Answer: 4). Infinite memory

Explanation: Deadlock conditions are the first three plus circular wait.

Ref: Operating System Concepts – Silberschatz

---

## 14.

In **SCAN disk scheduling**, the disk arm moves:

- 1). Randomly
- 2). In one direction until end then reverses
- 3). Shortest seek only
- 4). Circular movement

Answer: 2). In one direction until end then reverses

Explanation: SCAN is also called Elevator algorithm.

Ref: Modern Operating Systems – Tanenbaum

---

### 15.

Which OS algorithm avoids deadlock by checking **safe state**?

- 1). Banker's Algorithm
- 2). FCFS
- 3). Round Robin
- 4). SJF

Answer: 1). Banker's Algorithm

Explanation: Banker's algorithm ensures system remains safe.

Ref: Operating System Concepts – Silberschatz

---

### 16.

Python code:

```
x = [1,2,3]
x.append([4,5])
print(len(x))
```

Output:

- 1). 3
- 2). 4
- 3). 5
- 4). Error

Answer: 2). 4

Explanation: List inside list counts as one element.

Ref: Python Programming – Reema Thareja

---

### 17.

Python code:

```
f = lambda x: x*2
print(f(5))
```

Output:

- 1). 5
- 2). 10
- 3). 25
- 4). Error

Answer: 2). 10

Explanation: Lambda doubles the value.

Ref: Python Crash Course – Eric Matthes

---

## 18.

Python code:

```
a = {1,2,2,3}
print(len(a))
```

Output:

- 1). 4
- 2). 3
- 3). 2
- 4). Error

Answer: 2). 3

Explanation: Sets remove duplicate values.

Ref: Python Programming – Reema Thareja

---

## 19.

Java multithreading improves performance by:

- 1). Increasing memory
- 2). Parallel execution of tasks
- 3). Reducing CPU speed
- 4). Increasing file size

Answer: 2). Parallel execution of tasks

Explanation: Multiple threads share CPU.

Ref: Java Complete Reference – Herbert Schildt

---

**20.**

Which Java keyword ensures **thread synchronization**?

- 1). lock
- 2). sync
- 3). synchronized
- 4). thread

Answer: 3). synchronized

Explanation: Prevents race condition.

Ref: Java Complete Reference – Herbert Schildt

---

**21.**

A smart home sensor sends small messages frequently with minimal bandwidth. Which protocol is best?

- 1). HTTP
- 2). FTP
- 3). MQTT
- 4). SMTP

Answer: 3). MQTT

Explanation: Lightweight publish-subscribe protocol.

Ref: IoT Fundamentals – Cisco Press

---

**22.**

Which IoT protocol uses **UDP instead of TCP**?

- 1). MQTT
- 2). CoAP
- 3). HTTP
- 4). AMQP

Answer: 2). CoAP

Explanation: Designed for constrained devices.

Ref: IoT Fundamentals – Cisco Press

---

**23.**

A smart wearable device requires **low power wireless communication within 10 meters**. Which technology is best?

- 1). Zigbee
- 2). BLE
- 3). Wi-Fi
- 4). NFC

Answer: 2). BLE

Explanation: Bluetooth Low Energy optimized for wearable devices.

Ref: Internet of Things – Bahga & Madiseti

---

**24.**

When an Android app becomes **partially hidden by another activity**, which lifecycle method executes?

- 1). onStop()
- 2). onPause()
- 3). onDestroy()
- 4). onCreate()

Answer: 2). onPause()

Explanation: Activity loses foreground but remains visible.

Ref: Android Application Development – Kogent Learning

---

**25.**

An Android app launches Google Maps using an **implicit intent**. What happens?

- 1). Specific activity starts
- 2). System chooses appropriate app
- 3). App crashes
- 4). Activity destroyed

Answer: 2). System chooses appropriate app

Explanation: Implicit intent allows system to select component.

Ref: Android Programming – Big Nerd Ranch Guide

---

26.

Two tables exist:

Students(SID, Name)

Marks(SID, Score)

A query retrieves **students even if they have no marks recorded**. Which SQL join is required?

- 1). INNER JOIN
- 2). LEFT OUTER JOIN
- 3). RIGHT JOIN
- 4). CROSS JOIN

Answer: 2). LEFT OUTER JOIN

Explanation: Left join returns all rows from left table even without matches.

Ref: Database System Concepts – Korth

---

27.

Given SQL query:

```
SELECT COUNT(*) FROM Students WHERE Marks > 50;
```

What does the query return?

- 1). Sum of marks
- 2). Number of students scoring above 50
- 3). Average marks
- 4). Maximum marks

Answer: 2). Number of students scoring above 50

Explanation: COUNT returns number of rows satisfying condition.

Ref: Database System Concepts – Korth

---

28.

A relation contains attributes:

StudentID → Name

StudentID → Department

Which normal form is satisfied?

- 1). 1NF
- 2). 2NF
- 3). 3NF
- 4). BCNF

Answer: 3). 3NF

Explanation: Non-key attributes depend only on primary key.

Ref: Database System Concepts – Korth

---

29.

If a table contains repeating groups of attributes, which normal form is violated?

- 1). 1NF
- 2). 2NF
- 3). 3NF
- 4). BCNF

Answer: 1). 1NF

Explanation: 1NF requires atomic attributes.

Ref: Database System Concepts – Korth

---

30.

In MongoDB, the equivalent of a **table** is called:

- 1). Row
- 2). Document
- 3). Collection
- 4). Record

Answer: 3). Collection

Explanation: MongoDB stores documents inside collections.

Ref: MongoDB – Definitive Guide

---

31.

Which MongoDB command retrieves all documents?

- 1). `db.collection.get()`
- 2). `db.collection.find()`
- 3). `db.collection.search()`
- 4). `db.collection.read()`

Answer: 2). `db.collection.find()`

Explanation: `find()` returns documents from collection.

Ref: MongoDB – Definitive Guide

---

32.

In MongoDB query:

```
db.students.find({age:20})
```

What does the query return?

- 1). Students older than 20
- 2). Students with age 20
- 3). Students younger than 20
- 4). All students

Answer: 2). Students with age 20

Explanation: Query filters documents where age=20.

Ref: MongoDB – Definitive Guide

---

33.

Which SQL clause filters groups after aggregation?

- 1). WHERE
- 2). GROUP BY
- 3). HAVING
- 4). ORDER BY

Answer: 3). HAVING

Explanation: HAVING filters aggregated groups.

Ref: Database System Concepts – Korth

---

34.

A developer wants to deploy an application without managing servers or OS. Which cloud model fits best?

- 1). IaaS
- 2). PaaS
- 3). SaaS
- 4). Hybrid Cloud

Answer: 2). PaaS

Explanation: PaaS provides platform for development.

Ref: Cloud Computing – Thomas Erl

---

35.

Which cloud model provides **complete applications to users via browser**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). Virtual Cloud

Answer: 1). SaaS

Explanation: SaaS delivers software applications directly.

Ref: Cloud Computing – Thomas Erl

---

36.

In Hadoop MapReduce, the **Map phase** mainly performs:

- 1). Data storage
- 2). Data filtering and transformation
- 3). Data encryption
- 4). File deletion

Answer: 2). Data filtering and transformation

Explanation: Map processes input key-value pairs.

Ref: Big Data – Kogent Learning

---

37.

The Reduce phase in MapReduce performs:

- 1). Aggregation of results
- 2). Data deletion
- 3). Network routing
- 4). File compression

Answer: 1). Aggregation of results

Explanation: Reduce combines map outputs.

Ref: Big Data – Kogent Learning

---

38.

Which Hadoop component manages cluster resources?

- 1). NameNode
- 2). YARN
- 3). DataNode
- 4). Hive

Answer: 2). YARN

Explanation: YARN handles resource allocation.

Ref: Big Data Analytics – Seema Acharya

---

39.

Which Hadoop component stores actual data blocks?

- 1). NameNode
- 2). DataNode
- 3). JobTracker
- 4). Hive

Answer: 2). DataNode

Explanation: DataNodes store HDFS blocks.

Ref: Big Data – Kogent Learning

---

40.

An IP address **192.168.1.0/24** supports how many hosts?

- 1). 254
- 2). 256
- 3). 128
- 4). 512

Answer: 1). 254

Explanation: Hosts =  $2^8 - 2$ .

Ref: Data Communications & Networking – Forouzan

---

41.

Subnet mask **255.255.255.0** corresponds to:

- 1). /16
- 2). /24
- 3). /32
- 4). /8

Answer: 2). /24

Explanation: First 24 bits represent network portion.

Ref: Data Communications – Forouzan

---

42.

IP address **10.0.0.0** belongs to which class?

- 1). Class A
- 2). Class B
- 3). Class C
- 4). Class D

Answer: 1). Class A

Explanation: Class A range is 1–126.

Ref: Computer Networks – Tanenbaum

---

43.

Which protocol ensures **secure encrypted web communication**?

- 1). HTTP
- 2). HTTPS
- 3). FTP
- 4). SMTP

Answer: 2). HTTPS

Explanation: HTTPS uses SSL/TLS encryption.

Ref: Cryptography – William Stallings

---

## Section 8 – Digital Electronics

### High Probability Tip:

ECET often asks **logic gate combinations and Boolean simplifications**.

---

44.

Which gate produces output **1 only when both inputs are 1**?

- 1). OR
- 2). AND
- 3). XOR
- 4). NOR

Answer: 2). AND

Explanation: AND outputs 1 only if both inputs are 1.

Ref: Digital Electronics – R.P. Jain

---

45.

A NAND gate with inputs  $A=1$ ,  $B=1$  produces output:

- 1). 0
- 2). 1
- 3). Undefined
- 4). Error

Answer: 1). 0

Explanation:  $NAND = NOT(AND)$ .

Ref: Digital Design – Morris Mano

---

46.

Which gate is used to **invert signal**?

- 1). NOT gate
- 2). OR gate
- 3). XOR gate
- 4). AND gate

Answer: 1). NOT gate

Explanation: NOT gate complements input.

Ref: Digital Electronics – R.P. Jain

---

47.

In Agile development, the main focus is:

- 1). Documentation only
- 2). Continuous customer feedback
- 3). Long development cycles
- 4). Fixed requirements

Answer: 2). Continuous customer feedback

Explanation: Agile encourages iterative development.

Ref: Software Engineering – Pressman

---

48.

Which SDLC model is best suited for **projects with changing requirements**?

- 1). Waterfall
- 2). Spiral
- 3). Agile
- 4). V-Model

Answer: 3). Agile

Explanation: Agile adapts to requirement changes.

Ref: Software Engineering – Pressman

---

49.

Which tool is commonly used in Agile for tracking tasks?

- 1). Jira
- 2). Hadoop
- 3). MySQL
- 4). MongoDB

Answer: 1). Jira

Explanation: Jira is widely used in Agile project tracking.

Ref: Software Engineering – Pressman

---

50.

In Scrum methodology, development occurs in short cycles called:

- 1). Modules
- 2). Sprints
- 3). Threads
- 4). Phases

Answer: 2). Sprints

Explanation: Scrum divides development into sprint iterations.

Ref: Software Engineering – Pressman

---

51.

Python code:

```
a = [1,2,3]
b = a
b.append(4)
print(a)
```

Output:

- 1). [1,2,3]
- 2). [1,2,3,4]
- 3). [4]
- 4). Error

Answer: 2). [1,2,3,4]

Explanation: Both variables reference the same list object.

Ref: Python Programming – Reema Thareja

---

52.

Python code:

```
x = {1,2,3}
x.add(2)
print(len(x))
```

Output:

- 1). 4
- 2). 3
- 3). 2
- 4). Error

Answer: 2). 3

Explanation: Sets do not allow duplicate values.

Ref: Python Programming – Reema Thareja

---

53.

Python code:

```
x = (1,2,3)
x[1] = 5
print(x)
```

Result:

- 1). (1,5,3)
- 2). Error
- 3). (1,2,3,5)
- 4). (1,3)

Answer: 2). Error

Explanation: Tuples are immutable.

Ref: Python Programming – Reema Thareja

---

54.

Python code:

```
d = {"a":1,"b":2}
print(d.get("c",0))
```

Output:

- 1). None
- 2). 0
- 3). Error
- 4). c

Answer: 2). 0

Explanation: get() returns default value if key not present.

Ref: Python Programming – Reema Thareja

---

55.

Python code:

```
print(list(range(1,10,3)))
```

Output:

- 1). [1,4,7]
- 2). [1,3,6,9]
- 3). [1,4,7,10]
- 4). [3,6,9]

Answer: 1). [1,4,7]

Explanation: Range increments by step value 3.

Ref: Python Crash Course – Eric Matthes

---

56.

Java multithreading improves application performance when:

- 1). Tasks run sequentially
- 2). Tasks run concurrently
- 3). Only one CPU exists
- 4). Memory is full

Answer: 2). Tasks run concurrently

Explanation: Multiple threads share CPU resources.

Ref: Java Complete Reference – Herbert Schildt

---

57.

Which Java class is used to create a thread by implementing interface?

- 1). Runnable
- 2). ThreadManager
- 3). Execute
- 4). RunClass

Answer: 1). Runnable

Explanation: Threads can be created by implementing Runnable interface.

Ref: Java Complete Reference – Herbert Schildt

---

58.

A smart agriculture system requires **low power communication for sensors across 100 meters**. Which technology is suitable?

- 1). Wi-Fi
- 2). Zigbee
- 3). Ethernet
- 4). NFC

Answer: 2). Zigbee

Explanation: Zigbee is low power and suitable for sensor networks.

Ref: IoT Fundamentals – Cisco Press

---

59.

A smart watch communicating with a smartphone uses:

- 1). Zigbee
- 2). Bluetooth Low Energy
- 3). Wi-Fi
- 4). Ethernet

Answer: 2). Bluetooth Low Energy

Explanation: BLE supports short-range low-power communication.

Ref: Internet of Things – Bahga & Madisetti

---

60.

In MQTT protocol, the device sending data is called:

- 1). Broker
- 2). Publisher
- 3). Listener
- 4). Receiver

Answer: 2). Publisher

Explanation: Publisher sends messages to broker.

Ref: IoT Fundamentals – Cisco Press

---

61.

Which component distributes messages to subscribers in MQTT?

- 1). Router
- 2). Broker
- 3). Gateway
- 4). Switch

Answer: 2). Broker

Explanation: Broker manages publish-subscribe messaging.

Ref: IoT Fundamentals – Cisco Press

---

62.

If an Android activity becomes completely hidden by another activity, which method is called?

- 1). onPause()
- 2). onStop()
- 3). onDestroy()
- 4). onResume()

Answer: 2). onStop()

Explanation: Activity becomes invisible when onStop() executes.

Ref: Android Application Development – Kogent

---

63.

When a user returns to a previously stopped activity, which method executes first?

- 1). onStart()
- 2). onRestart()
- 3). onResume()
- 4). onCreate()

Answer: 2). onRestart()

Explanation: Restart occurs before start method.

Ref: Android Programming – Big Nerd Ranch

---

64.

Which Android component handles **background operations without UI**?

- 1). Activity
- 2). Service

- 3). Broadcast Receiver
- 4). Fragment

Answer: 2). Service

Explanation: Services run background tasks.

Ref: Android Programming – Big Nerd Ranch

---

65.

How many hosts are possible in network /26?

- 1). 62
- 2). 64
- 3). 30
- 4). 126

Answer: 1). 62

Explanation: Hosts =  $2^6 - 2$ .

Ref: Data Communications – Forouzan

---

66.

Subnet mask **255.255.255.192** corresponds to:

- 1). /24
- 2). /26
- 3). /28
- 4). /30

Answer: 2). /26

Explanation: 26 network bits.

Ref: Computer Networks – Tanenbaum

---

67.

Which protocol resolves IP address into MAC address?

- 1). DNS
- 2). ARP
- 3). DHCP
- 4). FTP

Answer: 2). ARP

Explanation: ARP maps IP to physical address.

Ref: Computer Networks – Tanenbaum

---

## Section – Cyber Security

68.

A hacker intercepts communication between two users without their knowledge. This attack is called:

- 1). Phishing
- 2). DoS
- 3). Man-in-the-Middle
- 4). Trojan

Answer: 3). Man-in-the-Middle

Explanation: Attacker secretly relays communication.

Ref: Cryptography – William Stallings

---

69.

Hash functions in cyber security are mainly used for:

- 1). Encryption
- 2). Data integrity verification
- 3). File compression
- 4). Data deletion

Answer: 2). Data integrity verification

Explanation: Hash ensures message integrity.

Ref: Cryptography – Stallings

---

## Section – Digital Electronics

70.

A logic circuit outputs **1 only when both inputs are different**. Which gate is used?

- 1). XOR
- 2). AND

- 3). NOR
- 4). NAND

Answer: 1). XOR

Explanation: XOR outputs 1 for different inputs.

Ref: Digital Electronics – R.P. Jain

---

71.

Boolean expression for OR gate is:

- 1).  $A + B$
- 2).  $AB$
- 3).  $(AB)'$
- 4).  $(A + B)'$

Answer: 1).  $A + B$

Explanation: OR operation represented by +.

Ref: Digital Design – Morris Mano

---

72.

A project requires frequent updates and customer feedback. Which development model fits best?

- 1). Waterfall
- 2). Agile
- 3). V Model
- 4). Prototype

Answer: 2). Agile

Explanation: Agile supports iterative development.

Ref: Software Engineering – Pressman

---

73.

In Agile methodology, daily team meeting is called:

- 1). Stand-up meeting
- 2). Review meeting
- 3). Planning meeting
- 4). Retrospective meeting

Answer: 1). Stand-up meeting

Explanation: Short meeting for daily progress tracking.

Ref: Software Engineering – Pressman

---

## Section – AI / ML

74.

A machine learning model trained with extremely small dataset often suffers from:

- 1). Overfitting
- 2). Underfitting
- 3). Clustering
- 4). Regression

Answer: 2). Underfitting

Explanation: Model fails to capture patterns due to insufficient training data.

Ref: Machine Learning – Tom Mitchell

---

75.

Gradient descent algorithm is used to:

- 1). Minimize loss function
- 2). Increase dataset
- 3). Encrypt model
- 4). Store weights

Answer: 1). Minimize loss function

Explanation: Iteratively updates weights to reduce error.

Ref: Machine Learning – Tom Mitchell

---

76.

Python code:

```
a = [1,2,3]
print(a[::-1])
```

Output:

- 1). [3,2,1]
- 2). [1,2,3]

- 3). [2,3,1]
- 4). Error

Answer: 1). [3,2,1]

Explanation: Slicing with step -1 reverses the list.

Ref: Python Programming – Reema Thareja

---

77.

Python code:

```
x = {"a":1,"b":2}
x["c"] = 3
print(len(x))
```

Output:

- 1). 2
- 2). 3
- 3). 4
- 4). Error

Answer: 2). 3

Explanation: New key-value pair added to dictionary.

Ref: Python Programming – Reema Thareja

---

78.

Python code:

```
print(type({}))
```

Output:

- 1). list
- 2). set
- 3). dict
- 4). tuple

Answer: 3). dict

Explanation: {} creates an empty dictionary.

Ref: Python Programming – Reema Thareja

---

79.

Python code:

```
x = lambda a,b : a + b  
print(x(3,4))
```

Output:

- 1). 7
- 2). 12
- 3). 34
- 4). Error

Answer: 1). 7

Explanation: Lambda adds the two values.

Ref: Python Crash Course – Eric Matthes

---

80.

Python code:

```
a = [1,2,3]  
b = a.copy()  
b.append(4)  
print(len(a))
```

Output:

- 1). 4
- 2). 3
- 3). 2
- 4). Error

Answer: 2). 3

Explanation: copy() creates separate list.

Ref: Python Programming – Reema Thareja

---

81.

An Android app sends an **implicit intent to open a webpage**. What does the system do?

- 1). Opens default browser
- 2). Stops activity

- 3). Deletes app
- 4). Restarts activity

Answer: 1). Opens default browser

Explanation: System chooses appropriate app.

Ref: Android Programming – Big Nerd Ranch

---

82.

When an activity is first launched, which lifecycle method executes first?

- 1). onCreate()
- 2). onStart()
- 3). onResume()
- 4). onPause()

Answer: 1). onCreate()

Explanation: Activity initialization occurs here.

Ref: Android Application Development – Kogent

---

83.

An Android developer wants to **share data between apps**. Which component should be used?

- 1). Activity
- 2). Service
- 3). Content Provider
- 4). Fragment

Answer: 3). Content Provider

Explanation: Allows sharing structured data between applications.

Ref: Android Programming – Big Nerd Ranch

---

84.

An IoT device encrypts communication with **public and private keys**. Which encryption is used?

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hash encryption
- 4). Compression

Answer: 2). Asymmetric encryption

Explanation: Public/private key pair used in asymmetric encryption.

Ref: Cryptography – William Stallings

---

85.

A smart home system authenticates device identity before data exchange. This process ensures:

- 1). Availability
- 2). Authentication
- 3). Compression
- 4). Routing

Answer: 2). Authentication

Explanation: Verifies identity of device.

Ref: Cyber Security – Stallings

---

86.

IoT gateways mainly perform:

- 1). Data routing and protocol conversion
- 2). Data deletion
- 3). Data encryption only
- 4). File compression

Answer: 1). Data routing and protocol conversion

Explanation: Gateways connect IoT devices with internet networks.

Ref: IoT Fundamentals – Cisco Press

---

## Section – Networks (Advanced Subnetting)

### High Probability Tip:

Subnetting is a common **numerical ECET question area**.

---

87.

A network /28 provides how many usable host addresses?

- 1). 14
- 2). 16

3). 30

4). 62

Answer: 1). 14

Explanation: Hosts =  $2^4 - 2$ .

Ref: Computer Networks – Tanenbaum

---

88.

IP address **172.16.0.0** belongs to which class?

1). Class A

2). Class B

3). Class C

4). Class D

Answer: 2). Class B

Explanation: Class B range is 128–191.

Ref: Data Communications – Forouzan

---

89.

Which protocol automatically assigns IP addresses to devices?

1). DNS

2). DHCP

3). ARP

4). FTP

Answer: 2). DHCP

Explanation: Dynamic Host Configuration Protocol.

Ref: Computer Networks – Tanenbaum

---

90.

Which logic gate outputs **0 only when both inputs are 1**?

1). NAND

2). NOR

3). XOR

4). AND

Answer: 1). NAND

Explanation:  $\text{NAND} = \text{NOT}(\text{AND})$ .

Ref: Digital Electronics – R.P. Jain

---

91.

Simplify Boolean expression:

$(A + B)'$

- 1).  $A' + B'$
- 2).  $A'B'$
- 3).  $AB$
- 4).  $A + B$

Answer: 2).  $A'B'$

Explanation: De Morgan's theorem.

Ref: Digital Design – Morris Mano

---

92.

Which gate can implement all Boolean functions?

- 1). AND
- 2). NAND
- 3). OR
- 4). XOR

Answer: 2). NAND

Explanation: NAND is universal gate.

Ref: Digital Electronics – R.P. Jain

---

93.

In Agile Scrum, backlog items are selected during:

- 1). Sprint planning
- 2). Sprint review
- 3). Retrospective
- 4). Daily meeting

Answer: 1). Sprint planning

Explanation: Team selects tasks for sprint.

Ref: Software Engineering – Pressman

---

94.

Which SDLC model is best when **project requirements are stable and clearly defined**?

- 1). Waterfall
- 2). Agile
- 3). Spiral
- 4). Prototype

Answer: 1). Waterfall

Explanation: Sequential development works best for stable requirements.

Ref: Software Engineering – Pressman

---

95.

If the Map phase generates intermediate key-value pairs, which component groups them before Reduce phase?

- 1). HDFS
- 2). Shuffle phase
- 3). DataNode
- 4). Spark

Answer: 2). Shuffle phase

Explanation: Shuffle groups keys before reduction.

Ref: Big Data Analytics – Seema Acharya

---

96.

A company processes large datasets using distributed computing cluster. Which framework is commonly used?

- 1). Hadoop
- 2). MySQL
- 3). Oracle
- 4). SQLite

Answer: 1). Hadoop

Explanation: Hadoop supports distributed processing of big data.

Ref: Big Data – Kogent Learning

---

97.

A machine learning model predicts **house prices based on area and location**. Which type of problem is this?

- 1). Classification
- 2). Regression
- 3). Clustering
- 4). Association

Answer: 2). Regression

Explanation: Predicts continuous numeric value.

Ref: Machine Learning – Tom Mitchell

---

98.

Which ML algorithm groups similar data without labels?

- 1). Classification
- 2). Regression
- 3). Clustering
- 4). Decision tree

Answer: 3). Clustering

Explanation: Unsupervised learning technique.

Ref: Machine Learning – Alpaydin

---

99.

Neural networks learn patterns by adjusting:

- 1). Network cables
- 2). Weights
- 3). Files
- 4). Tables

Answer: 2). Weights

Explanation: Training adjusts weights to minimize error.

Ref: Machine Learning – Tom Mitchell

---

100.

A model performs perfectly on training data but poorly on new data. This indicates:

- 1). Underfitting
- 2). Overfitting
- 3). Clustering
- 4). Regression

Answer: 2). Overfitting

Explanation: Model memorizes training data instead of generalizing.

Ref: Machine Learning – Tom Mitchell

## AP ECET 2026 – AI &amp; ML

## Grand Test - 3

1.

A circular linked list contains **10 nodes**. Each node stores one pointer. How many NULL pointers exist in the entire list?

- 1). 0
- 2). 1
- 3). 9
- 4). 10

Answer: 1). 0

Explanation: In circular linked lists, the last node points back to the first node, so no pointer contains NULL.

Ref: Data Structures – Horowitz & Sahni

---

2.

A developer inserts a new node at the **beginning of a circular linked list** using a tail pointer. How many pointer updates are required?

- 1). 1
- 2). 2
- 3). 3
- 4). 4

Answer: 2). 2

Explanation: One pointer links the new node to the head and the tail pointer updates to point to the new head.

Ref: Data Structures using C – Reema Thareja

---

3.

A Binary Search Tree contains values:

50, 30, 70, 20, 40, 60, 80

Which node will appear **first in inorder traversal**?

- 1). 50
- 2). 20

3). 30

4). 80

Answer: 2). 20

Explanation: Inorder traversal of BST prints values in sorted order.

Ref: Data Structures – Horowitz & Sahni

---

4.

Which sorting algorithm has **best-case complexity  $O(n)$**  when the array is already sorted?

1). Bubble Sort

2). Insertion Sort

3). Merge Sort

4). Quick Sort

Answer: 2). Insertion Sort

Explanation: Insertion sort performs minimal shifts when elements are already ordered.

Ref: Data Structures – Horowitz & Sahni

---

5.

A binary tree has **15 nodes**. What is the maximum possible height?

1). 4

2). 7

3). 15

4). 8

Answer: 3). 15

Explanation: Maximum height occurs in skewed tree where each node has only one child.

Ref: Data Structures – Horowitz & Sahni

---

6.

A disk request queue contains:

82, 170, 43, 140, 24, 16

Initial head = 50

Using **SCAN algorithm moving toward 0 first**, which request will be served first?

- 1). 43
- 2). 82
- 3). 24
- 4). 170

Answer: 1). 43

Explanation: SCAN moves toward lower cylinder numbers first.

Ref: Operating System Concepts – Silberschatz

---

7.

In **C-SCAN disk scheduling**, the disk head after reaching the last cylinder:

- 1). Reverses direction
- 2). Moves randomly
- 3). Returns immediately to first cylinder
- 4). Stops execution

Answer: 3). Returns immediately to first cylinder

Explanation: C-SCAN treats cylinders as circular queue.

Ref: Operating System Concepts – Silberschatz

---

8.

If page size = **4 KB**, how many pages are required for a **32 KB process**?

- 1). 4
- 2). 8
- 3). 16
- 4). 32

Answer: 2). 8

Explanation: Number of pages = Process size / Page size = 32 / 4.

Ref: Operating System Concepts – Silberschatz

---

9.

A page table contains **128 entries**. Minimum number of bits required for page number is:

- 1). 5
- 2). 6

3). 7

4). 8

Answer: 3). 7

Explanation:  $2^7 = 128$  page entries.

Ref: Operating System Concepts – Silberschatz

---

10.

In paging system, **page fault occurs when:**

1). Page found in cache

2). Page not in main memory

3). Page is corrupted

4). Page is compressed

Answer: 2). Page not in main memory

Explanation: OS must load page from disk.

Ref: Operating System Concepts – Silberschatz

---

11.

Python code:

```
x = [1,2,3]
```

```
y = x
```

```
y.append(4)
```

```
print(len(x))
```

What is printed?

1). 3

2). 4

3). 5

4). Error

Answer: 2). 4

Explanation: Both variables reference same list object.

Ref: Python Documentation

---

12.

Python code:

```
x = {1,2,3,2}
print(len(x))
```

Output is:

- 1). 4
- 2). 3
- 3). 2
- 4). Error

Answer: 2). 3

Explanation: Sets remove duplicate elements.

Ref: Python Documentation

---

13.

A Python developer wants to handle **file read errors** without crashing the program. Which construct should be used?

- 1). if statement
- 2). try-except
- 3). lambda
- 4). class

Answer: 2). try-except

Explanation: Exception handling prevents program termination.

Ref: Python Documentation

---

14.

Which Java Collection maintains **insertion order and allows duplicates**?

- 1). HashSet
- 2). TreeSet
- 3). ArrayList
- 4). HashMap

Answer: 3). ArrayList

Explanation: ArrayList preserves insertion order.

Ref: Java Collections Framework – Oracle Docs

---

15.

In Java multithreading, if two threads access shared variable simultaneously without synchronization, the problem is called:

- 1). Deadlock
- 2). Race condition
- 3). Thread starvation
- 4). Page fault

Answer: 2). Race condition

Explanation: Multiple threads update shared resource unpredictably.

Ref: Java Complete Reference – Herbert Schildt

---

16.

A smart agriculture IoT network must send **tiny sensor data every few seconds with minimal bandwidth**. Which protocol is best?

- 1). HTTP
- 2). MQTT
- 3). FTP
- 4). SMTP

Answer: 2). MQTT

Explanation: MQTT is lightweight publish-subscribe protocol.

Ref: IoT Fundamentals – Cisco Press

---

17.

Which IoT protocol uses **UDP instead of TCP** for lightweight communication?

- 1). MQTT
- 2). CoAP
- 3). HTTP
- 4). AMQP

Answer: 2). CoAP

Explanation: CoAP designed for constrained devices.

Ref: IoT Fundamentals – Cisco Press

---

18.

An IoT gateway mainly performs:

- 1). Data encryption only
- 2). Protocol translation and routing
- 3). Sensor data deletion
- 4). Network compression

Answer: 2). Protocol translation and routing

Explanation: Gateway connects IoT networks to internet.

Ref: IoT Fundamentals – Cisco Press

---

19.

In Android, when an activity becomes partially hidden by another activity, which method executes?

- 1). onPause()
- 2). onStop()
- 3). onDestroy()
- 4). onCreate()

Answer: 1). onPause()

Explanation: Activity loses foreground focus but remains visible.

Ref: Android Programming – Big Nerd Ranch

---

20.

An Android developer wants to start camera app using system selection. Which intent type is used?

- 1). Explicit Intent
- 2). Implicit Intent
- 3). Static Intent
- 4). System Intent

Answer: 2). Implicit Intent

Explanation: Implicit intents allow system to choose appropriate component.

Ref: Android Documentation

---

21.

In Hadoop ecosystem, which component manages cluster resources?

- 1). NameNode
- 2). YARN
- 3). DataNode
- 4). HDFS

Answer: 2). YARN

Explanation: YARN handles resource scheduling.

Ref: Big Data Analytics – Seema Acharya

---

22.

In MapReduce framework, intermediate results from map tasks are grouped during which stage?

- 1). Shuffle
- 2). Reduce
- 3). Map
- 4). Storage

Answer: 1). Shuffle

Explanation: Shuffle groups intermediate key-value pairs.

Ref: Big Data – Kogent Learning

---

23.

Which cloud model provides **virtualized hardware infrastructure**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). FaaS

Answer: 3). IaaS

Explanation: Infrastructure as a Service provides virtual machines.

Ref: Cloud Computing – Thomas Erl

---

24.

A SQL query retrieves **records present in both tables only**. Which join is used?

- 1). LEFT JOIN
- 2). RIGHT JOIN

- 3). INNER JOIN
- 4). FULL JOIN

Answer: 3). INNER JOIN

Explanation: Inner join returns matching records from both tables.

Ref: Database System Concepts – Korth

---

25.

Which OSI layer handles **encryption and decryption of data**?

- 1). Transport
- 2). Presentation
- 3). Network
- 4). Data Link

Answer: 2). Presentation

Explanation: Presentation layer manages data encryption and formatting.

Ref: Computer Networks – Tanenbaum

---

26.

A Binary Search Tree contains nodes inserted in the following order:

40, 20, 60, 10, 30, 50, 70

What will be the **postorder traversal**?

- 1). 10 30 20 50 70 60 40
- 2). 40 20 10 30 60 50 70
- 3). 10 20 30 40 50 60 70
- 4). 70 60 50 40 30 20 10

Answer: 1). 10 30 20 50 70 60 40

Explanation: Postorder traversal = Left → Right → Root.

Ref: Data Structures – Horowitz & Sahni

---

27.

A circular linked list contains **n nodes**. If traversal starts at any node, how many steps are required to return to the same node?

- 1).  $n-1$
- 2).  $n$
- 3).  $n+1$
- 4).  $n^2$

Answer: 2).  $n$

Explanation: Traversal visits all nodes before returning to start.

Ref: Data Structures using C – Reema Thareja

---

28.

Which sorting algorithm performs **best when data is nearly sorted**?

- 1). Quick Sort
- 2). Insertion Sort
- 3). Merge Sort
- 4). Heap Sort

Answer: 2). Insertion Sort

Explanation: Insertion sort shifts only misplaced elements.

Ref: Data Structures – Horowitz & Sahni

---

29.

A disk contains request queue:

95, 180, 34, 119, 11

Initial head = 50

Using **SCAN moving toward 0**, which cylinder is served second?

- 1). 34
- 2). 11
- 3). 95
- 4). 119

Answer: 1). 34

Explanation: SCAN moves to nearest in direction toward 0: 34 then 11.

Ref: Operating System Concepts – Silberschatz

---

30.

A system uses **paging** with page size = 2 KB. A program of size **18 KB** requires how many pages?

- 1). 8
- 2). 9
- 3). 10
- 4). 12

Answer: 2). 9

Explanation:  $18 \div 2 = 9$  pages.

Ref: Operating System Concepts – Silberschatz

---

31.

If **memory access time = 100 ns** and **TLB hit ratio = 80%**, what is effective access time assuming TLB access time = 10 ns?

- 1). 108 ns
- 2). 110 ns
- 3). 120 ns
- 4). 140 ns

Answer: 1). 108 ns

Explanation:

$EAT = 0.8(100 + 10) + 0.2(200 + 10) = 108$  ns

Ref: Operating System Concepts – Silberschatz

---

32.

In Java, which collection automatically **sorts elements in ascending order**?

- 1). ArrayList
- 2). HashSet
- 3). TreeSet
- 4). LinkedList

Answer: 3). TreeSet

Explanation: TreeSet maintains sorted order.

Ref: Java Collections Framework – Oracle Docs

---

33.

A Java developer wants to store **key-value pairs** where keys must be unique. Which collection is best?

- 1). ArrayList
- 2). HashMap
- 3). TreeSet
- 4). LinkedList

Answer: 2). HashMap

Explanation: HashMap stores unique keys with associated values.

Ref: Java Collections Framework – Oracle Docs

---

34.

Python code:

```
x = [10,20,30]
print(x[1:])
```

Output:

- 1). [10,20]
- 2). [20,30]
- 3). [30]
- 4). Error

Answer: 2). [20,30]

Explanation: Slice from index 1 to end.

Ref: Python Documentation

---

35.

Python code:

```
a = {1,2,3}
b = {3,4}
print(a & b)
```

Output:

- 1). {1,2}
- 2). {3}
- 3). {4}
- 4). {}

Answer: 2). {3}

Explanation: & operator performs set intersection.

Ref: Python Documentation

---

36.

An IoT sensor network requires **very low power consumption and short-range communication**. Which protocol is most suitable?

- 1). Wi-Fi
- 2). Zigbee
- 3). Ethernet
- 4). HTTP

Answer: 2). Zigbee

Explanation: Zigbee designed for low power sensor networks.

Ref: IoT Fundamentals – Cisco Press

---

37.

In MQTT protocol, the component that distributes messages between publishers and subscribers is called:

- 1). Gateway
- 2). Broker
- 3). Router
- 4). Sensor

Answer: 2). Broker

Explanation: Broker manages message routing.

Ref: IoT Fundamentals – Cisco Press

---

38.

In Android lifecycle, if the user presses the **Home button**, the activity enters which state?

- 1). onPause() then onStop()
- 2). onResume()
- 3). onDestroy()
- 4). onCreate()

Answer: 1). onPause() then onStop()

Explanation: Activity moves to background.

Ref: Android Programming – Big Nerd Ranch

---

39.

An Android app wants to **send email using Gmail application**. Which intent type should be used?

- 1). Explicit Intent
- 2). Implicit Intent
- 3). Static Intent
- 4). Thread Intent

Answer: 2). Implicit Intent

Explanation: System selects suitable email app.

Ref: Android Documentation

---

40.

Which Hadoop component stores **metadata of files** in HDFS?

- 1). DataNode
- 2). NameNode
- 3). YARN
- 4). MapReduce

Answer: 2). NameNode

Explanation: NameNode manages file system metadata.

Ref: Big Data – Kogent Learning

---

41.

In MapReduce architecture, which phase performs **parallel processing of input data**?

- 1). Reduce
- 2). Map
- 3). Shuffle
- 4). Merge

Answer: 2). Map

Explanation: Map processes input key-value pairs.

Ref: Big Data Analytics – Seema Acharya

---

42.

Which cloud deployment model allows **both private and public infrastructure**?

- 1). Public Cloud
- 2). Hybrid Cloud
- 3). Private Cloud
- 4). Community Cloud

Answer: 2). Hybrid Cloud

Explanation: Hybrid combines public and private resources.

Ref: Cloud Computing – Thomas Erl

---

43.

A database relation has attributes:

StudentID → Name

StudentID → Department

Which normal form is satisfied?

- 1). 1NF
- 2). 2NF
- 3). 3NF
- 4). BCNF

Answer: 3). 3NF

Explanation: Non-key attributes depend on primary key.

Ref: Database System Concepts – Korth

---

44.

Which MongoDB command inserts a new document into collection?

- 1). insertOne()
- 2). addRow()

- 3). createRow()
- 4). put()

Answer: 1). insertOne()

Explanation: Used to insert single document.

Ref: MongoDB Documentation

---

45.

Which OSI layer is responsible for **logical addressing and routing**?

- 1). Data Link
- 2). Network
- 3). Transport
- 4). Session

Answer: 2). Network

Explanation: Handles IP addressing and routing.

Ref: Computer Networks – Tanenbaum

---

46.

In cyber security, **hash functions** are mainly used for:

- 1). Encryption
- 2). Data integrity verification
- 3). Data compression
- 4). Data transmission

Answer: 2). Data integrity verification

Explanation: Hash detects message tampering.

Ref: Cryptography – William Stallings

---

47.

A logic circuit output is **1 when inputs are different**. Which gate performs this function?

- 1). OR
- 2). AND
- 3). XOR
- 4). NOR

Answer: 3). XOR

Explanation: XOR outputs 1 for different inputs.

Ref: Digital Electronics – R.P. Jain

---

48.

Using De Morgan's theorem, simplify:

$(A \cdot B)'$

1).  $A' + B'$

2).  $A'B'$

3).  $A + B$

4).  $AB$

Answer: 1).  $A' + B'$

Explanation: De Morgan's law.

Ref: Digital Design – Morris Mano

---

49.

In Software Engineering, **software reliability** refers to:

1). Speed of program

2). Probability of failure-free operation

3). Program size

4). Program complexity

Answer: 2). Probability of failure-free operation

Explanation: Reliability measures likelihood of correct operation.

Ref: Software Engineering – Pressman

---

50.

In Agile methodology, which artifact contains **list of all project requirements**?

1). Sprint backlog

2). Product backlog

3). Task board

4). Release plan

Answer: 2). Product backlog

Explanation: Product backlog stores all requirements.

Ref: Software Engineering – Pressman

---

51.

A binary tree contains **n nodes**. What is the minimum number of edges in the tree?

- 1). n
- 2). n-1
- 3). n+1
- 4). 2n

Answer: 2). n-1

Explanation: Every tree with n nodes has exactly n-1 edges.

Ref: Data Structures – Horowitz & Sahni

---

52.

A Binary Search Tree stores keys:

15, 10, 20, 8, 12, 17, 25

Which node will be visited **last in preorder traversal**?

- 1). 25
- 2). 17
- 3). 20
- 4). 12

Answer: 1). 25

Explanation: Preorder = Root → Left → Right.

Ref: Data Structures – Horowitz & Sahni

---

53.

A process requires **64 KB memory**. Page size = **4 KB**. How many page table entries are required?

- 1). 8
- 2). 12

3). 16

4). 32

Answer: 3). 16

Explanation:  $64 \text{ KB} / 4 \text{ KB} = 16$  pages.

Ref: Operating System Concepts – Silberschatz

---

54.

A system uses paging where **logical address = 16 bits** and **page size = 1 KB**. How many bits represent the page number?

1). 6

2). 8

3). 10

4). 12

Answer: 1). 6

Explanation:

Page size = 1 KB =  $2^{10}$  → offset = 10 bits

Page number bits =  $16 - 10 = 6$

Ref: Operating System Concepts – Silberschatz

---

55.

In C-SCAN disk scheduling, after reaching the last cylinder the head:

1). Reverses direction

2). Moves randomly

3). Returns to first cylinder without servicing

4). Stops

Answer: 3). Returns to first cylinder without servicing

Explanation: C-SCAN treats cylinders as circular queue.

Ref: Operating System Concepts – Silberschatz

---

56.

Python code:

```
a = [1,2,3]
print(a*2)
```

Output:

- 1). [1,2,3,1,2,3]
- 2). [2,4,6]
- 3). [1,2,3,2]
- 4). Error

Answer: 1). [1,2,3,1,2,3]

Explanation: List multiplication repeats elements.

Ref: Python Documentation

---

57.

Python code:

```
d = {"x":1,"y":2}
print(list(d.keys()))
```

Output:

- 1). ['x','y']
- 2). [1,2]
- 3). {'x','y'}
- 4). Error

Answer: 1). ['x','y']

Explanation: keys() returns dictionary keys.

Ref: Python Documentation

---

58.

Python code:

```
a = {1,2,3}
a.add(4)
print(sum(a))
```

Output:

- 1). 6
- 2). 10
- 3). 7
- 4). Error

Answer: 2). 10

Explanation: Set becomes {1,2,3,4}.

Ref: Python Documentation

---

59.

In Java, which class is used for **reading text from a file**?

- 1). FileReader
- 2). FileWriter
- 3). FileInputStream
- 4). Scanner

Answer: 1). FileReader

Explanation: FileReader reads character streams from files.

Ref: Java Complete Reference – Herbert Schildt

---

60.

A Java developer wants to **iterate through elements of a collection**. Which interface should be used?

- 1). Iterator
- 2). Comparator
- 3). Runnable
- 4). Cloneable

Answer: 1). Iterator

Explanation: Iterator allows sequential traversal.

Ref: Java Collections Framework – Oracle Docs

---

61.

A smart IoT network uses **publish–subscribe communication**. Which protocol is most suitable?

- 1). FTP
- 2). MQTT
- 3). SMTP
- 4). HTTP

Answer: 2). MQTT

Explanation: MQTT supports publish–subscribe messaging.

Ref: IoT Fundamentals – Cisco Press

---

62.

Which IoT protocol operates over **UDP** for constrained devices?

- 1). HTTP
- 2). MQTT
- 3). CoAP
- 4). FTP

Answer: 3). CoAP

Explanation: CoAP uses UDP for lightweight communication.

Ref: IoT Fundamentals – Cisco Press

---

63.

A wearable health device communicates with smartphone using **low power short-range wireless**. Which technology is used?

- 1). Wi-Fi
- 2). Bluetooth Low Energy
- 3). Zigbee
- 4). Ethernet

Answer: 2). Bluetooth Low Energy

Explanation: BLE optimized for low power wearable devices.

Ref: Internet of Things – Bahga & Madisetti

---

64.

An Android activity returns to foreground after being stopped. Which lifecycle method is called first?

- 1). onCreate()
- 2). onStart()
- 3). onRestart()
- 4). onResume()

Answer: 3). onRestart()

Explanation: Restart occurs before onStart().

Ref: Android Programming – Big Nerd Ranch

---

65.

An Android developer wants to **share structured data between apps**. Which component should be used?

- 1). Service
- 2). Activity
- 3). Content Provider
- 4). Broadcast Receiver

Answer: 3). Content Provider

Explanation: Allows data sharing across applications.

Ref: Android Documentation

---

66.

Which Hadoop component stores **actual data blocks**?

- 1). NameNode
- 2). DataNode
- 3). YARN
- 4). MapReduce

Answer: 2). DataNode

Explanation: DataNodes store distributed data blocks.

Ref: Big Data – Kogent Learning

---

67.

In MapReduce architecture, which stage performs **aggregation of intermediate results**?

- 1). Map
- 2). Reduce
- 3). Shuffle
- 4). Storage

Answer: 2). Reduce

Explanation: Reduce combines values of same keys.

Ref: Big Data Analytics – Seema Acharya

---

68.

In cloud computing, which service model provides **ready-to-use applications via browser**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). DaaS

Answer: 1). SaaS

Explanation: Software delivered directly to users.

Ref: Cloud Computing – Thomas Erl

---

69.

A cloud environment automatically scales computing resources when demand increases. This feature is called:

- 1). Virtualization
- 2). Elasticity
- 3). Authentication
- 4). Encryption

Answer: 2). Elasticity

Explanation: Elasticity adjusts resources dynamically.

Ref: Cloud Computing – Thomas Erl

---

70.

A relation contains attributes:

$A \rightarrow B$

$B \rightarrow C$

Which dependency exists?

- 1). Functional dependency
- 2). Transitive dependency

- 3). Multivalued dependency
- 4). Partial dependency

Answer: 2). Transitive dependency

Explanation: A determines C through B.

Ref: Database System Concepts – Korth

---

71.

Which MongoDB command retrieves documents where age > 20?

- 1). find({age:20})
- 2). find({age:{\$gt:20}})
- 3). get(age>20)
- 4). select(age>20)

Answer: 2). find({age:{\$gt:20}})

Explanation: \$gt operator performs greater-than comparison.

Ref: MongoDB Documentation

---

72.

Which OSI layer ensures **end-to-end reliable data delivery**?

- 1). Network
- 2). Transport
- 3). Data Link
- 4). Session

Answer: 2). Transport

Explanation: Transport layer manages reliability and flow control.

Ref: Computer Networks – Tanenbaum

---

73.

In cyber security, a **digital signature** provides:

- 1). Data compression
- 2). Authentication and integrity
- 3). Data routing
- 4). File storage

Answer: 2). Authentication and integrity

Explanation: Digital signatures verify sender identity and message integrity.

Ref: Cryptography – William Stallings

---

74.

Which logic gate produces output **0** when both inputs are different?

- 1). XOR
- 2). XNOR
- 3). AND
- 4). OR

Answer: 2). XNOR

Explanation: XNOR outputs 1 when inputs are same.

Ref: Digital Electronics – R.P. Jain

---

75.

In Software Engineering, which testing verifies **individual program modules**?

- 1). Unit testing
- 2). System testing
- 3). Acceptance testing
- 4). Integration testing

Answer: 1). Unit testing

Explanation: Unit testing checks smallest program components.

Ref: Software Engineering – Pressman

---

76.

A binary tree has **20 nodes**. What is the minimum possible height of the tree?

- 1). 4
- 2). 5
- 3). 6
- 4). 7

Answer: 2). 5

Explanation: Minimum height occurs when the tree is balanced.

Height  $\approx \log_2(20) + 1 \approx 5$ .

Ref: Data Structures – Horowitz & Sahni

---

77.

A stack contains elements:

10, 20, 30, 40 (top = 40).

Two POP operations are performed. What will be the new top?

- 1). 10
- 2). 20
- 3). 30
- 4). 40

Answer: 2). 20

Explanation: Stack follows LIFO. Removing 40 and 30 leaves 20 on top.

Ref: Data Structures using C – Reema Thareja

---

78.

A memory system has **page size = 8 KB**.

A process size = **40 KB**.

How many pages are required?

- 1). 4
- 2). 5
- 3). 6
- 4). 8

Answer: 2). 5

Explanation:

Number of pages = Process size / Page size =  $40 / 8 = 5$

Ref: Operating System Concepts – Silberschatz

---

79.

A logical address space contains **1024 pages**.

Minimum number of bits required to represent page number is:

- 1). 8
- 2). 9

3). 10

4). 11

Answer: 3). 10

Explanation:

$2^{10} = 1024$  pages.

Ref: Operating System Concepts – Silberschatz

---

80.

In disk scheduling, which algorithm provides **uniform wait time and circular movement**?

1). SSTF

2). SCAN

3). C-SCAN

4). FCFS

Answer: 3). C-SCAN

Explanation: C-SCAN moves head in one direction and jumps back to start.

Ref: Operating System Concepts – Silberschatz

---

81.

Python code:

```
a = [1,2,3]
b = a[:]
b.append(4)
print(len(a))
```

Output:

1). 4

2). 3

3). 2

4). Error

Answer: 2). 3

Explanation: Slicing creates a copy of the list.

Ref: Python Documentation

---

82.

Python code:

```
x = {"a":1,"b":2}
print("a" in x)
```

Output:

- 1). True
- 2). False
- 3). 1
- 4). Error

Answer: 1). True

Explanation: in operator checks existence of key.

Ref: Python Documentation

---

83.

Python code:

```
a = {1,2,3}
b = {3,4,5}
print(a | b)
```

Output:

- 1). {1,2,3,4,5}
- 2). {3}
- 3). {1,2}
- 4). Error

Answer: 1). {1,2,3,4,5}

Explanation: | performs set union.

Ref: Python Documentation

---

84.

Which Java collection allows **duplicate elements but no ordering guarantee**?

- 1). HashSet
- 2). ArrayList
- 3). TreeSet
- 4). HashMap

Answer: 2). ArrayList

Explanation: ArrayList allows duplicates but maintains insertion order.

Ref: Java Collections Framework – Oracle Docs

---

85.

In Java, which keyword prevents a class from being inherited?

- 1). final
- 2). static
- 3). abstract
- 4). public

Answer: 1). final

Explanation: A final class cannot be extended.

Ref: Java Complete Reference – Herbert Schildt

---

86.

An IoT system requires **real-time sensor communication with minimal delay**. Which protocol is most suitable?

- 1). FTP
- 2). HTTP
- 3). MQTT
- 4). SMTP

Answer: 3). MQTT

Explanation: MQTT provides lightweight messaging for IoT devices.

Ref: IoT Fundamentals – Cisco Press

---

87.

Which IoT communication protocol is **REST-based and works over UDP**?

- 1). HTTP
- 2). MQTT
- 3). CoAP
- 4). AMQP

Answer: 3). CoAP

Explanation: Constrained Application Protocol is lightweight and UDP-based.

Ref: IoT Fundamentals – Cisco Press

---

88.

In Android lifecycle, which method is executed when activity **becomes visible again after pause**?

- 1). onStart()
- 2). onResume()
- 3). onCreate()
- 4). onDestroy()

Answer: 2). onResume()

Explanation: onResume() moves activity to foreground.

Ref: Android Programming – Big Nerd Ranch

---

89.

Which Android component receives **system broadcast messages** such as battery low alerts?

- 1). Service
- 2). Activity
- 3). Broadcast Receiver
- 4). Fragment

Answer: 3). Broadcast Receiver

Explanation: Broadcast receivers respond to system events.

Ref: Android Documentation

---

90.

Which Hadoop component is responsible for **processing large datasets in parallel**?

- 1). MapReduce
- 2). HDFS
- 3). YARN
- 4). Hive

Answer: 1). MapReduce

Explanation: MapReduce divides tasks into map and reduce stages.

Ref: Big Data – Kogent Learning

---

91.

Which cloud computing characteristic allows **users to pay only for resources used**?

- 1). Elasticity
- 2). Measured Service
- 3). Availability
- 4). Virtualization

Answer: 2). Measured Service

Explanation: Usage-based billing model.

Ref: Cloud Computing – Thomas Erl

---

92.

A relation  $R(A,B,C)$  has dependencies:

$A \rightarrow B$

$B \rightarrow C$

Which normal form is violated?

- 1). 1NF
- 2). 2NF
- 3). 3NF
- 4). BCNF

Answer: 3). 3NF

Explanation: Transitive dependency exists.

Ref: Database System Concepts – Korth

---

93.

SQL query to retrieve **all columns from Students table** is:

- 1). `SELECT Students`
- 2). `SELECT * FROM Students`

- 3). GET \* Students
- 4). DISPLAY Students

Answer: 2). SELECT \* FROM Students

Explanation: Standard SQL syntax.

Ref: Database System Concepts – Korth

---

94.

Which OSI layer is responsible for **physical transmission of bits over medium**?

- 1). Data Link
- 2). Network
- 3). Physical
- 4). Transport

Answer: 3). Physical

Explanation: Handles electrical signals and bit transmission.

Ref: Computer Networks – Tanenbaum

---

95.

Which cyber security attack involves **sending massive traffic to overload a server**?

- 1). Phishing
- 2). DoS attack
- 3). Trojan
- 4). Spyware

Answer: 2). DoS attack

Explanation: Denial of Service overloads system resources.

Ref: Cryptography – William Stallings

---

96.

Simplify Boolean expression:

$(A + B)(A + B')$

- 1). A
- 2). B

- 3). AB
- 4). A + B

Answer: 1). A

Explanation: Using Boolean algebra laws.

Ref: Digital Design – Morris Mano

---

97.

Which testing type verifies **interaction between integrated modules**?

- 1). Unit testing
- 2). Integration testing
- 3). System testing
- 4). Acceptance testing

Answer: 2). Integration testing

Explanation: Ensures modules work together correctly.

Ref: Software Engineering – Pressman

---

98.

In Computer Organization, **cache memory** is used to:

- 1). Increase disk capacity
- 2). Reduce memory access time
- 3). Increase CPU speed directly
- 4). Store permanent data

Answer: 2). Reduce memory access time

Explanation: Cache stores frequently used data.

Ref: Computer System Architecture – M. Morris Mano

---

99.

A processor executes **1 billion instructions per second**. What is its speed in GHz assuming one instruction per cycle?

- 1). 1 GHz
- 2). 2 GHz
- 3). 500 MHz
- 4). 5 GHz

Answer: 1). 1 GHz

Explanation: 1 billion cycles per second = 1 GHz.

Ref: Computer Organization – Hamacher

---

100.

A machine learning model performs well on training data but poorly on test data. This problem is called:

- 1). Underfitting
- 2). Overfitting
- 3). Clustering
- 4). Classification

Answer: 2). Overfitting

Explanation: Model memorizes training data instead of generalizing.

Ref: Machine Learning – Tom Mitchell

**AP ECET 2026 – AI & ML****Grand Test – 4**

1.

A Python developer connects to MongoDB using PyMongo. Which method retrieves all documents from a collection?

- 1). find()
- 2). get()
- 3). select()
- 4). fetch()

Answer: 1). find()

Explanation: In PyMongo, the find() method retrieves documents from a collection based on a query filter. Without parameters, it returns all documents.

Ref: MongoDB Documentation

---

2.

A Python application inserts a new document into MongoDB using PyMongo. Which method performs this operation?

- 1). insertOne()
- 2). addDocument()
- 3). put()
- 4). createRow()

Answer: 1). insertOne()

Explanation: insertOne() adds a single document to a MongoDB collection. It returns an object containing the inserted document ID.

Ref: MongoDB Documentation

---

3.

A developer wants to update a MongoDB document where age = 25 using PyMongo. Which command is correct?

- 1). updateOne({"age":25}, {"\$set":{"age":26}})
- 2). modify(age=25)
- 3). change(age=25)
- 4). update(age=25)

Answer: 1). `updateOne({"age":25}, {"$set":{"age":26}})`

Explanation: `updateOne()` modifies the first matching document using update operators like `$set`. It is commonly used for partial updates.

Ref: MongoDB Documentation

---

4.

Which Python library is commonly used for SQL database connectivity?

- 1). PyMongo
- 2). SQLite3
- 3). NumPy
- 4). Matplotlib

Answer: 2). SQLite3

Explanation: SQLite3 is included in Python's standard library and allows interaction with SQLite databases using SQL queries. It supports creating tables and executing SQL commands.

Ref: Python Documentation

---

5.

A Python program executes the SQL query:

```
SELECT COUNT(*) FROM Students;
```

What will the query return?

- 1). Total rows in Students table
- 2). Sum of student marks
- 3). Average marks
- 4). Maximum student ID

Answer: 1). Total rows in Students table

Explanation: `COUNT(*)` counts the total number of rows in a table. It is commonly used in aggregation queries.

Ref: Database System Concepts – Korth

---

6.

An IoT temperature sensor sends data every 5 seconds using a lightweight publish-subscribe protocol. Which protocol is used?

- 1). HTTP
- 2). FTP
- 3). MQTT
- 4). SMTP

Answer: 3). MQTT

Explanation: MQTT is a lightweight messaging protocol designed for IoT devices with limited bandwidth. It uses a publish-subscribe model for communication.

Ref: IoT Fundamentals – Cisco Press

---

7.

In IoT architecture, which component forwards data from sensors to the cloud?

- 1). IoT Gateway
- 2). Data Warehouse
- 3). Hadoop Node
- 4). Web Browser

Answer: 1). IoT Gateway

Explanation: IoT gateways aggregate sensor data and translate protocols before forwarding to cloud services. They enable connectivity between local devices and internet infrastructure.

Ref: Internet of Things – Bahga & Madisetti

---

8.

Which IoT protocol is designed for constrained devices and operates over UDP?

- 1). HTTP
- 2). MQTT
- 3). CoAP
- 4). FTP

Answer: 3). CoAP

Explanation: CoAP (Constrained Application Protocol) is designed for low-power IoT devices and runs over UDP for minimal overhead. It follows a REST-like architecture.

Ref: IoT Fundamentals – Cisco Press

---

9.

In Big Data architecture, which component stores distributed files?

- 1). MapReduce
- 2). HDFS
- 3). Hive
- 4). Spark

Answer: 2). HDFS

Explanation: Hadoop Distributed File System stores large datasets across multiple nodes in a cluster. It ensures fault tolerance through data replication.

Ref: Big Data – Kogent Learning

---

10.

In Hadoop MapReduce, the **Reduce phase** performs which task?

- 1). Data storage
- 2). Aggregation of intermediate results
- 3). File encryption
- 4). Data deletion

Answer: 2). Aggregation of intermediate results

Explanation: Reduce collects intermediate outputs generated by map tasks and performs aggregation operations. It produces the final processed dataset.

Ref: Big Data Analytics – Seema Acharya

---

11.

Which cloud computing service provides **virtual machines and storage infrastructure**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). DaaS

Answer: 3). IaaS

Explanation: Infrastructure as a Service provides virtualized hardware resources such as servers, storage, and networking. Users manage operating systems and applications.

Ref: Cloud Computing – Thomas Erl

---

12.

A company runs web applications directly from the cloud through browsers. Which service model is used?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). Hybrid Cloud

Answer: 1). SaaS

Explanation: Software as a Service delivers applications through the internet without requiring local installation. Examples include Gmail and Office 365.

Ref: Cloud Computing – Thomas Erl

---

13.

Which Android UI control is used for displaying editable text input?

- 1). TextView
- 2). EditText
- 3). Button
- 4). ImageView

Answer: 2). EditText

Explanation: EditText allows users to input text data within Android applications. It supports validation and keyboard input.

Ref: Android Programming – Big Nerd Ranch

---

14.

Which Android layout arranges UI components in a single row or column?

- 1). LinearLayout
- 2). FrameLayout
- 3). GridLayout
- 4). TableLayout

Answer: 1). LinearLayout

Explanation: LinearLayout organizes elements either horizontally or vertically. It is commonly used for simple user interfaces.

Ref: Android Programming – Big Nerd Ranch

---

15.

When an Android activity is first created, which lifecycle method executes first?

- 1). onCreate()
- 2). onStart()
- 3). onResume()
- 4). onPause()

Answer: 1). onCreate()

Explanation: onCreate() initializes activity components and user interface. It is the first method executed in the activity lifecycle.

Ref: Android Documentation

---

16.

Which PHP function is used to connect to a MySQL database?

- 1). mysql\_connect()
- 2). mysqli\_connect()
- 3). connect\_db()
- 4). db\_link()

Answer: 2). mysqli\_connect()

Explanation: mysqli\_connect() establishes a connection between PHP and MySQL databases. It supports improved security and performance.

Ref: PHP and MySQL – Larry Ullman

---

17.

In network security, AES encryption is classified as:

- 1). Asymmetric encryption
- 2). Symmetric encryption
- 3). Hash algorithm
- 4). Compression algorithm

Answer: 2). Symmetric encryption

Explanation: AES uses the same secret key for encryption and decryption. It is widely used for secure data communication.

Ref: Cryptography and Network Security – William Stallings

---

18.

A hacker intercepts communication between two users without their knowledge. This attack is called:

- 1). Phishing
- 2). Man-in-the-Middle
- 3). Trojan
- 4). Worm

Answer: 2). Man-in-the-Middle

Explanation: In a MITM attack, the attacker secretly relays communication between two parties. This compromises confidentiality and integrity.

Ref: Cryptography – Stallings

---

19.

Which disk scheduling algorithm moves the disk head in one direction until the end before reversing?

- 1). SSTF
- 2). SCAN
- 3). FCFS
- 4). C-SCAN

Answer: 2). SCAN

Explanation: SCAN algorithm moves the disk arm like an elevator across cylinders. It reduces average seek time compared to FCFS.

Ref: Operating System Concepts – Silberschatz

---

20.

Which file allocation method uses pointers to link disk blocks?

- 1). Contiguous allocation
- 2). Linked allocation
- 3). Indexed allocation
- 4). Sequential allocation

Answer: 2). Linked allocation

Explanation: In linked allocation, each disk block contains a pointer to the next block. This allows files to occupy non-contiguous disk locations.

Ref: Operating System Concepts – Silberschatz

---

21.

Which tree traversal visits nodes in **Left-Root-Right order**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 2). Inorder

Explanation: Inorder traversal of a Binary Search Tree produces elements in sorted order. It is widely used in searching operations.

Ref: Data Structures – Horowitz & Sahni

---

22.

Which register in digital electronics temporarily stores binary data?

- 1). Counter
- 2). Shift register
- 3). Accumulator
- 4). Buffer

Answer: 2). Shift register

Explanation: Shift registers store binary data and shift bits sequentially. They are used in serial-to-parallel conversions.

Ref: Digital Electronics – R.P. Jain

---

23.

Convert binary number **1011<sub>2</sub>** to decimal.

- 1). 9
- 2). 10
- 3). 11
- 4). 12

Answer: 3). 11

Explanation:  $1011_2 = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 8 + 2 + 1 = 11$ .

Ref: Digital Design – Morris Mano

---

24.

Which software testing method verifies the internal logic of the program?

- 1). Black box testing
- 2). White box testing
- 3). System testing
- 4). Acceptance testing

Answer: 2). White box testing

Explanation: White box testing examines internal program structure and control flow. It helps identify logical errors in code.

Ref: Software Engineering – Pressman

---

25.

Which software quality model measures reliability, maintainability, and efficiency?

- 1). CMMI
- 2). ISO 9126
- 3). Waterfall Model
- 4). Spiral Model

Answer: 2). ISO 9126

Explanation: ISO 9126 defines software quality attributes including functionality, reliability, usability, and maintainability. It is widely used in quality evaluation.

Ref: Software Engineering – Pressman

---

26.

A Python application retrieves MongoDB documents where temperature > 30 using PyMongo.

Which query is correct?

- 1). `find({"temperature":30})`
- 2). `find({"temperature":{"$gt":30}})`
- 3). `find(temp>30)`
- 4). `select(temp>30)`

Answer: 2). `find({"temperature":{"$gt":30}})`

Explanation: The \$gt operator performs a greater-than comparison in MongoDB queries.

PyMongo uses JSON-like query syntax to filter documents.

Ref: MongoDB Documentation

---

27.

A Python program executes the following SQL query:

```
SELECT AVG(score) FROM Results;
```

What will be returned?

- 1). Total number of students
- 2). Average score
- 3). Maximum score
- 4). Student count

Answer: 2). Average score

Explanation: The AVG() function calculates the arithmetic mean of the values in a column. It is commonly used in SQL aggregation queries.

Ref: Database System Concepts – Korth

---

28.

A MongoDB database stores sensor data in the following format:

```
{ "device": "sensor1", "temp": 28 }
```

What type of database structure is this?

- 1). Relational row
- 2). Document
- 3). Graph node
- 4). Array element

Answer: 2). Document

Explanation: MongoDB stores data as JSON-like documents inside collections. Each document contains key-value pairs.

Ref: MongoDB Documentation

---

29.

Which Python library allows interaction with MongoDB databases?

- 1). NumPy
- 2). PyMongo

- 3). Pandas
- 4). Flask

Answer: 2). PyMongo

Explanation: PyMongo provides Python APIs for connecting and performing CRUD operations in MongoDB. It supports query execution and document insertion.

Ref: MongoDB Documentation

---

30.

An IoT smart home sensor sends temperature data to a cloud server through a gateway using MQTT. Which communication model is used?

- 1). Client–Server
- 2). Publish–Subscribe
- 3). Peer-to-Peer
- 4). Request–Response

Answer: 2). Publish–Subscribe

Explanation: MQTT uses a publish-subscribe messaging model where sensors publish messages to topics and subscribers receive them through a broker.

Ref: IoT Fundamentals – Cisco Press

---

31.

Which IoT device component converts **analog sensor signals into digital values**?

- 1). ADC
- 2). Router
- 3). Gateway
- 4). Processor

Answer: 1). ADC

Explanation: Analog-to-Digital Converters transform analog sensor readings into digital data that can be processed by microcontrollers.

Ref: Internet of Things – Bahga & Madisetti

---

32.

In Big Data architecture, which system processes large datasets using distributed parallel computation?

- 1). MySQL
- 2). Hadoop
- 3). SQLite
- 4). MongoDB

Answer: 2). Hadoop

Explanation: Hadoop distributes data processing across multiple nodes using HDFS and MapReduce. This allows efficient processing of massive datasets.

Ref: Big Data – Kogent Learning

---

33.

In Hadoop ecosystem, which component provides SQL-like querying capability?

- 1). Pig
- 2). Hive
- 3). Spark
- 4). HDFS

Answer: 2). Hive

Explanation: Apache Hive provides an SQL-like interface called HiveQL for querying large datasets stored in Hadoop.

Ref: Big Data Analytics – Seema Acharya

---

34.

Which cloud service model allows developers to deploy applications without managing hardware or operating systems?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). DaaS

Answer: 2). PaaS

Explanation: Platform as a Service provides a development environment where developers can build and deploy applications. Infrastructure management is handled by the cloud provider.

Ref: Cloud Computing – Thomas Erl

---

35.

In cloud computing, automatic scaling of resources based on workload demand is called:

- 1). Virtualization
- 2). Elasticity
- 3). Encryption
- 4). Authentication

Answer: 2). Elasticity

Explanation: Elasticity dynamically allocates resources depending on system load. This ensures efficient utilization of computing infrastructure.

Ref: Cloud Computing – Thomas Erl

---

36.

Which Android UI control is used to display images in an application?

- 1). TextView
- 2). Button
- 3). ImageView
- 4). EditText

Answer: 3). ImageView

Explanation: ImageView is used to display images from resources or URLs in Android user interfaces.

Ref: Android Programming – Big Nerd Ranch

---

37.

Which Android layout is most suitable for overlapping UI components?

- 1). LinearLayout
- 2). FrameLayout
- 3). GridLayout
- 4). RelativeLayout

Answer: 2). FrameLayout

Explanation: FrameLayout places components on top of each other and is useful for overlays.

Ref: Android Programming – Big Nerd Ranch

---

38.

If an Android activity moves from foreground to background because another activity starts, which lifecycle method executes first?

- 1). onPause()
- 2). onDestroy()
- 3). onCreate()
- 4). onRestart()

Answer: 1). onPause()

Explanation: onPause() executes when an activity loses focus but may still be partially visible.

Ref: Android Documentation

---

39.

Which PHP command retrieves data from MySQL database?

- 1). SELECT
- 2). INSERT
- 3). UPDATE
- 4). DELETE

Answer: 1). SELECT

Explanation: SELECT is used to retrieve records from database tables. PHP scripts execute this query to display data.

Ref: PHP and MySQL – Larry Ullman

---

40.

Which encryption algorithm uses **56-bit key length**?

- 1). AES
- 2). RSA
- 3). DES
- 4). SHA

Answer: 3). DES

Explanation: Data Encryption Standard (DES) uses a 56-bit symmetric key for encryption. It is now largely replaced by AES due to security concerns.

Ref: Cryptography – Stallings

---

41.

AES encryption typically uses which key sizes?

- 1). 64, 128
- 2). 128, 192, 256
- 3). 32, 64
- 4). 16, 32

Answer: 2). 128, 192, 256

Explanation: AES supports multiple key sizes for strong encryption. Larger key sizes increase resistance to brute-force attacks.

Ref: Cryptography – Stallings

---

42.

A hacker sends fake emails requesting login credentials. This cyber attack is known as:

- 1). Worm attack
- 2). Phishing attack
- 3). Trojan attack
- 4). DoS attack

Answer: 2). Phishing attack

Explanation: Phishing tricks users into revealing sensitive information by impersonating trusted entities.

Ref: Cyber Security – Stallings

---

43.

In disk scheduling, which algorithm selects request with minimum seek distance from current head position?

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 2). SSTF

Explanation: Shortest Seek Time First reduces average seek time by servicing nearest cylinder request.

Ref: Operating System Concepts – Silberschatz

---

44.

Which file allocation method stores a **separate index block containing addresses of all file blocks**?

- 1). Contiguous allocation
- 2). Linked allocation
- 3). Indexed allocation
- 4). Sequential allocation

Answer: 3). Indexed allocation

Explanation: Indexed allocation maintains a separate index block that stores pointers to all file blocks. This allows efficient random access.

Ref: Operating System Concepts – Silberschatz

---

45.

Which tree traversal visits nodes **Root → Left → Right**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 1). Preorder

Explanation: Preorder traversal processes the root node before its child nodes.

Ref: Data Structures – Horowitz & Sahni

---

46.

A binary tree with **7 nodes** has maximum possible height:

- 1). 2
- 2). 3
- 3). 7
- 4). 6

Answer: 3). 7

Explanation: Maximum height occurs in skewed tree where nodes form a chain.

Ref: Data Structures – Horowitz & Sahni

---

47.

Convert hexadecimal  $1A_{16}$  to decimal.

- 1). 20
- 2). 24
- 3). 26
- 4). 28

Answer: 3). 26

Explanation:  $1A_{16} = 1 \times 16 + 10 = 26$  in decimal.

Ref: Digital Design – Morris Mano

---

48.

A 4-bit binary counter can represent how many unique states?

- 1). 8
- 2). 16
- 3). 32
- 4). 64

Answer: 2). 16

Explanation: Number of states =  $2^n$  where  $n$  = number of bits.

Ref: Digital Electronics – R.P. Jain

---

49.

Which software testing verifies **complete integrated system functionality**?

- 1). Unit testing
- 2). Integration testing
- 3). System testing
- 4). Acceptance testing

Answer: 3). System testing

Explanation: System testing evaluates the fully integrated application to ensure it meets functional requirements.

Ref: Software Engineering – Pressman

---

50.

Which software quality factor measures the **ease of fixing defects or updating software**?

- 1). Reliability
- 2). Maintainability
- 3). Efficiency
- 4). Portability

Answer: 2). Maintainability

Explanation: Maintainability indicates how easily software can be modified or corrected. High maintainability reduces long-term development costs.

Ref: Software Engineering – Pressman

---

51.

A Python application uses the following PyMongo command:

```
collection.deleteOne({"device":"sensor1"})
```

What will happen?

- 1). All documents will be deleted
- 2). The first document matching the query will be removed
- 3). The database will be dropped
- 4). The collection will be renamed

Answer: 2). The first document matching the query will be removed

Explanation: deleteOne() removes the first document that satisfies the query filter. It does not affect other documents in the collection.

Ref: MongoDB Documentation

---

52.

A developer executes the SQL command:

```
INSERT INTO Students VALUES (101,'Ravi',85);
```

What is the result?

- 1). Deletes student record
- 2). Adds new row to Students table
- 3). Updates student record
- 4). Displays student data

Answer: 2). Adds new row to Students table

Explanation: INSERT statement adds new records into a database table. Each value corresponds

to a column in the table.

Ref: Database System Concepts – Korth

---

53.

In MongoDB, what is the equivalent of a table in relational databases?

- 1). Document
- 2). Collection
- 3). Schema
- 4). Node

Answer: 2). Collection

Explanation: Collections group related documents in MongoDB similar to tables in relational databases. They do not require predefined schemas.

Ref: MongoDB Documentation

---

54.

Which Python method retrieves all key-value pairs of a dictionary?

- 1). keys()
- 2). values()
- 3). items()
- 4). pairs()

Answer: 3). items()

Explanation: items() returns both keys and values as tuples in a list-like structure. This is useful for iterating over dictionary data.

Ref: Python Documentation

---

55.

An IoT humidity sensor sends data through MQTT to a broker. Which component receives the message first?

- 1). Subscriber
- 2). Broker
- 3). Gateway
- 4). Cloud server

Answer: 2). Broker

Explanation: In MQTT communication, messages from publishers are sent to the broker first. The broker distributes them to subscribers.

Ref: IoT Fundamentals – Cisco Press

---

56.

Which IoT communication technology is most suitable for **short-range home automation devices**?

- 1). Zigbee
- 2). Ethernet
- 3). Satellite
- 4). Optical fiber

Answer: 1). Zigbee

Explanation: Zigbee provides low-power, short-range communication ideal for smart home networks. It operates using IEEE 802.15.4 standard.

Ref: Internet of Things – Bahga & Madisetti

---

57.

In Big Data processing, which Apache tool performs **in-memory data processing faster than MapReduce**?

- 1). Hive
- 2). Spark
- 3). Pig
- 4). Flume

Answer: 2). Spark

Explanation: Apache Spark performs distributed computing using in-memory processing which is significantly faster than traditional MapReduce.

Ref: Big Data Analytics – Seema Acharya

---

58.

Which Big Data concept describes the **speed at which data is generated and processed**?

- 1). Volume
- 2). Velocity

- 3). Variety
- 4). Veracity

Answer: 2). Velocity

Explanation: Velocity refers to the rapid generation and processing speed of data streams in big data systems.

Ref: Big Data – Kogent Learning

---

59.

A cloud infrastructure shared among several organizations with similar requirements is called:

- 1). Public Cloud
- 2). Private Cloud
- 3). Community Cloud
- 4). Hybrid Cloud

Answer: 3). Community Cloud

Explanation: Community cloud infrastructure is shared by multiple organizations with common concerns such as security or compliance.

Ref: Cloud Computing – Thomas Erl

---

60.

Which cloud characteristic allows users to access services via the internet from any device?

- 1). On-demand self service
- 2). Broad network access
- 3). Resource pooling
- 4). Measured service

Answer: 2). Broad network access

Explanation: Broad network access ensures services are available through standard internet technologies across multiple platforms.

Ref: Cloud Computing – Thomas Erl

---

61.

Which Android UI element allows users to choose one option from multiple options?

- 1). CheckBox
- 2). RadioButton

- 3). TextView
- 4). ImageView

Answer: 2). RadioButton

Explanation: RadioButton allows only one option selection within a RadioGroup. It is commonly used in surveys and settings forms.

Ref: Android Programming – Big Nerd Ranch

---

62.

Which Android layout organizes UI components in a **grid of rows and columns**?

- 1). LinearLayout
- 2). FrameLayout
- 3). GridLayout
- 4). RelativeLayout

Answer: 3). GridLayout

Explanation: GridLayout arranges UI elements in rows and columns similar to a table structure.

Ref: Android Programming – Big Nerd Ranch

---

63.

If the user presses the **Back button** in Android, which lifecycle method is usually triggered?

- 1). onDestroy()
- 2). onCreate()
- 3). onRestart()
- 4). onStart()

Answer: 1). onDestroy()

Explanation: Pressing the back button removes the activity from the stack and destroys it.

Ref: Android Documentation

---

64.

Which PHP function retrieves data from HTTP POST requests?

- 1). \$\_GET
- 2). \$\_POST
- 3). \$\_REQUEST
- 4). \$\_SESSION

Answer: 2). \$\_POST

Explanation: \$\_POST is a PHP superglobal used to collect form data sent via HTTP POST method.

Ref: PHP and MySQL – Larry Ullman

---

65.

Which encryption algorithm is considered the **modern replacement for DES**?

- 1). AES
- 2). RSA
- 3). MD5
- 4). SHA

Answer: 1). AES

Explanation: AES provides stronger encryption using larger key sizes compared to DES. It is widely adopted for modern security systems.

Ref: Cryptography – Stallings

---

66.

Which cyber attack replicates itself automatically and spreads through networks?

- 1). Trojan
- 2). Worm
- 3). Phishing
- 4). Spyware

Answer: 2). Worm

Explanation: Worms spread automatically without user intervention by exploiting network vulnerabilities.

Ref: Cyber Security – Stallings

---

67.

Which disk scheduling algorithm may cause **starvation for some requests**?

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 2). SSTF

Explanation: SSTF may repeatedly service nearby requests while ignoring distant ones, causing starvation.

Ref: Operating System Concepts – Silberschatz

---

68.

In file systems, which directory structure allows **multiple paths to the same file**?

- 1). Single-level directory
- 2). Tree-structured directory
- 3). Acyclic graph directory
- 4). Two-level directory

Answer: 3). Acyclic graph directory

Explanation: Acyclic graph directories allow shared files or subdirectories with multiple paths.

Ref: Operating System Concepts – Silberschatz

---

69.

In a Binary Search Tree, which property must always hold true?

- 1). Left child  $>$  root
- 2). Right child  $<$  root
- 3). Left child  $<$  root  $<$  right child
- 4). Root is always largest

Answer: 3). Left child  $<$  root  $<$  right child

Explanation: BST property ensures efficient searching by maintaining sorted order.

Ref: Data Structures – Horowitz & Sahni

---

70.

A binary tree with **height  $h = 4$**  can have maximum nodes equal to:

- 1). 8
- 2). 15
- 3). 16
- 4). 31

Answer: 2). 15

Explanation: Maximum nodes in binary tree =  $2^h - 1$ . For  $h=4 \rightarrow 2^4 - 1 = 15$ .

Ref: Data Structures – Horowitz & Sahni

---

71.

Convert decimal number  $25_{10}$  into binary.

- 1). 11001
- 2). 10101
- 3). 11101
- 4). 10011

Answer: 1). 11001

Explanation:  $25 = 16 + 8 + 1 \rightarrow$  binary representation 11001.

Ref: Digital Design – Morris Mano

---

72.

Which digital circuit counts number of pulses in binary sequence?

- 1). Register
- 2). Counter
- 3). Encoder
- 4). Decoder

Answer: 2). Counter

Explanation: Counters sequentially count input pulses and generate binary output states.

Ref: Digital Electronics – R.P. Jain

---

73.

Which software testing method checks **software performance under heavy load**?

- 1). Unit testing
- 2). Stress testing
- 3). Integration testing
- 4). Regression testing

Answer: 2). Stress testing

Explanation: Stress testing evaluates system behavior under extreme workload conditions.

Ref: Software Engineering – Pressman

---

74.

Which quality management framework provides **process maturity levels for software organizations**?

- 1). ISO 9126
- 2). CMMI
- 3). Waterfall model
- 4). Agile model

Answer: 2). CMMI

Explanation: Capability Maturity Model Integration measures process maturity across five levels.

Ref: Software Engineering – Pressman

---

75.

Which Agile artifact contains **tasks selected for a specific sprint**?

- 1). Product backlog
- 2). Sprint backlog
- 3). Release plan
- 4). Task board

Answer: 2). Sprint backlog

Explanation: Sprint backlog lists the tasks planned for completion during a sprint iteration.

Ref: Software Engineering – Pressman

---

76.

A Python program connects to a MySQL database using `sqlite3.connect("students.db")`. What does this command perform?

- 1). Deletes database file
- 2). Establishes database connection
- 3). Inserts student records
- 4). Executes SQL query

Answer: 2). Establishes database connection

Explanation: The `connect()` function creates or opens a database file and establishes a connection

object. This connection is required to execute SQL queries.  
Ref: Python Documentation

---

77.

A MongoDB command is executed:

```
db.students.find({"marks":{"$gte":80}})
```

What will this query return?

- 1). Students scoring less than 80
- 2). Students scoring greater than or equal to 80
- 3). All student records
- 4). Students scoring exactly 80

Answer: 2). Students scoring greater than or equal to 80

Explanation: The \$gte operator means "greater than or equal to." It filters documents whose marks field is  $\geq 80$ .

Ref: MongoDB Documentation

---

78.

A smart agriculture IoT system collects soil moisture data and sends it to cloud storage for analysis. Which stage performs **data storage for big data processing**?

- 1). Sensor node
- 2). IoT Gateway
- 3). Cloud storage / HDFS
- 4). Mobile application

Answer: 3). Cloud storage / HDFS

Explanation: Cloud storage or distributed file systems like HDFS store large IoT datasets. These stored datasets are later processed by big data frameworks.

Ref: Big Data – Kogent Learning

---

79.

Which IoT communication technology is commonly used for **wearable health monitoring devices**?

- 1). Bluetooth Low Energy
- 2). Ethernet
- 3). Satellite communication
- 4). Fiber optics

Answer: 1). Bluetooth Low Energy

Explanation: BLE provides low power consumption and short-range connectivity suitable for wearable IoT devices.

Ref: Internet of Things – Bahga & Madisetti

---

80.

In Hadoop architecture, which component schedules cluster resources and manages applications?

- 1). NameNode
- 2). DataNode
- 3). YARN
- 4). Hive

Answer: 3). YARN

Explanation: Yet Another Resource Negotiator (YARN) manages cluster resources and schedules big data processing jobs.

Ref: Big Data Analytics – Seema Acharya

---

81.

Which cloud deployment model allows an organization to operate **both private infrastructure and public cloud resources together**?

- 1). Public Cloud
- 2). Private Cloud
- 3). Hybrid Cloud
- 4). Community Cloud

Answer: 3). Hybrid Cloud

Explanation: Hybrid cloud combines private infrastructure with public cloud services. This provides flexibility and scalability.

Ref: Cloud Computing – Thomas Erl

---

82.

Which Android UI element displays **scrollable lists of data** efficiently?

- 1). TextView
- 2). ListView
- 3). ImageView
- 4). Button

Answer: 2). ListView

Explanation: ListView efficiently displays large lists of data using adapters to bind data to views.

Ref: Android Programming – Big Nerd Ranch

---

83.

Which Android component performs **background tasks without a user interface**?

- 1). Activity
- 2). Service
- 3). Broadcast Receiver
- 4). Fragment

Answer: 2). Service

Explanation: Services run background operations such as downloading data or playing music without UI interaction.

Ref: Android Documentation

---

84.

In Android lifecycle, when the activity becomes visible but not yet interactive, which method is called?

- 1). onCreate()
- 2). onStart()
- 3). onResume()
- 4). onPause()

Answer: 2). onStart()

Explanation: onStart() occurs after creation when the activity becomes visible to the user but is not yet ready for interaction.

Ref: Android Documentation

---

85.

Which PHP command deletes records from a database table?

- 1). SELECT
- 2). UPDATE
- 3). DELETE
- 4). DROP

Answer: 3). DELETE

Explanation: DELETE removes records from a database table based on specified conditions.

Ref: PHP and MySQL – Larry Ullman

---

86.

Which cyber security technique converts plaintext into unreadable form using a secret key?

- 1). Authentication
- 2). Encryption
- 3). Compression
- 4). Encoding

Answer: 2). Encryption

Explanation: Encryption transforms readable data into ciphertext to protect confidentiality during transmission.

Ref: Cryptography – Stallings

---

87.

Which encryption algorithm is widely used in **secure Wi-Fi networks (WPA2)**?

- 1). AES
- 2). DES
- 3). RSA
- 4). SHA

Answer: 1). AES

Explanation: AES encryption provides strong symmetric encryption used in modern wireless security protocols.

Ref: Cryptography – Stallings

---

88.

Which cyber attack attempts to guess passwords repeatedly using automated tools?

- 1). Phishing
- 2). Brute force attack
- 3). Worm attack
- 4). Trojan attack

Answer: 2). Brute force attack

Explanation: Brute force attacks try all possible password combinations until the correct one is found.

Ref: Cyber Security – Stallings

---

89.

In disk scheduling, the algorithm that services requests in arrival order is:

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 1). FCFS

Explanation: First Come First Serve processes disk requests sequentially based on arrival order.

Ref: Operating System Concepts – Silberschatz

---

90.

Which operating system component manages files and directories stored on disk?

- 1). Process manager
- 2). File system
- 3). Memory manager
- 4). Scheduler

Answer: 2). File system

Explanation: The file system organizes, stores, and retrieves files from storage devices.

Ref: Operating System Concepts – Silberschatz

---

91.

In a Binary Search Tree, searching for a key has average time complexity:

- 1).  $O(n)$
- 2).  $O(\log n)$

- 3).  $O(n^2)$
- 4).  $O(1)$

Answer: 2).  $O(\log n)$

Explanation: Balanced BST operations take logarithmic time due to halving the search space each step.

Ref: Data Structures – Horowitz & Sahni

---

92.

Which tree traversal is commonly used to **delete a binary tree safely**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 3). Postorder

Explanation: Postorder traversal deletes child nodes before the parent node, preventing dangling pointers.

Ref: Data Structures – Horowitz & Sahni

---

93.

Convert octal number **17<sub>8</sub>** to decimal.

- 1). 13
- 2). 14
- 3). 15
- 4). 16

Answer: 3). 15

Explanation:  $17_8 = 1 \times 8 + 7 = 15_{10}$ .

Ref: Digital Design – Morris Mano

---

94.

Which digital circuit converts **serial data into parallel output**?

- 1). Counter
- 2). Shift register

- 3). Decoder
- 4). Multiplexer

Answer: 2). Shift register

Explanation: Shift registers shift bits sequentially and convert serial input into parallel output.

Ref: Digital Electronics – R.P. Jain

---

95.

Which counter increases its value with each clock pulse?

- 1). Up counter
- 2). Down counter
- 3). Ring counter
- 4). Johnson counter

Answer: 1). Up counter

Explanation: Up counters increment their binary value with each clock pulse.

Ref: Digital Electronics – R.P. Jain

---

96.

Which software testing technique checks **individual program modules independently**?

- 1). Unit testing
- 2). Integration testing
- 3). System testing
- 4). Acceptance testing

Answer: 1). Unit testing

Explanation: Unit testing verifies functionality of individual modules or components before integration.

Ref: Software Engineering – Pressman

---

97.

Which testing method ensures **software updates do not break existing functionality**?

- 1). Regression testing
- 2). Stress testing
- 3). Load testing
- 4). Performance testing

Answer: 1). Regression testing

Explanation: Regression testing re-tests software after modifications to ensure previous functionality remains intact.

Ref: Software Engineering – Pressman

---

98.

Which software quality attribute measures **software's ability to perform efficiently with minimal resources**?

- 1). Usability
- 2). Efficiency
- 3). Portability
- 4). Maintainability

Answer: 2). Efficiency

Explanation: Efficiency measures system performance relative to resource consumption such as memory and CPU usage.

Ref: Software Engineering – Pressman

---

99.

Which software development model focuses on **continuous iterations and rapid feedback from users**?

- 1). Waterfall Model
- 2). Spiral Model
- 3). Agile Model
- 4). V-Model

Answer: 3). Agile Model

Explanation: Agile promotes iterative development cycles with continuous user feedback and quick adaptation to changes.

Ref: Software Engineering – Pressman

---

100.

In modern AI systems, IoT sensors collect large datasets that are processed using Big Data frameworks. What is the primary benefit of this integration?

- 1). Reduced data storage
- 2). Real-time intelligent decision making
- 3). Lower internet speed
- 4). Reduced network devices

Answer: 2). Real-time intelligent decision making

Explanation: IoT sensors generate large volumes of data that big data analytics processes to derive insights. This enables intelligent automated systems.

Ref: Big Data Analytics – Seema Acharya

**Grand Test – 5****AP ECET 2026 – AI & ML**

---

1. In a Binary Search Tree, inserting elements in sorted order results in which worst-case structure?

- 1). Balanced tree
- 2). Complete tree
- 3). Skewed tree
- 4). AVL tree

Answer: 3). Skewed tree

Explanation: When sorted values are inserted sequentially, the BST becomes a chain-like structure with height equal to number of nodes.

Ref: Data Structures – Horowitz & Sahni

---

2. The worst-case time complexity of searching in an unbalanced Binary Search Tree is:

- 1).  $O(\log n)$
- 2).  $O(n)$
- 3).  $O(1)$
- 4).  $O(n \log n)$

Answer: 2).  $O(n)$

Explanation: In a skewed BST the height becomes  $n$ , making search equivalent to linear traversal.

Ref: Data Structures – Horowitz & Sahni

---

3. In a binary tree with  $n$  nodes, the number of NULL pointers is:

- 1).  $n-1$
- 2).  $n+1$
- 3).  $2n$
- 4).  $n$

Answer: 2).  $n+1$

Explanation: A binary tree has  $2n$  pointers and  $n-1$  edges, leaving  $n+1$  NULL pointers.

Ref: Data Structures using C – Reema Thareja

---

4. In Operating Systems, which problem occurs when two processes wait indefinitely for resources held by each other?

- 1). Starvation

- 2). Deadlock
- 3). Thrashing
- 4). Fragmentation

Answer: 2). Deadlock

Explanation: Deadlock arises when processes form a circular wait condition for resources.

Ref: Operating System Concepts – Silberschatz

---

5. Which of the following is NOT a necessary condition for deadlock?

- 1). Mutual exclusion
- 2). Hold and wait
- 3). Preemption allowed
- 4). Circular wait

Answer: 3). Preemption allowed

Explanation: Deadlock requires no-preemption condition; allowing preemption can break deadlocks.

Ref: Operating System Concepts – Silberschatz

---

6. Which disk scheduling algorithm minimizes seek time but may cause starvation?

- 1). FCFS
- 2). SSTF
- 3). SCAN
- 4). C-SCAN

Answer: 2). SSTF

Explanation: SSTF always selects the nearest request which may indefinitely delay distant requests.

Ref: Operating System Concepts – Silberschatz

---

7. In Java, which method starts a new thread execution?

- 1). run()
- 2). start()
- 3). execute()
- 4). begin()

Answer: 2). start()

Explanation: start() creates a new thread and calls the run() method internally.

Ref: Java Complete Reference – Herbert Schildt

---

8. In Java exception handling, which block always executes whether exception occurs or not?

- 1). catch
- 2). try
- 3). finally
- 4). throw

Answer: 3). finally

Explanation: finally block executes after try/catch and is typically used for resource cleanup.

Ref: Java Complete Reference – Herbert Schildt

---

9. Which Java exception occurs when dividing a number by zero?

- 1). ArithmeticException
- 2). IOException
- 3). NullPointerException
- 4). RuntimeException

Answer: 1). ArithmeticException

Explanation: Division by zero in Java triggers ArithmeticException during runtime.

Ref: Java Complete Reference – Herbert Schildt

---

10. In Python, what is the output of:

```
[x*x for x in range(4)]
```

- 1). [1,4,9,16]
- 2). [0,1,4,9]
- 3). [1,2,3,4]
- 4). [0,2,4,6]

Answer: 2). [0,1,4,9]

Explanation: List comprehension squares each number from 0 to 3.

Ref: Python Documentation

---

11. Which Python data structure is immutable?

- 1). List
- 2). Tuple
- 3). Dictionary
- 4). Set

Answer: 2). Tuple

Explanation: Tuples cannot be modified after creation unlike lists.

Ref: Python Documentation

---

12. Which Python function reads the entire file content?

- 1). read()
- 2). write()
- 3). open()
- 4). close()

Answer: 1). read()

Explanation: read() returns the entire content of the file as a string.

Ref: Python Documentation

---

13. Which IoT technology provides **very short-range communication (<10 cm)** used in contactless payments?

- 1). Zigbee
- 2). Bluetooth
- 3). NFC
- 4). Wi-Fi

Answer: 3). NFC

Explanation: Near Field Communication enables secure short-range communication used in digital payments.

Ref: IoT Fundamentals – Cisco Press

---

14. Which IoT protocol uses **publish-subscribe communication model**?

- 1). HTTP
- 2). MQTT
- 3). FTP
- 4). SMTP

Answer: 2). MQTT

Explanation: MQTT uses broker-based publish-subscribe messaging for IoT systems.

Ref: IoT Fundamentals – Cisco Press

---

15. Which wireless technology is commonly used in **home automation networks**?

- 1). Ethernet
- 2). Zigbee
- 3). Satellite

4). DSL

Answer: 2). Zigbee

Explanation: Zigbee supports low-power mesh networking suitable for smart homes.

Ref: Internet of Things – Bahga & Madiseti

---

16. In JavaScript, which keyword declares a block-scoped variable?

1). var

2). let

3). define

4). function

Answer: 2). let

Explanation: let provides block-level scope unlike var which has function scope.

Ref: JavaScript Documentation – Mozilla

---

17. Which Ajax feature allows web pages to update content **without refreshing the entire page**?

1). Dynamic HTML

2). Asynchronous communication

3). Static HTML

4). Server-side scripting

Answer: 2). Asynchronous communication

Explanation: Ajax sends background requests and updates page sections dynamically.

Ref: Web Technologies – Kogent Learning

---

18. Which PHP symbol represents a variable?

1). #

2). @

3). \$

4). &

Answer: 3). \$

Explanation: PHP variables always start with the \$ symbol.

Ref: PHP and MySQL – Larry Ullman

---

19. In 8086 microprocessor, how many general purpose registers exist?

1). 4

2). 6

- 3). 8
- 4). 16

Answer: 3). 8

Explanation: AX, BX, CX, DX, SI, DI, BP, SP are the eight general-purpose registers.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

20. In memory organization, cache memory is placed between:

- 1). CPU and RAM
- 2). RAM and disk
- 3). CPU and disk
- 4). RAM and ROM

Answer: 1). CPU and RAM

Explanation: Cache memory reduces access time by storing frequently used instructions close to CPU.

Ref: Computer System Architecture – M. Morris Mano

---

21. Which SQL clause groups rows having the same values?

- 1). GROUP BY
- 2). ORDER BY
- 3). HAVING
- 4). WHERE

Answer: 1). GROUP BY

Explanation: GROUP BY groups rows for aggregate calculations.

Ref: Database System Concepts – Korth

---

22. Which PL/SQL component handles runtime errors?

- 1). Declare section
- 2). Exception section
- 3). Begin section
- 4). Cursor section

Answer: 2). Exception section

Explanation: Exception block handles errors occurring during PL/SQL execution.

Ref: Oracle SQL and PL/SQL – Ivan Bayross

---

23. MongoDB is classified as which type of database?

- 1). Relational

- 2). Hierarchical
- 3). NoSQL
- 4). Network

Answer: 3). NoSQL

Explanation: MongoDB stores JSON-like documents without fixed schema.

Ref: MongoDB Documentation

---

24. Which flip-flop toggles its output when both inputs are HIGH?

- 1). SR flip-flop
- 2). JK flip-flop
- 3). D flip-flop
- 4). T flip-flop

Answer: 2). JK flip-flop

Explanation: When  $J=K=1$ , JK flip-flop toggles the output state.

Ref: Digital Electronics – R.P. Jain

---

25. In Software Engineering, which type of maintenance fixes errors discovered after delivery?

- 1). Perfective maintenance
- 2). Corrective maintenance
- 3). Adaptive maintenance
- 4). Preventive maintenance

Answer: 2). Corrective maintenance

Explanation: Corrective maintenance fixes faults found during system operation.

Ref: Software Engineering – Pressman

---

26. In Python IoT applications, which library is commonly used to communicate with an MQTT broker?

- 1). NumPy
- 2). Paho-MQTT
- 3). Pandas
- 4). TensorFlow

Answer: 2). Paho-MQTT

Explanation: Paho-MQTT is a Python client library used for implementing MQTT messaging in IoT systems. It allows devices to publish and subscribe to topics.

Ref: Eclipse Paho MQTT Documentation

---

27. In Python, what will be the output of: `tuple([1,2,3])`

- 1). [1,2,3]
- 2). (1,2,3)
- 3). {1,2,3}
- 4). Error

Answer: 2). (1,2,3)

Explanation: The `tuple()` function converts a list into a tuple, which is immutable.

Ref: Python Documentation

---

28. Which IoT protocol is specifically designed for **constrained devices using REST architecture**?

- 1). MQTT
- 2). CoAP
- 3). FTP
- 4). HTTP

Answer: 2). CoAP

Explanation: Constrained Application Protocol (CoAP) is a lightweight REST-based protocol designed for IoT devices with limited resources.

Ref: IoT Fundamentals – Cisco Press

---

29. In IoT communication technologies, Bluetooth operates typically within which range?

- 1). 1 meter
- 2). 10 meters
- 3). 100 meters
- 4). 1 kilometer

Answer: 2). 10 meters

Explanation: Standard Bluetooth devices typically operate within a 10-meter range for short-range communication.

Ref: Internet of Things – Bahga & Madisetti

---

30. In Android programming, which lifecycle method is called when an activity becomes visible to the user?

- 1). `onStart()`
- 2). `onCreate()`
- 3). `onResume()`
- 4). `onPause()`

Answer: 1). `onStart()`

Explanation: onStart() executes when the activity becomes visible after creation but before user interaction begins.

Ref: Android Documentation

---

31. Which Android database is most commonly used for local data storage?

- 1). MySQL
- 2). SQLite
- 3). MongoDB
- 4). Oracle

Answer: 2). SQLite

Explanation: SQLite is an embedded relational database used in Android applications for local storage.

Ref: Android Programming – Big Nerd Ranch

---

32. Which cyber security attack involves installing malicious software disguised as legitimate software?

- 1). Worm
- 2). Trojan
- 3). Phishing
- 4). Spoofing

Answer: 2). Trojan

Explanation: Trojan malware disguises itself as legitimate software to trick users into installing it.

Ref: Cryptography and Network Security – Stallings

---

33. Which encryption technique uses two keys, one public and one private?

- 1). Symmetric encryption
- 2). Asymmetric encryption
- 3). Hashing
- 4). Encoding

Answer: 2). Asymmetric encryption

Explanation: Asymmetric encryption uses a public key for encryption and a private key for decryption.

Ref: Cryptography – Stallings

---

34. Which disk scheduling algorithm provides more uniform wait time than SCAN?

- 1). FCFS
- 2). SSTF
- 3). C-SCAN
- 4). LOOK

Answer: 3). C-SCAN

Explanation: Circular SCAN moves in one direction and then jumps back to the beginning, ensuring more uniform service time.

Ref: Operating System Concepts – Silberschatz

---

35. In Operating Systems, semaphores are mainly used for:

- 1). Memory allocation
- 2). Process synchronization
- 3). Disk scheduling
- 4). File storage

Answer: 2). Process synchronization

Explanation: Semaphores control access to shared resources among concurrent processes.

Ref: Operating System Concepts – Silberschatz

---

36. Which traversal method is commonly used to **evaluate expression trees**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 3). Postorder

Explanation: Postorder traversal processes operands before operators, making it useful for expression evaluation.

Ref: Data Structures – Horowitz & Sahni

---

37. In Java multithreading, which interface must be implemented to create a thread?

- 1). Runnable
- 2). Serializable
- 3). Comparable
- 4). Cloneable

Answer: 1). Runnable

Explanation: Implementing Runnable allows a class to define a run() method for thread

execution.

Ref: Java Complete Reference – Herbert Schildt

---

38. Which Java keyword is used to explicitly throw an exception?

- 1). try
- 2). catch
- 3). throw
- 4). finally

Answer: 3). throw

Explanation: The throw keyword is used to manually throw an exception in Java.

Ref: Java Complete Reference – Herbert Schildt

---

39. Which SQL command modifies existing data in a table?

- 1). INSERT
- 2). UPDATE
- 3). SELECT
- 4). DELETE

Answer: 2). UPDATE

Explanation: UPDATE changes values of existing records in a table.

Ref: Database System Concepts – Korth

---

40. Which MongoDB operation removes documents from a collection?

- 1). find()
- 2). insertOne()
- 3). deleteOne()
- 4). updateOne()

Answer: 3). deleteOne()

Explanation: deleteOne() removes the first document that matches the specified condition.

Ref: MongoDB Documentation

---

41. In Digital Electronics, which flip-flop has only one input?

- 1). SR flip-flop
- 2). JK flip-flop
- 3). D flip-flop
- 4). T flip-flop

Answer: 3). D flip-flop

Explanation: D flip-flop has a single data input and stores its value on the triggering clock edge.

Ref: Digital Electronics – R.P. Jain

---

42. A 3-bit binary counter can represent how many states?

- 1). 4
- 2). 6
- 3). 8
- 4). 16

Answer: 3). 8

Explanation: Number of states =  $2^n$  where n is the number of bits.

Ref: Digital Electronics – R.P. Jain

---

43. In Software Engineering, which maintenance adapts software to a new environment?

- 1). Corrective maintenance
- 2). Perfective maintenance
- 3). Adaptive maintenance
- 4). Preventive maintenance

Answer: 3). Adaptive maintenance

Explanation: Adaptive maintenance modifies software to operate in a new environment or platform.

Ref: Software Engineering – Pressman

---

44. Which reliability metric measures the **average time between system failures**?

- 1). MTBF
- 2). MTTF
- 3). MTTR
- 4). SLA

Answer: 1). MTBF

Explanation: Mean Time Between Failures indicates average operational time before failure occurs.

Ref: Software Engineering – Pressman

---

45. In TCP/IP model, which layer corresponds to the OSI Transport layer?

- 1). Application layer

- 2). Internet layer
- 3). Transport layer
- 4). Network interface layer

Answer: 3). Transport layer

Explanation: TCP/IP Transport layer performs functions similar to OSI Transport layer such as end-to-end communication.

Ref: Computer Networks – Tanenbaum

---

46. Which subnet mask allows **254 hosts per network**?

- 1). 255.255.255.0
- 2). 255.255.255.128
- 3). 255.255.255.192
- 4). 255.255.255.224

Answer: 1). 255.255.255.0

Explanation: This mask leaves 8 bits for hosts, giving  $2^8 - 2 = 254$  usable hosts.

Ref: Computer Networks – Tanenbaum

---

47. In Big Data architecture, which tool is commonly used for **distributed data storage**?

- 1). Hadoop HDFS
- 2). MySQL
- 3). SQLite
- 4). Oracle DB

Answer: 1). Hadoop HDFS

Explanation: HDFS stores large datasets across multiple distributed nodes.

Ref: Big Data – Kogent Learning

---

48. Which cloud service provides **complete application development environment**?

- 1). SaaS
- 2). PaaS
- 3). IaaS
- 4). FaaS

Answer: 2). PaaS

Explanation: Platform as a Service offers tools and runtime environment for application development.

Ref: Cloud Computing – Thomas Erl

---

49. In 8086 microprocessor, the **code segment register** is abbreviated as:

- 1). CS
- 2). DS
- 3). SS
- 4). ES

Answer: 1). CS

Explanation: CS stores the address of the current code segment used by the processor.

Ref: Advanced Microprocessors – Ray & Bhurchandi

---

50. Which memory type retains data even when power is turned off?

- 1). RAM
- 2). Cache
- 3). ROM
- 4). Register

Answer: 3). ROM

Explanation: Read Only Memory stores permanent data that remains even after power loss.

Ref: Computer System Architecture – M. Morris Mano

---

51. In Python, which statement correctly creates a tuple containing a single element?

- 1). (5)
- 2). (5,)
- 3). tuple(5)
- 4). [5]

Answer: 2). (5,)

Explanation: A trailing comma is required to define a single-element tuple in Python; otherwise it is treated as a normal expression.

Ref: Python Documentation

---

52. Which Python function is used to write data to a file opened in write mode?

- 1). read()
- 2). write()
- 3). append()
- 4). input()

Answer: 2). write()

Explanation: The write() function inserts text into a file opened with write mode ('w' or

'a').

Ref: Python Documentation

---

53. In IoT architecture, which layer directly interacts with sensors and actuators?

- 1). Application layer
- 2). Perception layer
- 3). Network layer
- 4). Cloud layer

Answer: 2). Perception layer

Explanation: The perception layer collects data from sensors and interacts with the physical environment.

Ref: Internet of Things – Bahga & Madiseti

---

54. Which IoT technology uses **IEEE 802.15.4 standard** for low-power wireless communication?

- 1). Wi-Fi
- 2). Zigbee
- 3). Bluetooth
- 4). NFC

Answer: 2). Zigbee

Explanation: Zigbee operates on IEEE 802.15.4 and supports mesh networking for IoT devices.

Ref: IoT Fundamentals – Cisco Press

---

55. In Android lifecycle, which method is called when the activity comes to the foreground and the user can interact with it?

- 1). onStart()
- 2). onResume()
- 3). onPause()
- 4). onStop()

Answer: 2). onResume()

Explanation: onResume() places the activity in the running state where it receives user input.

Ref: Android Documentation

---

56. Which Android component listens for system-wide broadcast messages such as battery alerts?

- 1). Activity
- 2). Service
- 3). Broadcast Receiver
- 4). Fragment

Answer: 3). Broadcast Receiver

Explanation: Broadcast receivers respond to system or application broadcast messages.

Ref: Android Programming – Big Nerd Ranch

---

57. In Cloud Computing, which characteristic allows users to obtain computing resources automatically when needed?

- 1). Elasticity
- 2). On-demand self-service
- 3). Measured service
- 4). Broad network access

Answer: 2). On-demand self-service

Explanation: Users can provision computing resources automatically without human intervention.

Ref: Cloud Computing – Thomas Erl

---

58. Which big data concept describes **different types of data formats such as text, video, and sensor data**?

- 1). Volume
- 2). Velocity
- 3). Variety
- 4). Value

Answer: 3). Variety

Explanation: Variety refers to multiple forms of data including structured and unstructured data.

Ref: Big Data – Kogent Learning

---

59. In Operating Systems, which synchronization tool uses an integer variable to control access to shared resources?

- 1). Monitor
- 2). Semaphore
- 3). Mutex

4). Thread

Answer: 2). Semaphore

Explanation: Semaphores manage process synchronization and prevent race conditions.

Ref: Operating System Concepts – Silberschatz

---

60. Which deadlock prevention method eliminates the **hold-and-wait condition**?

1). Allow resource preemption

2). Require processes to request all resources at once

3). Allow circular waiting

4). Allow shared resource usage

Answer: 2). Require processes to request all resources at once

Explanation: By requesting all resources simultaneously, processes cannot hold some while waiting for others.

Ref: Operating System Concepts – Silberschatz

---

61. In Java multithreading, which method pauses thread execution temporarily?

1). sleep()

2). wait()

3). pause()

4). stop()

Answer: 1). sleep()

Explanation: sleep() temporarily suspends the execution of the current thread for a specified time.

Ref: Java Complete Reference – Herbert Schildt

---

62. Which Java exception occurs when attempting to access a method on a null object?

1). IOException

2). ArithmeticException

3). NullPointerException

4). ClassNotFoundException

Answer: 3). NullPointerException

Explanation: NullPointerException occurs when invoking methods on null object references.

Ref: Java Complete Reference – Herbert Schildt

---

63. Which SQL clause filters grouped records after aggregation?

- 1). WHERE
- 2). GROUP BY
- 3). HAVING
- 4). ORDER BY

Answer: 3). HAVING

Explanation: HAVING filters groups created by GROUP BY based on aggregate conditions.

Ref: Database System Concepts – Korth

---

64. In MongoDB, which command retrieves documents from a collection?

- 1). insertOne()
- 2). find()
- 3). updateOne()
- 4). deleteOne()

Answer: 2). find()

Explanation: find() retrieves documents that match query conditions.

Ref: MongoDB Documentation

---

65. Which flip-flop changes its output on every clock pulse when input  $T = 1$ ?

- 1). SR flip-flop
- 2). JK flip-flop
- 3). D flip-flop
- 4). T flip-flop

Answer: 4). T flip-flop

Explanation: T flip-flop toggles its output state whenever  $T = 1$  and a clock pulse occurs.

Ref: Digital Electronics – R.P. Jain

---

66. A 4-bit ripple counter counts from:

- 1). 0 to 8
- 2). 0 to 15
- 3). 0 to 16
- 4). 1 to 16

Answer: 2). 0 to 15

Explanation: A 4-bit counter has  $2^4 = 16$  states ranging from 0 to 15.

Ref: Digital Electronics – R.P. Jain

---

67. Which software maintenance type improves system performance and usability?

- 1). Corrective
- 2). Adaptive
- 3). Perfective
- 4). Preventive

Answer: 3). Perfective

Explanation: Perfective maintenance enhances system features or performance.

Ref: Software Engineering – Pressman

---

68. In Software Engineering, which metric measures software failure rate?

- 1). Reliability
- 2). Portability
- 3). Maintainability
- 4). Usability

Answer: 1). Reliability

Explanation: Reliability measures probability of failure-free software operation.

Ref: Software Engineering – Pressman

---

69. In TCP/IP model, which protocol ensures reliable data delivery?

- 1). UDP
- 2). TCP
- 3). IP
- 4). ICMP

Answer: 2). TCP

Explanation: Transmission Control Protocol provides reliable, connection-oriented communication.

Ref: Computer Networks – Tanenbaum

---

70. Which cyber crime involves impersonating a trusted website to steal user data?

- 1). Spoofing
- 2). Phishing
- 3). Sniffing
- 4). Worm attack

Answer: 2). Phishing

Explanation: Phishing attacks trick users into revealing sensitive information through fake websites or emails.

Ref: Cyber Security – Stallings

---

71. In subnetting, a subnet mask **255.255.255.192** allows how many hosts per subnet?

- 1). 30
- 2). 62
- 3). 126
- 4). 254

Answer: 2). 62

Explanation: Host bits = 6  $\rightarrow$  hosts =  $2^6 - 2 = 62$  usable addresses.

Ref: Computer Networks – Tanenbaum

---

72. Which big data framework provides **real-time stream processing**?

- 1). Hadoop MapReduce
- 2). Apache Spark
- 3). Hive
- 4). HDFS

Answer: 2). Apache Spark

Explanation: Spark performs real-time analytics and in-memory distributed processing.

Ref: Big Data Analytics – Seema Acharya

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73. Which cloud deployment model is owned and used exclusively by a single organization?

- 1). Public cloud
- 2). Private cloud
- 3). Hybrid cloud
- 4). Community cloud

Answer: 2). Private cloud

Explanation: Private cloud infrastructure is dedicated to one organization.

Ref: Cloud Computing – Thomas Erl

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74. In 8086 microprocessor, which register stores the **stack segment address**?

- 1). CS
- 2). DS
- 3). SS
- 4). ES

Answer: 3). SS

Explanation: Stack Segment (SS) register holds the base address of the stack.

Ref: Advanced Microprocessors – Ray & Bhurchandi

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75. Which memory stores frequently used instructions to speed up processing?

- 1). RAM
- 2). ROM
- 3). Cache
- 4). Disk

Answer: 3). Cache

Explanation: Cache memory reduces memory access time by storing frequently accessed instructions near CPU.

Ref: Computer System Architecture – M. Morris Mano

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76. In Android Activity Life Cycle, which method is called **when the activity is no longer visible to the user**?

- 1). onPause()
- 2). onStop()
- 3). onStart()
- 4). onResume()

Answer: 2). onStop()

Explanation: onStop() executes when the activity becomes completely hidden because another activity is in the foreground.

Ref: Android Documentation

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77. In Android applications, which component manages database operations for SQLite databases?

- 1). SQLiteDatabase
- 2). SQLiteOpenHelper
- 3). DatabaseAdapter
- 4). ContentResolver

Answer: 2). SQLiteOpenHelper

Explanation: SQLiteOpenHelper helps create and upgrade databases in Android applications while managing database connections.

Ref: Android Programming – Big Nerd Ranch

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78. In Python IoT applications, sensor data is often transmitted to cloud servers using which protocol?

- 1). FTP

- 2). MQTT
- 3). SMTP
- 4). TELNET

Answer: 2). MQTT

Explanation: MQTT provides lightweight messaging suitable for IoT devices sending sensor data to cloud platforms.

Ref: IoT Fundamentals – Cisco Press

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79. Which Python data structure is commonly used to store **sensor readings mapped to timestamps** in IoT applications?

- 1). Tuple
- 2). Dictionary
- 3). Set
- 4). String

Answer: 2). Dictionary

Explanation: Dictionaries store key-value pairs, making them ideal for mapping timestamps to sensor values.

Ref: Python Documentation

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80. In Operating Systems, which algorithm detects deadlock by analyzing the resource allocation graph?

- 1). Banker's algorithm
- 2). Deadlock detection algorithm
- 3). FIFO scheduling
- 4). Paging algorithm

Answer: 2). Deadlock detection algorithm

Explanation: Deadlock detection periodically checks resource allocation graphs for cycles.

Ref: Operating System Concepts – Silberschatz

---

81. In Operating Systems, the Banker's algorithm is used for:

- 1). Deadlock prevention
- 2). Deadlock avoidance
- 3). Memory allocation
- 4). Process scheduling

Answer: 2). Deadlock avoidance

Explanation: Banker's algorithm checks whether allocating resources keeps the system in a safe state.

Ref: Operating System Concepts – Silberschatz

---

82. Which flip-flop is commonly used to build binary counters?

- 1). SR flip-flop
- 2). JK flip-flop
- 3). D flip-flop
- 4). T flip-flop

Answer: 4). T flip-flop

Explanation: T flip-flops toggle output on every clock pulse, making them suitable for counters.

Ref: Digital Electronics – R.P. Jain

---

83. A 5-bit binary counter can represent how many states?

- 1). 16
- 2). 32
- 3). 64
- 4). 128

Answer: 2). 32

Explanation: A binary counter with n bits has  $2^n$  states  $\rightarrow 2^5 = 32$ .

Ref: Digital Electronics – R.P. Jain

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84. Which cyber crime involves secretly capturing network packets to obtain sensitive information?

- 1). Phishing
- 2). Sniffing
- 3). Spoofing
- 4). Trojan attack

Answer: 2). Sniffing

Explanation: Packet sniffing intercepts network data to capture credentials or sensitive information.

Ref: Cyber Security – Stallings

---

85. Which encryption technique is widely used in **secure cloud storage systems**?

- 1). DES
- 2). AES
- 3). MD5
- 4). CRC

Answer: 2). AES

Explanation: AES provides strong symmetric encryption and is widely used for cloud data security.

Ref: Cryptography – Stallings

---

86. In a Binary Search Tree, which traversal produces **sorted order of elements**?

- 1). Preorder
- 2). Inorder
- 3). Postorder
- 4). Level order

Answer: 2). Inorder

Explanation: Inorder traversal visits nodes in ascending order in a BST.

Ref: Data Structures – Horowitz & Sahni

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87. Which Java thread state indicates the thread is waiting for a resource lock?

- 1). Runnable
- 2). Blocked
- 3). Terminated
- 4). New

Answer: 2). Blocked

Explanation: Blocked state occurs when a thread waits to acquire a monitor lock.

Ref: Java Complete Reference – Herbert Schildt

---

88. In Java exception handling, which keyword defines a custom exception?

- 1). try
- 2). throw
- 3). class
- 4). catch

Answer: 3). class

Explanation: Custom exceptions are created by defining a class extending Exception.

Ref: Java Complete Reference – Herbert Schildt

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89. Which SQL command creates a new database table?

- 1). CREATE TABLE
- 2). INSERT TABLE
- 3). ADD TABLE
- 4). NEW TABLE

Answer: 1). CREATE TABLE

Explanation: CREATE TABLE defines a new relational table structure.

Ref: Database System Concepts – Korth

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90. In MongoDB, which command updates existing documents?

- 1). insertOne()
- 2). updateOne()
- 3). find()
- 4). drop()

Answer: 2). updateOne()

Explanation: updateOne() modifies fields of the first document that matches the query condition.

Ref: MongoDB Documentation

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91. In Big Data architecture, which component performs distributed processing of large datasets?

- 1). HDFS
- 2). MapReduce
- 3). Hive
- 4). Pig

Answer: 2). MapReduce

Explanation: MapReduce splits tasks into map and reduce phases to process large data sets.

Ref: Big Data – Kogent Learning

---

92. Which Big Data concept refers to the **amount of data generated every second**?

- 1). Volume
- 2). Velocity

- 3). Variety
- 4). Value

Answer: 2). Velocity

Explanation: Velocity refers to the speed of data generation and processing.

Ref: Big Data – Kogent Learning

---

93. In Cloud Computing, which model delivers **software applications through web browsers**?

- 1). IaaS
- 2). PaaS
- 3). SaaS
- 4). FaaS

Answer: 3). SaaS

Explanation: SaaS provides complete software applications accessible via the internet.

Ref: Cloud Computing – Thomas Erl

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94. Which cloud characteristic allows users to pay only for resources they consume?

- 1). Elasticity
- 2). Measured service
- 3). Resource pooling
- 4). Virtualization

Answer: 2). Measured service

Explanation: Measured service tracks resource usage and enables pay-as-you-go billing.

Ref: Cloud Computing – Thomas Erl

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95. In Web Technologies, which JavaScript function sends asynchronous HTTP requests?

- 1). fetch()
- 2). print()
- 3). load()
- 4). send()

Answer: 1). fetch()

Explanation: fetch() allows asynchronous HTTP requests used in Ajax applications.

Ref: JavaScript Documentation – Mozilla

---

96. Which jQuery function hides HTML elements dynamically?

- 1). hide()
- 2). remove()
- 3). clear()
- 4). delete()

Answer: 1). hide()

Explanation: hide() hides selected elements in jQuery without removing them from DOM.

Ref: JavaScript & JQuery – Jon Duckett

---

97. In Computer Organization, which addressing mode directly specifies operand address?

- 1). Immediate addressing
- 2). Direct addressing
- 3). Indirect addressing
- 4). Register addressing

Answer: 2). Direct addressing

Explanation: Direct addressing mode explicitly specifies the memory address of the operand.

Ref: Computer System Architecture – M. Morris Mano

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98. Which memory management technique divides memory into fixed-size blocks called pages?

- 1). Segmentation
- 2). Paging
- 3). Partitioning
- 4). Swapping

Answer: 2). Paging

Explanation: Paging divides logical memory into pages and physical memory into frames.

Ref: Operating System Concepts – Silberschatz

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99. In Software Engineering, which process ensures software meets predefined quality standards?

- 1). Quality Assurance
- 2). Maintenance
- 3). Documentation
- 4). Debugging

Answer: 1). Quality Assurance

Explanation: Quality assurance involves systematic processes to ensure software meets standards.

Ref: Software Engineering – Pressman

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100. In modern AI systems, IoT devices generate data which is analyzed using Big Data frameworks and stored in the cloud. This integration primarily enables:

- 1). Faster internet speed
- 2). Intelligent automated decision making
- 3). Reduced data generation
- 4). Smaller storage capacity

Answer: 2). Intelligent automated decision making

Explanation: Combining IoT data, cloud storage, and big data analytics enables real-time intelligent systems and predictive insights.

Ref: Big Data Analytics – Seema Acharya

## END NOTE

**Your Rank is Not Decided in the Exam Hall... It Is Decided in Your Preparation Room.**

**Dear Student,** If you have reached this page, it means you have completed a serious journey.

- You have mastered Python and C syntax.
- You have visualized Data Structures and Algorithms.
- You have understood the logic behind Machine Learning models.
- You have faced mock tests under pressure.
- You have debugged your mistakes and improved.

**That is exactly how ranks are built.**

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### Remember These Final Principles

**✓ Logic wins over rote learning. ✓ Accuracy is more powerful than speed. ✓ Revision is more important than starting new topics. ✓ Dry-running code snippets gives confidence. ✓ Mock test analysis gives the rank.**

**AP ECET is not about unsolvable problems. It is about avoiding silly mistakes in fundamental logic.**

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### Final Strategy Before Exam

1. **Revise the Core 11 Units:** Focus on your short notes for Digital Electronics, Operating Systems, and Network basics.
2. **Focus on Frequently Tested Areas:**
  - **Data Structures:** Pointer logic, Trees, and Sorting complexities.
  - **DBMS:** Normalization rules and SQL query outputs.
  - **Python/C:** Scope of variables and loop outputs.
  - **AI & ML Foundations:** Supervised vs. Unsupervised learning, Bias-Variance tradeoff, and Activation functions.
  - **Software Engineering:** SDLC models and Testing types.
3. **Rest & Mindset:** Sleep well before exam day. Stay calm. Read each logic-based question twice.

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### **In the Exam Hall**

- **Attempt Easy Questions First:** Secure the marks from Theory and OS/DBMS sections first.
  - **Avoid Overthinking:** Don't get stuck on one complex "Output of the Code" question.
  - **Trace Carefully:** Use the rough sheet to dry-run loops or recursion step-by-step.
  - **Elimination Method:** In ML questions, eliminate the most "illogical" parameters first.
  - **Time Management:** Ensure you have time to review your "marked for review" questions.
- 

### **Your Future Starts After This Exam**

This exam is not the destination. It is the **bridge**. After ECET:

- You enter **B.Tech (AI & ML / CSE)**.
- You build **Deep Learning and Neural Network** expertise.
- You work on **Real-world Datasets and Internships**.
- You prepare for the **Global Tech Industry**.
- You shape the **Future of Technology**.

**Your rank is just the beginning.**

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### **Believe This**

You are not competing with thousands. You are competing with:

- Your preparation
- Your focus
- Your discipline

**If you prepared sincerely, your rank is already secured.**

 **Study Smart. Stay Consistent. Aim High. All the Best for AP ECET 2026. You are ready.**

## Book Description

AP ECET is a gateway for Diploma students to enter B.Tech through lateral entry. Success in this exam requires clarity, structured preparation, and focused practice. This book is designed as a complete preparation system based on:

- Unit-wise weightage analysis
- Concept clarity in simple language
- Three-level practice questions (Basic to Rank Booster)
- Important formulas and comparison charts
- Frequently repeated questions
- Rapid revision sheets
- Smart exam attempt strategies

### Why Choose This Book?

- ✓ Clear and concise theory
- ✓ Structured preparation plan
- ✓ Exam-oriented practice questions
- ✓ Concept + Numerical balance
- ✓ Rank-focused strategy

## About the Author

Bandi Dayasagar is an academician, researcher, and career mentor with strong expertise in Mechanical Engineering and Computer Information Systems. With academic qualifications from Diploma to MS (USA) and practical exposure in leading national Sagar Educational Society to guide Diploma toward structured, exam-focused preparation.

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