



AP ECET 2026 Chemistry – Complete Preparation Book (Common to All Branches)

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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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

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 book is designed as a complete preparation tool for AP ECET Chemistry, especially for Diploma students aiming to secure a top rank. To get maximum benefit, follow the structured approach given below:

1. **Understand the Exam Pattern First**
Before starting preparation, go through the syllabus and weightage of each unit. This will help you focus more on high-scoring topics.
2. **Follow Unit-wise Preparation**
Each unit is arranged in a systematic manner. Start from Unit 1 and proceed sequentially. Do not skip units, as concepts are interconnected.
3. **Practice MCQs Actively**
After studying each topic, solve all the MCQs provided. These questions are based on previous year patterns and most expected models.
4. **Focus on Numerical Problems**
Special attention should be given to numerical-based topics such as Solutions, Electrochemistry, and Acids & Bases. Practice calculations regularly to improve speed and accuracy.
5. **Learn from Solutions**
Do not just check the correct answer — carefully read the solution. Understanding the method is more important than memorizing the answer.
6. **Revise Frequently**
Revision is the key to success. After completing each unit, revise the important formulas, concepts, and frequently repeated questions.
7. **Attempt Grand Tests Seriously**
The Grand Tests are designed to simulate the real AP ECET exam. Attempt them in a timed environment without distractions to evaluate your performance.
8. **Analyze Your Mistakes**
After every test, identify your weak areas. Focus on improving those topics instead of repeating the same mistakes.
9. **Maintain Formula Notes**
Prepare a short notebook for formulas, key concepts, and shortcuts. Revise it daily, especially before the exam.
10. **Stay Consistent and Confident**
Success in AP ECET is not about studying everything, but about revising the right things multiple times. Stay consistent, practice daily, and believe in your preparation.

Final Tip:

This book is your practice weapon. Use it daily, revise regularly, and attempt tests seriously — your rank will automatically improve.

Wishing you success in AP ECET 2026.

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AP ECET 2026 Chemistry Weightage Table

UNIT No	Topic	Marks
1.	Atomic Structure	3
2.	Chemical Bonding	2
3.	Solutions	3
4.	Acids and Bases	2
5.	Electrochemistry	3
6.	Water Technology	3
7.	Corrosion	2
8.	Polymers	4
9.	Fuels	1
10.	Environmental Chemistry	2
Total		25

UNIT 1 - ATOMIC STRUCTURE

1. Which of the following is not a fundamental particle of an atom?

1. Electron
2. Proton
3. Neutron
4. Photon

Correct Answer: 4) Photon

Solution: Electron, proton, and neutron are constituents of atoms. Photon is a particle of electromagnetic radiation, not part of atomic structure.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The charge of an electron is:

1. $+1.6 \times 10^{-19}$ C
2. -1.6×10^{-19} C
3. 0
4. +1

Correct Answer: 2) -1.6×10^{-19} C

Solution: Electron carries a negative charge equal to -1.6×10^{-19} coulombs.

Ref: Physical Chemistry – O.P. Tandon

3. The mass of a proton is approximately equal to:

1. 1 amu
2. 1/1836 amu
3. 0 amu
4. 2 amu

Correct Answer: 1) 1 amu

Solution: Proton mass ≈ 1.007 amu, approximately equal to 1 amu.

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

4. Bohr's atomic model is applicable to:

1. Multi-electron atoms
2. Hydrogen atom
3. All elements
4. Molecules

Correct Answer: 2) Hydrogen atom

Solution: Bohr's theory is valid only for single electron systems like hydrogen.

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

5. The energy of an electron in Bohr's orbit is:

1. Positive
2. Zero
3. Negative
4. Infinite

Correct Answer: 3) Negative

Solution: Electron is bound to nucleus, so its energy is negative.

Ref: Physical Chemistry – O.P. Tandon

6. Principal quantum number (n) determines:

1. Shape of orbital
2. Orientation
3. Energy level
4. Spin

Correct Answer: 3) Energy level

Solution: 'n' indicates shell and energy of electron.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

7. Maximum number of electrons in a shell is given by:

1. n^2
2. $2n^2$
3. $2n$
4. n^3

Correct Answer: 2) $2n^2$

Solution: Maximum electrons = $2n^2$

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

8. Maximum number of electrons in third shell is:

1. 8
2. 18
3. 32
4. 9

Correct Answer: 2) 18

Solution: $2 \times (3^2) = 18$

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

9. Azimuthal quantum number (l) represents:

1. Energy
2. Shape of orbital
3. Size
4. Spin

Correct Answer: 2) Shape of orbital

Solution: 'l' determines subshell shape (s, p, d).

Ref: Concise Inorganic Chemistry – J.D. Lee

10. Value of azimuthal quantum number for p-orbital is:

1. 0
2. 1
3. 2
4. 3

Correct Answer: 2) 1

Solution: $s=0$, $p=1$, $d=2$

Ref: Objective Chemistry – R.K. Gupta

11. Magnetic quantum number determines:

1. Energy
2. Shape
3. Orientation
4. Spin

Correct Answer: 3) Orientation

Solution: It gives orientation of orbitals in space.

Ref: Physical Chemistry – O.P. Tandon

12. Spin quantum number values are:

1. 0,1
2. +1, -1
3. $+\frac{1}{2}$, $-\frac{1}{2}$
4. $\frac{1}{3}$

Correct Answer: 3) $+\frac{1}{2}$, $-\frac{1}{2}$

Solution: Electron spin has two possible values.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

13. Pauli Exclusion Principle states:

1. Orbitals fill singly first
2. Lowest energy filled first
3. No two electrons have same four quantum numbers
4. Electrons revolve randomly

Correct Answer: 3) No two electrons have same four quantum numbers

Solution: Each electron in atom has unique set of quantum numbers.

Ref: Concise Inorganic Chemistry – J.D. Lee

14. Aufbau principle is related to:

1. Orbital shape
2. Electron filling order
3. Spin
4. Energy emission

Correct Answer: 2) Electron filling order

Solution: Electrons fill orbitals in increasing energy order.

Ref: Objective Chemistry for Engineering Entrances – Bansal

15. According to Hund's rule:

1. Pairing occurs first
2. Maximum pairing occurs
3. Maximum unpaired electrons
4. No pairing

Correct Answer: 3) Maximum unpaired electrons

Solution: Orbitals fill singly before pairing.

Ref: MCQ in Chemistry – Dinesh

16. Electronic configuration of nitrogen ($Z = 7$):

1. $1s^2 2s^2 2p^3$
2. $1s^2 2s^2 2p^5$
3. $1s^2 2p^5$
4. $1s^2 2s^1 2p^4$

Correct Answer: 1) $1s^2 2s^2 2p^3$

Solution: Total electrons = 7 $\rightarrow$ fill as per Aufbau rule.

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

17. Maximum number of electrons in p-subshell is:

1. 2
2. 6
3. 10
4. 14

Correct Answer: 2) 6

Solution: 3 orbitals $\times$ 2 electrons each = 6

Ref: Physical Chemistry – O.P. Tandon

18. Shape of s-orbital is:

1. Dumbbell
2. Spherical
3. Linear
4. Elliptical

Correct Answer: 2) Spherical

Solution: s-orbital has spherical symmetry.

Ref: Concise Inorganic Chemistry – J.D. Lee

19. Shape of p-orbital is:

1. Spherical
2. Dumbbell
3. Square
4. Planar

Correct Answer: 2) Dumbbell

Solution: Two lobes separated by nodal plane.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Number of orbitals in d-subshell is:

1. 3
2. 5
3. 7
4. 9

Correct Answer: 2) 5

Solution: m values = -2 to $+2 \rightarrow 5$ orbitals

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

21. Which orbital has highest energy among the following?

1. 2s
2. 2p
3. 3s
4. 1s

Correct Answer: 3) 3s

Solution: Higher 'n' means higher energy.

Ref: Physical Chemistry – O.P. Tandon

22. Aufbau principle follows:

1. n rule
2. (n + l) rule
3. l rule
4. m rule

Correct Answer: 2) (n + l) rule

Solution: Lower (n+l) filled first.

Ref: Objective Chemistry – R.K. Gupta

23. Electronic configuration of sodium (Z=11) is:

1. $1s^2 2s^2 2p^6 3s^1$
2. $1s^2 2s^2 2p^5$
3. $1s^2 2p^6 3s^2$
4. $1s^2 2s^2 3p^6$

Correct Answer: 1) $1s^2 2s^2 2p^6 3s^1$

Solution: Total electrons = 11

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

24. Number of orbitals in third shell is:

1. 3
2. 6
3. 9
4. 18

Correct Answer: 3) 9

Solution: Number of orbitals = $n^2 = 3^2 = 9$

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

25. Which subshell has highest energy?

1. s
2. p
3. d
4. All same

Correct Answer: 3) d

Solution: Energy increases as $s < p < d$

Ref: Physical Chemistry – O.P. Tandon

26. Maximum number of electrons in d-subshell is:

1. 6
2. 10
3. 14
4. 18

Correct Answer: 2) 10

Solution: $5 \text{ orbitals} \times 2 = 10$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

27. For s-orbital, value of l is:

1. 0
2. 1
3. 2
4. 3

Correct Answer: 1) 0

Solution: $s \rightarrow l = 0$

Ref: Concise Inorganic Chemistry – J.D. Lee

28. Number of nodes in p-orbital is:

1. 0
2. 1
3. 2
4. 3

Correct Answer: 2) 1

Solution: p-orbital has one nodal plane.

Ref: Physical Chemistry – O.P. Tandon

29. Maximum electrons in second shell is:

1. 2
2. 8
3. 18
4. 32

Correct Answer: 2) 8

Solution: $2 \times (2^2) = 8$

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

30. Lowest energy orbital is:

1. 1s
2. 2s
3. 2p
4. 3s

Correct Answer: 1) 1s

Solution: Closest to nucleus → lowest energy

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

31. The wavelength of radiation is inversely proportional to:

1. Frequency
2. Velocity
3. Energy
4. Amplitude

Correct Answer: 1) Frequency

Solution: $c = \nu\lambda \rightarrow \lambda \propto 1/\nu$

Ref: Physical Chemistry – O.P. Tandon

32. Energy of a photon is given by:

1. $E = mc^2$
2. $E = h\nu$
3. $E = mv^2$
4. $E = n^2$

Correct Answer: 2) $E = h\nu$

Solution: Planck's equation: $E = h\nu$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

33. If frequency increases, wavelength:

1. Increases
2. Decreases
3. Remains same
4. Becomes zero

Correct Answer: 2) Decreases

Solution: $\lambda = c/\nu \rightarrow$ inversely proportional

Ref: Physical Chemistry – O.P. Tandon

34. Value of Planck's constant is:

1. $6.626 \times 10^{-34} \text{ Js}$
2. 3×10^8
3. 1.6×10^{-19}
4. 9.1×10^{-31}

Correct Answer: 1) $6.626 \times 10^{-34} \text{ Js}$

Solution: Standard constant used in quantum theory

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

35. Energy of electron in nth orbit is proportional to:

1. n
2. $1/n$
3. $1/n^2$
4. n^2

Correct Answer: 3) $1/n^2$

Solution: $E \propto -1/n^2$

Ref: Physical Chemistry – O.P. Tandon

36. Which transition emits maximum energy?

1. $n=2 \rightarrow n=1$
2. $n=3 \rightarrow n=2$
3. $n=4 \rightarrow n=3$
4. $n=5 \rightarrow n=4$

Correct Answer: 1) $n=2 \rightarrow n=1$

Solution: Larger energy gap $\rightarrow$ higher emission

Ref: Objective Chemistry – R.K. Gupta

37. Which series lies in visible region?

1. Lyman
2. Balmer
3. Paschen
4. Brackett

Correct Answer: 2) Balmer

Solution: Balmer series falls in visible region

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Lyman series belongs to:

1. Visible region
2. UV region
3. IR region
4. X-ray

Correct Answer: 2) UV region

Solution: Transitions ending at $n=1$

Ref: Physical Chemistry – O.P. Tandon

39. Momentum of photon is:

1. $h\nu$
2. h/λ
3. mc
4. λ/h

Correct Answer: 2) h/λ

Solution: $p = h/\lambda$

Ref: Concise Inorganic Chemistry – J.D. Lee

40. Dual nature of matter was proposed by:

1. Bohr
2. Einstein
3. de Broglie
4. Planck

Correct Answer: 3) de Broglie

Solution: $\lambda = h/mv$

Ref: Physical Chemistry – O.P. Tandon

41. de Broglie wavelength is given by:

1. $\lambda = mv/h$
2. $\lambda = h/mv$
3. $\lambda = mc^2$
4. $\lambda = v/h$

Correct Answer: 2) $\lambda = h/mv$

Solution: Fundamental relation of wave nature

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Heisenberg uncertainty principle states:

1. Energy is constant
2. Position and momentum cannot be determined simultaneously
3. Electrons move in orbits
4. Energy is quantized

Correct Answer: 2) Position and momentum cannot be determined simultaneously

Solution: $\Delta x \cdot \Delta p \geq h/4\pi$

Ref: Physical Chemistry – O.P. Tandon

43. Orbital is defined as:

1. Fixed path
2. Region of maximum probability
3. Circular path
4. Random motion

Correct Answer: 2) Region of maximum probability

Solution: Quantum mechanical concept

Ref: Concise Inorganic Chemistry – J.D. Lee

44. Maximum number of orbitals in a shell is:

1. n
2. n^2
3. $2n^2$
4. n^3

Correct Answer: 2) n^2

Solution: Total orbitals = n^2

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

45. Which has maximum penetrating power?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: s-orbital penetrates closest to nucleus

Ref: Physical Chemistry – O.P. Tandon

46. Which has minimum energy in same shell?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: $s < p < d < f$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

47. Total number of quantum numbers is:

1. 2
2. 3
3. 4
4. 5

Correct Answer: 3) 4

Solution: n, l, m, s

Ref: Objective Chemistry – R.K. Gupta

48. Which quantum number decides size?

1. n
2. l
3. m
4. s

Correct Answer: 1) n

Solution: Larger n $\rightarrow$ larger orbital

Ref: Physical Chemistry – O.P. Tandon

49. Number of subshells in nth shell is:

1. n^2
2. n
3. $2n$
4. n^3

Correct Answer: 2) n

Solution: Shell contains n subshells

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Number of orbitals in p-subshell:

1. 1
2. 3
3. 5
4. 7

Correct Answer: 2) 3

Solution: p_x, p_y, p_z

Ref: Concise Inorganic Chemistry – J.D. Lee

51. Which of the following has no node?

1. $1s$
2. $2s$
3. $2p$
4. $3s$

Correct Answer: 1) $1s$

Solution: Nodes = $n - 1 - 1 \rightarrow 0$ for $1s$

Ref: Physical Chemistry – O.P. Tandon

52. Number of radial nodes =

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

Correct Answer: 2) $n - 1 - 1$

Solution: Standard formula

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

53. Number of angular nodes =

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

Correct Answer: 2) 1

Solution: Angular nodes = 1

Ref: Physical Chemistry – O.P. Tandon

54. Total nodes =

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

Correct Answer: 2) $n - 1$

Solution: Total nodes = $n - 1$

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

55. Which orbital has 2 angular nodes?

1. s
2. p
3. d
4. f

Correct Answer: 3) d

Solution: $l = 2 \rightarrow 2$ angular nodes

Ref: Concise Inorganic Chemistry – J.D. Lee

56. Which has highest number of orbitals?

1. s
2. p
3. d
4. f

Correct Answer: 4) f

Solution: f has 7 orbitals

Ref: Physical Chemistry – O.P. Tandon

57. Which is incorrect electronic configuration?

1. $1s^2 2s^2 2p^6$
2. $1s^2 2p^6 2s^2$
3. $1s^2 2s^2 2p^6 3s^1$
4. $1s^2 2s^2 2p^6$

Correct Answer: 2) $1s^2 2p^6 2s^2$

Solution: Violates Aufbau order

Ref: Objective Chemistry – R.K. Gupta

58. Which rule explains half-filled stability?

1. Pauli
2. Aufbau
3. Hund
4. Bohr

Correct Answer: 3) Hund

Solution: Half-filled orbitals are stable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

59. Which transition requires energy absorption?

1. $n=2 \rightarrow n=1$
2. $n=3 \rightarrow n=2$
3. $n=1 \rightarrow n=2$
4. $n=4 \rightarrow n=3$

Correct Answer: 3) $n=1 \rightarrow n=2$

Solution: Moving to higher orbit needs energy

Ref: Physical Chemistry – O.P. Tandon

60. If $n=4$, number of subshells is:

1. 2
2. 3
3. 4
4. 16

Correct Answer: 3) 4

Solution: Subshells = n

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

61. Velocity of electron increases when:

1. n increases
2. n decreases
3. Orbit increases
4. Energy increases

Correct Answer: 2) n decreases

Solution: Closer to nucleus $\rightarrow$ higher velocity

Ref: Physical Chemistry – O.P. Tandon

62. Radius of orbit is proportional to:

1. n
2. n^2
3. $1/n$
4. $1/n^2$

Correct Answer: 2) n^2

Solution: $r \propto n^2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

63. Which shell has largest size?

1. K
2. L
3. M
4. N

Correct Answer: 4) N

Solution: Higher $n \rightarrow$ larger size

Ref: Concise Inorganic Chemistry – J.D. Lee

64. Number of electrons in K shell is:

1. 2
2. 8
3. 18
4. 32

Correct Answer: 1) 2

Solution: $n=1 \rightarrow 2n^2 = 2$

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

65. Number of electrons in L shell is:

1. 2
2. 8
3. 18
4. 32

Correct Answer: 2) 8

Solution: $n=2 \rightarrow 2n^2 = 8$

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

66. Which has maximum energy among same n?

1. s
2. p
3. d
4. f

Correct Answer: 4) f

Solution: Energy order: $s < p < d < f$

Ref: Physical Chemistry – O.P. Tandon

67. Total number of orbitals in N shell:

1. 16
2. 32
3. 8
4. 4

Correct Answer: 1) 16

Solution: $n^2 = 4^2 = 16$

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

68. Which quantum number decides orbital orientation?

1. n
2. l
3. m
4. s

Correct Answer: 3) m

Solution: Magnetic quantum number

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

69. Which orbital has 3 angular nodes?

1. p
2. d
3. f
4. s

Correct Answer: 3) f

Solution: $l = 3 \rightarrow 3$ angular nodes

Ref: Physical Chemistry – O.P. Tandon

70. Which series ends at $n=2$?

1. Lyman
2. Balmer
3. Paschen
4. Brackett

Correct Answer: 2) Balmer

Solution: Final state $n=2$

Ref: Objective Chemistry – R.K. Gupta

71. Energy required to remove electron from ground state is called:

1. Excitation energy
2. Ionization energy
3. Binding energy
4. Potential energy

Correct Answer: 2) Ionization energy

Solution: Energy needed to remove electron completely

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. Ground state means:

1. Highest energy
2. Lowest energy
3. Medium energy
4. Zero energy

Correct Answer: 2) Lowest energy

Solution: Most stable state

Ref: Physical Chemistry – O.P. Tandon

73. Excited state means:

1. Minimum energy
2. Maximum energy
3. Higher than ground state
4. Zero energy

Correct Answer: 3) Higher than ground state

Solution: Electron absorbs energy

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

74. Which particle has no charge?

1. Proton
2. Electron
3. Neutron
4. Photon

Correct Answer: 3) Neutron

Solution: Neutron is neutral

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

75. Which has highest mass?

1. Electron
2. Proton
3. Neutron
4. Photon

Correct Answer: 3) Neutron

Solution: Neutron slightly heavier than proton

Ref: Concise Inorganic Chemistry – J.D. Lee

76. Which orbital penetrates least?

1. s
2. p
3. d
4. f

Correct Answer: 4) f

Solution: Penetration order: $s > p > d > f$

Ref: Physical Chemistry – O.P. Tandon

77. Which is correct order of energy?

1. $s > p > d$
2. $s < p < d$
3. $d < p < s$
4. $p < s < d$

Correct Answer: 2) $s < p < d$

Solution: Standard order

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which orbital has highest shielding effect?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: s-electrons shield more effectively

Ref: Physical Chemistry – O.P. Tandon

79. Which orbital is most diffused?

1. s
2. p
3. d
4. f

Correct Answer: 4) f

Solution: f-orbitals spread widely

Ref: Concise Inorganic Chemistry – J.D. Lee

80. Which statement is correct?

1. Orbitals are fixed paths
2. Orbitals are probability regions
3. Orbitals are circular paths
4. Orbitals are imaginary

Correct Answer: 2) Orbitals are probability regions

Solution: Quantum mechanics defines orbitals as probability zones

Ref: Physical Chemistry – O.P. Tandon

81. The energy of electron in hydrogen atom at $n=2$ is:

1. -13.6 eV
2. -3.4 eV
3. -1.51 eV
4. -0.85 eV

Correct Answer: 2) -3.4 eV

Solution: $E = -13.6/n^2 = -13.6/4 = -3.4 \text{ eV}$

Ref: Physical Chemistry – O.P. Tandon

82. Energy of electron in ground state is:

1. -13.6 eV
2. -3.4 eV
3. -1.51 eV
4. 0 eV

Correct Answer: 1) -13.6 eV

Solution: For $n=1 \rightarrow E = -13.6 \text{ eV}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. Energy difference between $n=1$ and $n=2$ is:

1. 10.2 eV
2. 13.6 eV
3. 3.4 eV
4. 1.51 eV

Correct Answer: 1) 10.2 eV

Solution: $\Delta E = 13.6 - 3.4 = 10.2 \text{ eV}$

Ref: Physical Chemistry – O.P. Tandon

84. Radius of second orbit is:

1. r_1
2. $2r_1$
3. $4r_1$
4. $8r_1$

Correct Answer: 3) $4r_1$

Solution: $r \propto n^2 \rightarrow r_2 = 4r_1$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. If velocity in first orbit is v , in second orbit it is:

1. v
2. $v/2$
3. $v/4$
4. $2v$

Correct Answer: 2) $v/2$

Solution: $v \propto 1/n \rightarrow v_2 = v/2$

Ref: Physical Chemistry – O.P. Tandon

86. Number of spectral lines for $n=4$ is:

1. 4
2. 6
3. 10
4. 12

Correct Answer: 2) 6

Solution: $n(n-1)/2 = 4 \times 3/2 = 6$

Ref: Objective Chemistry – R.K. Gupta

87. Number of spectral lines for $n=3$ is:

1. 3
2. 6
3. 2
4. 4

Correct Answer: 1) 3

Solution: $3 \times 2/2 = 3$

Ref: AP ECET Engineering Common Entrance Test Guide – Arihant Experts

88. Angular momentum of electron is given by:

1. $nh/2\pi$
2. h/λ
3. mv
4. mc^2

Correct Answer: 1) $nh/2\pi$

Solution: Bohr quantization rule

Ref: Physical Chemistry – O.P. Tandon

89. If wavelength decreases, energy:

1. Decreases
2. Increases
3. Remains constant
4. Zero

Correct Answer: 2) Increases

Solution: $E = hc/\lambda \rightarrow$ inversely proportional

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. Which has shortest wavelength?

1. Radio waves
2. UV rays
3. X-rays
4. Infrared

Correct Answer: 3) X-rays

Solution: Shortest wavelength $\rightarrow$ highest energy

Ref: Physical Chemistry – O.P. Tandon

91. Which transition gives UV radiation?

1. $n=3 \rightarrow n=2$
2. $n=2 \rightarrow n=1$
3. $n=4 \rightarrow n=3$
4. $n=5 \rightarrow n=4$

Correct Answer: 2) $n=2 \rightarrow n=1$

Solution: Lyman series (UV)

Ref: Objective Chemistry – R.K. Gupta

92. If $n=5$, number of orbitals is:

1. 5
2. 10
3. 25
4. 50

Correct Answer: 3) 25

Solution: $n^2 = 25$

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

93. Number of electrons in 4th shell is:

1. 16
2. 32
3. 18
4. 8

Correct Answer: 2) 32

Solution: $2n^2 = 2 \times 16 = 32$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

94. Which has maximum energy difference?

1. $1 \rightarrow 2$
2. $2 \rightarrow 3$
3. $3 \rightarrow 4$
4. $4 \rightarrow 5$

Correct Answer: 1) $1 \rightarrow 2$

Solution: Energy gap decreases with n

Ref: Physical Chemistry – O.P. Tandon

95. Which has least energy?

1. $n=1$
2. $n=2$
3. $n=3$
4. $n=4$

Correct Answer: 1) $n=1$

Solution: Lowest energy state

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

96. Which quantum number has no negative value?

1. n
2. l
3. m
4. s

Correct Answer: 1) n

Solution: n always positive integer

Ref: Concise Inorganic Chemistry – J.D. Lee

97. Which quantum number can be negative?

1. n
2. l
3. m
4. None

Correct Answer: 3) m

Solution: m ranges from $-l$ to $+l$

Ref: Physical Chemistry – O.P. Tandon

98. Total number of orbitals in p-subshell is:

1. 2
2. 3
3. 5
4. 7

Correct Answer: 2) 3

Solution: p_x, p_y, p_z

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

99. Maximum electrons with $n=3$ and $l=1$:

1. 2
2. 4
3. 6
4. 10

Correct Answer: 3) 6

Solution: p-subshell $\rightarrow$ 3 orbitals $\rightarrow$ 6 electrons

Ref: Objective Chemistry – R.K. Gupta

100. For $n=4$, $l=2 \rightarrow$ orbital type is:

1. s
2. p
3. d
4. f

Correct Answer: 3) d

Solution: $l=2$ corresponds to d

Ref: Physical Chemistry – O.P. Tandon

101. Which has highest number of nodes?

1. 2s
2. 2p
3. 3s
4. 3p

Correct Answer: 3) 3s

Solution: Nodes = $n-1 \rightarrow$ 3s has 2 nodes

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

102. Which orbital has no angular node?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: $l=0 \rightarrow$ no angular node

Ref: Physical Chemistry – O.P. Tandon

103. Which orbital has one angular node?

1. s
2. p
3. d
4. f

Correct Answer: 2) p

Solution: $l=1 \rightarrow 1$ angular node

Ref: Concise Inorganic Chemistry – J.D. Lee

104. Which orbital has maximum angular nodes?

1. s
2. p
3. d
4. f

Correct Answer: 4) f

Solution: $l=3 \rightarrow 3$ nodes

Ref: Physical Chemistry – O.P. Tandon

105. Which orbital has zero radial node?

1. 1s
2. 2s
3. 3s
4. 2p

Correct Answer: 1) 1s

Solution: $n-l-1 = 0$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

106. Which has same energy in hydrogen atom?

1. 2s and 2p
2. 2s and 3s
3. 3p and 2p
4. 1s and 2s

Correct Answer: 1) 2s and 2p

Solution: Same $n \rightarrow$ same energy (degenerate)

Ref: Physical Chemistry – O.P. Tandon

107. Which breaks degeneracy?

1. Multi-electron atom
2. Hydrogen atom
3. Vacuum
4. Photon

Correct Answer: 1) Multi-electron atom

Solution: Electron interactions break degeneracy

Ref: Concise Inorganic Chemistry – J.D. Lee

108. Which has highest penetration?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: Closest to nucleus

Ref: Physical Chemistry – O.P. Tandon

109. Which has highest shielding?

1. s
2. p
3. d
4. f

Correct Answer: 1) s

Solution: s shields more effectively

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

110. Which orbital is most stable?

1. Half-filled
2. Fully filled
3. Both
4. None

Correct Answer: 3) Both

Solution: Extra stability due to symmetry

Ref: Objective Chemistry – R.K. Gupta

UNIT 2 - CHEMICAL BONDING

1. Chemical bond is defined as:

1. Force of attraction between atoms
2. Repulsion between atoms
3. Energy of atoms
4. Electron transfer

Correct Answer: 1) Force of attraction between atoms

Solution: A chemical bond holds atoms together in a molecule or compound.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Which bond is formed by transfer of electrons?

1. Covalent bond
2. Ionic bond
3. Metallic bond
4. Hydrogen bond

Correct Answer: 2) Ionic bond

Solution: Ionic bond involves complete transfer of electrons.

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

3. Which bond is formed by sharing of electrons?

1. Ionic
2. Covalent
3. Metallic
4. Coordinate

Correct Answer: 2) Covalent

Solution: Covalent bond involves sharing of electron pairs.

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

4. Formation of NaCl involves:

1. Sharing
2. Transfer
3. Donation
4. Overlap

Correct Answer: 2) Transfer

Solution: Na loses electron, Cl gains electron $\rightarrow$ ionic bond.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

5. Which compound is ionic?

1. H₂
2. O₂
3. NaCl
4. CH₄

Correct Answer: 3) NaCl

Solution: Metal + non-metal $\rightarrow$ ionic compound.

Ref: Concise Inorganic Chemistry – J.D. Lee

6. Which compound is covalent?

1. NaCl
2. KCl
3. H₂
4. CaO

Correct Answer: 3) H₂

Solution: Non-metal + non-metal $\rightarrow$ covalent bond.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

7. Ionic bond is strongest in:

1. Water
2. Vacuum
3. Organic solvent
4. Air

Correct Answer: 2) Vacuum

Solution: No dielectric medium → strong electrostatic attraction.

Ref: Physical Chemistry – O.P. Tandon

8. Which has high melting point?

1. Covalent compounds
2. Ionic compounds
3. Organic compounds
4. Gases

Correct Answer: 2) Ionic compounds

Solution: Strong electrostatic forces → high melting point.

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

9. Which conducts electricity in molten state?

1. Covalent compounds
2. Ionic compounds
3. Organic compounds
4. Polymers

Correct Answer: 2) Ionic compounds

Solution: Free ions conduct electricity.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Which does not conduct electricity?

1. NaCl (molten)
2. KCl (aqueous)
3. H₂
4. CaCl₂ (molten)

Correct Answer: 3) H₂

Solution: Covalent compounds lack free ions.

Ref: Concise Inorganic Chemistry – J.D. Lee

11. Covalent compounds generally have:

1. High melting point
2. Low melting point
3. High conductivity
4. Ionic nature

Correct Answer: 2) Low melting point

Solution: Weak intermolecular forces

Ref: Physical Chemistry – O.P. Tandon

12. Which has maximum covalent character?

1. NaCl
2. MgCl₂
3. AlCl₃
4. KCl

Correct Answer: 3) AlCl₃

Solution: According to Fajan's rule, small cation → more covalent.

Ref: Concise Inorganic Chemistry – J.D. Lee

13. Fajan's rule is related to:

1. Ionic bond
2. Covalent character
3. Metallic bond
4. Hydrogen bond

Correct Answer: 2) Covalent character

Solution: Predicts polarization and covalent nature.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Which has highest lattice energy?

1. NaCl
2. MgO
3. KCl
4. CaO

Correct Answer: 2) MgO

Solution: Higher charge → higher lattice energy.

Ref: Physical Chemistry – O.P. Tandon

15. Lattice energy increases with:

1. Decrease in charge
2. Increase in size
3. Increase in charge
4. Decrease in distance

Correct Answer: 3) Increase in charge

Solution: Greater charge → stronger attraction.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Which is polar covalent?

1. H_2
2. O_2
3. HCl
4. N_2

Correct Answer: 3) HCl

Solution: Unequal sharing of electrons.

Ref: Physical Chemistry – O.P. Tandon

17. Which is non-polar covalent?

1. HCl
2. NH_3
3. CO_2
4. H_2

Correct Answer: 4) H_2

Solution: Equal sharing of electrons.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Bond formed by donation of lone pair is:

1. Ionic
2. Covalent
3. Coordinate
4. Metallic

Correct Answer: 3) Coordinate

Solution: One atom donates both electrons.

Ref: Concise Inorganic Chemistry – J.D. Lee

19. Example of coordinate bond:

1. NaCl
2. NH_4^+
3. H_2
4. O_2

Correct Answer: 2) NH_4^+

Solution: NH_3 donates lone pair to H^+

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Which has lone pair?

1. Na^+
2. H^+
3. NH_3
4. Cl^+

Correct Answer: 3) NH_3

Solution: Nitrogen has lone pair.

Ref: Physical Chemistry – O.P. Tandon

21. Which has highest bond energy?

1. Single bond
2. Double bond
3. Triple bond
4. Ionic bond

Correct Answer: 3) Triple bond

Solution: More shared electrons $\rightarrow$ stronger bond

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Bond length is shortest in:

1. Single bond
2. Double bond
3. Triple bond
4. Ionic bond

Correct Answer: 3) Triple bond

Solution: Higher bond order $\rightarrow$ shorter bond

Ref: Physical Chemistry – O.P. Tandon

23. Which bond is longest?

1. Single
2. Double
3. Triple
4. Coordinate

Correct Answer: 1) Single

Solution: Lower bond order $\rightarrow$ longer bond

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Bond order is defined as:

1. Number of bonds
2. Number of shared electrons/2
3. Number of atoms
4. Energy of bond

Correct Answer: 2) Number of shared electrons/2

Solution: Bond order = shared electrons $\div$ 2

Ref: Physical Chemistry – O.P. Tandon

25. Bond order of O_2 is:

1. 1
2. 2
3. 3
4. 0

Correct Answer: 2) 2

Solution: Double bond present

Ref: Objective Chemistry – R.K. Gupta

26. Bond order of N_2 is:

1. 1
2. 2
3. 3
4. 4

Correct Answer: 3) 3

Solution: Triple bond

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

27. Which has bond order 1?

1. O_2
2. N_2
3. H_2
4. CO

Correct Answer: 3) H_2

Solution: Single bond

Ref: Physical Chemistry – O.P. Tandon

28. Which molecule has coordinate bond?

1. H_2
2. NH_4^+
3. O_2
4. N_2

Correct Answer: 2) NH_4^+

Solution: Lone pair donation

Ref: Concise Inorganic Chemistry – J.D. Lee

29. Which has ionic bond?

1. CH_4
2. NH_3
3. NaCl
4. CO_2

Correct Answer: 3) NaCl

Solution: Electron transfer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Which has covalent bond?

1. KCl
2. CaO
3. CO_2
4. NaCl

Correct Answer: 3) CO_2

Solution: Sharing of electrons

Ref: Physical Chemistry – O.P. Tandon

31. Which compound is hardest?

1. NaCl
2. Diamond
3. Ice
4. CO₂

Correct Answer: 2) Diamond

Solution: Strong covalent network

Ref: Concise Inorganic Chemistry – J.D. Lee

32. Which is soft?

1. Diamond
2. NaCl
3. Graphite
4. Quartz

Correct Answer: 3) Graphite

Solution: Layered structure

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

33. Which conducts electricity?

1. Diamond
2. Graphite
3. CO₂
4. CH₄

Correct Answer: 2) Graphite

Solution: Free electrons present

Ref: Physical Chemistry – O.P. Tandon

34. Which has delocalized electrons?

1. Diamond
2. Graphite
3. NaCl
4. H₂

Correct Answer: 2) Graphite

Solution: π -electrons are mobile

Ref: Concise Inorganic Chemistry – J.D. Lee

35. Which is strongest bond?

1. Ionic
2. Covalent
3. Hydrogen
4. Van der Waals

Correct Answer: 2) Covalent

Solution: Strong overlap of orbitals

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Which has highest polarity?

1. H₂
2. Cl₂
3. HCl
4. O₂

Correct Answer: 3) HCl

Solution: Electronegativity difference

Ref: Physical Chemistry – O.P. Tandon

37. Which has zero dipole moment?

1. H_2O
2. NH_3
3. CO_2
4. HCl

Correct Answer: 3) CO_2

Solution: Linear and symmetric

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Which has highest electronegativity?

1. F
2. O
3. Cl
4. N

Correct Answer: 1) F

Solution: Fluorine highest EN

Ref: Concise Inorganic Chemistry – J.D. Lee

39. Ionic character increases with:

1. Small electronegativity difference
2. Large electronegativity difference
3. Same atoms
4. Covalent bonding

Correct Answer: 2) Large electronegativity difference

Solution: Greater difference $\rightarrow$ more ionic

Ref: Physical Chemistry – O.P. Tandon

40. Which has maximum ionic character?

1. HCl
2. NaCl
3. CH₄
4. NH₃

Correct Answer: 2) NaCl

Solution: Large EN difference

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

41. VSEPR theory is used to predict:

1. Bond energy
2. Molecular shape
3. Bond order
4. Atomic mass

Correct Answer: 2) Molecular shape

Solution: VSEPR explains geometry based on electron pair repulsion.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Shape of BeCl₂ is:

1. Bent
2. Linear
3. Trigonal planar
4. Tetrahedral

Correct Answer: 2) Linear

Solution: Two bond pairs, no lone pair → linear

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

43. Shape of BF₃ is:

1. Linear

2. Bent
3. Trigonal planar
4. Tetrahedral

Correct Answer: 3) Trigonal planar

Solution: 3 bond pairs, no lone pair

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

44. Shape of CH_4 is:

1. Linear
2. Tetrahedral
3. Square planar
4. Bent

Correct Answer: 2) Tetrahedral

Solution: 4 bond pairs, no lone pairs

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

45. Shape of NH_3 is:

1. Linear
2. Trigonal planar
3. Trigonal pyramidal
4. Tetrahedral

Correct Answer: 3) Trigonal pyramidal

Solution: One lone pair distorts tetrahedral shape

Ref: Physical Chemistry – O.P. Tandon

46. Shape of H_2O is:

1. Linear
2. Bent
3. Tetrahedral

4. Planar

Correct Answer: 2) Bent

Solution: Two lone pairs $\rightarrow$ bent shape

Ref: Concise Inorganic Chemistry – J.D. Lee

47. Hybridization of CH_4 is:

1. sp
2. sp^2
3. sp^3
4. sp^3d

Correct Answer: 3) sp^3

Solution: Four sigma bonds

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. Hybridization of BF_3 is:

1. sp
2. sp^2
3. sp^3
4. sp^3d

Correct Answer: 2) sp^2

Solution: Three sigma bonds

Ref: Physical Chemistry – O.P. Tandon

49. Hybridization of BeCl_2 is:

1. sp
2. sp^2
3. sp^3
4. sp^3d

Correct Answer: 1) sp

Solution: Two sigma bonds

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

50. Hybridization of NH_3 is:

1. sp
2. sp^2
3. sp^3
4. sp^3d

Correct Answer: 3) sp^3

Solution: 3 bond pairs + 1 lone pair

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

51. Hybridization of H_2O is:

1. sp
2. sp^2
3. sp^3
4. sp^3d

Correct Answer: 3) sp^3

Solution: 2 bond pairs + 2 lone pairs

Ref: Physical Chemistry – O.P. Tandon

52. Bond angle in CH_4 is:

1. 90°
2. 104.5°
3. 109.5°
4. 120°

Correct Answer: 3) 109.5°

Solution: Ideal tetrahedral angle

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

53. Bond angle in NH_3 is:

1. 109.5°
2. 120°
3. 107°
4. 90°

Correct Answer: 3) 107°

Solution: Lone pair reduces angle

Ref: Physical Chemistry – O.P. Tandon

54. Bond angle in H_2O is:

1. 104.5°
2. 109.5°
3. 120°
4. 90°

Correct Answer: 1) 104.5°

Solution: Two lone pairs $\rightarrow$ more compression

Ref: Concise Inorganic Chemistry – J.D. Lee

55. Bond angle in BF_3 is:

1. 90°
2. 104.5°
3. 109.5°
4. 120°

Correct Answer: 4) 120°

Solution: Trigonal planar geometry

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Shape of CO_2 is:

1. Bent
2. Linear
3. Trigonal planar
4. Tetrahedral

Correct Answer: 2) Linear

Solution: Two bond pairs, no lone pair

Ref: Physical Chemistry – O.P. Tandon

57. Hybridization of CO₂ is:

1. sp
2. sp²
3. sp³
4. sp³d

Correct Answer: 1) sp

Solution: Two sigma bonds

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. Which has tetrahedral shape?

1. BF₃
2. CH₄
3. CO₂
4. BeCl₂

Correct Answer: 2) CH₄

Solution: Four bond pairs

Ref: Concise Inorganic Chemistry – J.D. Lee

59. Which has trigonal planar shape?

1. CH₄
2. NH₃

3. BF_3
4. H_2O

Correct Answer: 3) BF_3

Solution: Three bond pairs

Ref: Physical Chemistry – O.P. Tandon

60. Which has bent shape?

1. CO_2
2. H_2O
3. BF_3
4. BeCl_2

Correct Answer: 2) H_2O

Solution: Lone pair repulsion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

61. Lone pair repulsion order is:

1. $\text{BP-BP} > \text{LP-BP} > \text{LP-LP}$
2. $\text{LP-LP} > \text{LP-BP} > \text{BP-BP}$
3. $\text{BP-LP} > \text{LP-LP} > \text{BP-BP}$
4. All equal

Correct Answer: 2) $\text{LP-LP} > \text{LP-BP} > \text{BP-BP}$

Solution: Lone pairs repel more strongly

Ref: Physical Chemistry – O.P. Tandon

62. Which has maximum bond angle?

1. CH_4
2. NH_3
3. H_2O
4. BF_3

Correct Answer: 4) BF_3

Solution: No lone pairs $\rightarrow$ maximum angle

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

63. Which has minimum bond angle?

1. CH_4
2. NH_3
3. H_2O
4. BF_3

Correct Answer: 3) H_2O

Solution: Two lone pairs compress angle

Ref: Physical Chemistry – O.P. Tandon

64. Which has sp^2 hybridization?

1. CH_4
2. BF_3
3. NH_3
4. H_2O

Correct Answer: 2) BF_3

Solution: Three sigma bonds

Ref: Concise Inorganic Chemistry – J.D. Lee

65. Which has sp hybridization?

1. CO_2
2. CH_4
3. NH_3
4. H_2O

Correct Answer: 1) CO_2

Solution: Two sigma bonds

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Which has sp^3 hybridization?

1. BF_3
2. CO_2
3. CH_4
4. $BeCl_2$

Correct Answer: 3) CH_4

Solution: Four sigma bonds

Ref: Physical Chemistry – O.P. Tandon

67. Which is polar molecule?

1. CO_2
2. CH_4
3. H_2O
4. BF_3

Correct Answer: 3) H_2O

Solution: Bent shape $\rightarrow$ net dipole

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Which is non-polar molecule?

1. NH_3
2. H_2O
3. CO_2
4. HCl

Correct Answer: 3) CO_2

Solution: Symmetrical molecule

Ref: Physical Chemistry – O.P. Tandon

69. Dipole moment depends on:

1. Charge only
2. Distance only
3. Both charge and distance
4. Mass

Correct Answer: 3) Both charge and distance

Solution: $\mu = q \times d$

Ref: Concise Inorganic Chemistry – J.D. Lee

70. Which has zero dipole moment?

1. NH_3
2. H_2O
3. CO_2
4. SO_2

Correct Answer: 3) CO_2

Solution: Symmetrical cancellation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

71. Which molecule is pyramidal?

1. CO_2
2. BF_3
3. NH_3
4. CH_4

Correct Answer: 3) NH_3

Solution: One lone pair

Ref: Physical Chemistry – O.P. Tandon

72. Which molecule is tetrahedral?

1. NH_3
2. CH_4

3. H_2O

4. BF_3

Correct Answer: 2) CH_4

Solution: Four bond pairs

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

73. Which molecule is linear?

1. H_2O

2. NH_3

3. CO_2

4. CH_4

Correct Answer: 3) CO_2

Solution: Two bond pairs

Ref: Concise Inorganic Chemistry – J.D. Lee

74. Which molecule is trigonal planar?

1. NH_3

2. BF_3

3. CH_4

4. H_2O

Correct Answer: 2) BF_3

Solution: Three bond pairs

Ref: Physical Chemistry – O.P. Tandon

75. Which has highest dipole moment?

1. CO_2

2. CH_4

3. NH_3

4. BF_3

Correct Answer: 3) NH_3

Solution: Polar molecule

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. Which has zero polarity?

1. NH_3
2. H_2O
3. CO_2
4. HCl

Correct Answer: 3) CO_2

Solution: Symmetry cancels dipole

Ref: Physical Chemistry – O.P. Tandon

77. Hybrid orbitals are formed by:

1. Electron transfer
2. Mixing of atomic orbitals
3. Ionization
4. Polarization

Correct Answer: 2) Mixing of atomic orbitals

Solution: Hybridization concept

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which has highest bond angle distortion?

1. CH_4
2. NH_3
3. H_2O
4. BF_3

Correct Answer: 3) H_2O

Solution: Two lone pairs cause maximum distortion

Ref: Physical Chemistry – O.P. Tandon

79. Which has no lone pair?

1. NH_3
2. H_2O
3. BF_3
4. SO_2

Correct Answer: 3) BF_3

Solution: All bonding pairs

Ref: Concise Inorganic Chemistry – J.D. Lee

80. Which has maximum lone pairs?

1. CH_4
2. NH_3
3. H_2O
4. BF_3

Correct Answer: 3) H_2O

Solution: Two lone pairs

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

81. Which compound has maximum ionic character?

1. LiCl
2. NaCl
3. KCl
4. CsCl

Correct Answer: 4) CsCl

Solution: Larger cation size $\rightarrow$ less polarization $\rightarrow$ more ionic character.

Ref: Concise Inorganic Chemistry – J.D. Lee

UNIT 3 - SOLUTIONS

1. A solution is defined as:

1. Heterogeneous mixture
2. Homogeneous mixture
3. Pure substance
4. Compound

Correct Answer: 2) Homogeneous mixture

Solution: Solution is a uniform mixture of solute and solvent.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The component present in larger amount is called:

1. Solute
2. Solvent
3. Mixture
4. Compound

Correct Answer: 2) Solvent

Solution: Solvent dissolves solute.

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

3. The component present in smaller amount is:

1. Solvent
2. Solute
3. Medium
4. Mixture

Correct Answer: 2) Solute

Solution: Solute gets dissolved.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Which is an example of solution?

1. Sand + water
2. Oil + water
3. Sugar + water
4. Chalk + water

Correct Answer: 3) Sugar + water

Solution: Homogeneous mixture

Ref: Physical Chemistry – O.P. Tandon

5. Molarity is defined as:

1. Moles per kg solvent
2. Moles per litre solution
3. Grams per litre
4. Equivalents per litre

Correct Answer: 2) Moles per litre solution

Solution: $M = \text{moles} / \text{volume (L)}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Normality is defined as:

1. Moles per litre
2. Equivalents per litre
3. Grams per litre
4. Mole fraction

Correct Answer: 2) Equivalents per litre

Solution: $N = \text{equivalents} / \text{litre}$

Ref: Physical Chemistry – O.P. Tandon

7. Number of moles =

1. mass $\times$ molar mass
2. mass / molar mass
3. molar mass / mass
4. volume / mass

Correct Answer: 2) mass / molar mass

Solution: $n = w/M$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Molar mass of NaCl is:

1. 23
2. 35.5
3. 58.5
4. 60

Correct Answer: 3) 58.5

Solution: $23 + 35.5$

Ref: Concise Inorganic Chemistry – J.D. Lee

9. 1 mole contains:

1. 6.022×10^{23} particles
2. 3×10^8
3. 1.6×10^{-19}
4. 10^{23}

Correct Answer: 1) 6.022×10^{23} particles

Solution: Avogadro number

Ref: Physical Chemistry – O.P. Tandon

10. Molarity depends on:

1. Temperature
2. Pressure
3. Volume
4. Mass

Correct Answer: 1) Temperature

Solution: Volume changes with temperature

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

11. Molality is defined as:

1. Moles per litre
2. Moles per kg solvent
3. Grams per litre
4. Equivalents

Correct Answer: 2) Moles per kg solvent

Solution: Independent of temperature

Ref: Physical Chemistry – O.P. Tandon

12. Which concentration is temperature independent?

1. Molarity
2. Normality
3. Molality
4. Density

Correct Answer: 3) Molality

Solution: Based on mass

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

13. Equivalent weight =

1. Molecular weight $\times$ valency
2. Molecular weight / valency
3. Valency / weight
4. Weight $\times$ volume

Correct Answer: 2) Molecular weight / valency

Solution: Standard formula

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

14. Equivalent weight of H_2SO_4 is:

1. 98
2. 49
3. 32
4. 18

Correct Answer: 2) 49

Solution: $98/2$

Ref: Physical Chemistry – O.P. Tandon

15. Equivalent weight of NaOH is:

1. 40
2. 20
3. 80
4. 23

Correct Answer: 1) 40

Solution: $40/1$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. 1M solution means:

1. 1 mole per kg
2. 1 mole per litre
3. 1 equivalent per litre
4. 1 gram per litre

Correct Answer: 2) 1 mole per litre

Solution: Definition of molarity

Ref: Physical Chemistry – O.P. Tandon

17. 1N solution means:

1. 1 mole per litre
2. 1 equivalent per litre
3. 1 gram per litre
4. 1 kg per litre

Correct Answer: 2) 1 equivalent per litre

Solution: Definition of normality

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Relationship between N and M is:

1. $N = M$
2. $N = M \times \text{valency}$
3. $N = M / \text{valency}$
4. $N = \text{valency}$

Correct Answer: 2) $N = M \times \text{valency}$

Solution: Based on equivalents

Ref: Physical Chemistry – O.P. Tandon

19. If valency = 2, then N =

1. M
2. 2M
3. M/2
4. 4M

Correct Answer: 2) 2M

Solution: $N = M \times 2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. 1 mole of H₂ contains:

1. 1 atom
2. 2 atoms
3. 6.022×10^{23} molecules
4. 3×10^8

Correct Answer: 3) 6.022×10^{23} molecules

Solution: Mole concept

Ref: Physical Chemistry – O.P. Tandon

21. Number of atoms in 1 mole of H₂ is:

1. 6.022×10^{23}
2. 12.044×10^{23}
3. 3×10^8
4. 10^{23}

Correct Answer: 2) 12.044×10^{23}

Solution: $2 \times$ Avogadro number

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. 58.5 g of NaCl contains:

1. 1 mole
2. 2 moles
3. 0.5 mole
4. 10 moles

Correct Answer: 1) 1 mole

Solution: Equal to molar mass

Ref: Physical Chemistry – O.P. Tandon

23. 29.25 g NaCl contains:

1. 1 mole
2. 0.5 mole
3. 2 moles
4. 0.25 mole

Correct Answer: 2) 0.5 mole

Solution: Half of molar mass

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. 98 g H₂SO₄ =

1. 1 mole
2. 2 moles
3. 0.5 mole
4. 3 moles

Correct Answer: 1) 1 mole

Solution: Molar mass = 98

Ref: Physical Chemistry – O.P. Tandon

25. Number of moles in 18 g water:

1. 1
2. 2
3. 0.5
4. 3

Correct Answer: 1) 1

Solution: Molar mass = 18

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. 9 g water =

1. 1 mole
2. 0.5 mole
3. 2 moles
4. 3 moles

Correct Answer: 2) 0.5 mole

Solution: Half of molar mass

Ref: Physical Chemistry – O.P. Tandon

27. 1 mole of CO₂ contains:

1. 1 mole atoms
2. 2 mole atoms
3. 3 mole atoms
4. 4 mole atoms

Correct Answer: 3) 3 mole atoms

Solution: 1 C + 2 O

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Number of molecules in 2 moles:

1. 6.022×10^{23}
2. 12.044×10^{23}
3. 3×10^{23}
4. 10^{23}

Correct Answer: 2) 12.044×10^{23}

Solution: $2 \times$ Avogadro number

Ref: Physical Chemistry – O.P. Tandon

29. 1 litre =

1. 100 ml
2. 1000 ml
3. 10 ml
4. 500 ml

Correct Answer: 2) 1000 ml

Solution: Standard conversion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. 500 ml =

1. 1 L
2. 0.5 L
3. 2 L
4. 5 L

Correct Answer: 2) 0.5 L

Solution: Divide by 1000

Ref: Physical Chemistry – O.P. Tandon

31. Molarity formula is:

1. moles $\times$ volume
2. moles / volume
3. mass / volume
4. equivalents

Correct Answer: 2) moles / volume

Solution: $M = n/V$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. Normality formula is:

1. moles/L
2. eq/L
3. mass/L
4. mole fraction

Correct Answer: 2) eq/L

Solution: $N = \text{equivalents/L}$

Ref: Physical Chemistry – O.P. Tandon

33. 1N HCl means:

1. 1 mole/L
2. 1 eq/L
3. 2 eq/L
4. 0.5 eq/L

Correct Answer: 2) 1 eq/L

Solution: Definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. Equivalent weight of HCl is:

1. 36.5
2. 18
3. 49
4. 58.5

Correct Answer: 1) 36.5

Solution: Valency = 1

Ref: Physical Chemistry – O.P. Tandon

35. Which is strongest acid?

1. HCl
2. H₂SO₄
3. HNO₃
4. CH₃COOH

Correct Answer: 2) H₂SO₄

Solution: Strong diprotic acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Which is weak acid?

1. HCl
2. H₂SO₄
3. CH₃COOH
4. HNO₃

Correct Answer: 3) CH₃COOH

Solution: Weak electrolyte

Ref: Physical Chemistry – O.P. Tandon

37. Which is strong base?

1. NaOH
2. NH_4OH
3. CH_3NH_2
4. H_2O

Correct Answer: 1) NaOH

Solution: Fully ionizes

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Which is weak base?

1. NaOH
2. KOH
3. NH_4OH
4. $\text{Ca}(\text{OH})_2$

Correct Answer: 3) NH_4OH

Solution: Partial ionization

Ref: Physical Chemistry – O.P. Tandon

39. Which is electrolyte?

1. Sugar
2. Urea
3. NaCl
4. Alcohol

Correct Answer: 3) NaCl

Solution: Produces ions in solution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Which is non-electrolyte?

1. NaCl
2. KCl
3. Sugar
4. HCl

Correct Answer: 3) Sugar

Solution: Does not ionize

Ref: Physical Chemistry – O.P. Tandon

41. Molarity of solution containing 1 mole solute in 2 L solution is:

1. 2 M
2. 1 M
3. 0.5 M
4. 0.25 M

Correct Answer: 3) 0.5 M

Solution: $M = 1/2 = 0.5 \text{ M}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Molarity of 2 moles solute in 1 L solution is:

1. 1 M
2. 2 M
3. 0.5 M
4. 4 M

Correct Answer: 2) 2 M

Solution: $M = 2/1 = 2 \text{ M}$

Ref: Physical Chemistry – O.P. Tandon

43. Moles in 58.5 g NaCl:

1. 1
2. 2
3. 0.5
4. 3

Correct Answer: 1) 1

Solution: $58.5/58.5 = 1$ mole

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

44. Molarity of 58.5 g NaCl in 1 L solution:

1. 1 M
2. 2 M
3. 0.5 M
4. 3 M

Correct Answer: 1) 1 M

Solution: 1 mole in 1 L

Ref: Physical Chemistry – O.P. Tandon

45. Molarity of 29.25 g NaCl in 1 L solution:

1. 1 M
2. 0.5 M
3. 2 M
4. 0.25 M

Correct Answer: 2) 0.5 M

Solution: $29.25/58.5 = 0.5$ mole

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

46. Molarity of 1 mole solute in 500 ml solution:

1. 1 M
2. 2 M
3. 0.5 M
4. 4 M

Correct Answer: 2) 2 M

Solution: $M = 1/0.5 = 2 \text{ M}$

Ref: Physical Chemistry – O.P. Tandon

47. Normality of 1 M H_2SO_4 solution:

1. 1 N
2. 2 N
3. 0.5 N
4. 4 N

Correct Answer: 2) 2 N

Solution: $N = M \times 2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. Normality of 1 M HCl solution:

1. 2 N
2. 1 N
3. 0.5 N
4. 3 N

Correct Answer: 2) 1 N

Solution: Valency = 1

Ref: Physical Chemistry – O.P. Tandon

49. Moles in 98 g H_2SO_4 :

1. 1
2. 2
3. 0.5
4. 4

Correct Answer: 1) 1

Solution: $98/98 = 1$ mole

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Normality of 98 g H_2SO_4 in 1 L solution:

1. 1 N
2. 2 N
3. 0.5 N
4. 4 N

Correct Answer: 2) 2 N

Solution: Equivalent = $98/49 = 2$ eq $\rightarrow$ 2N

Ref: Physical Chemistry – O.P. Tandon

51. Equivalent weight of $\text{Ca}(\text{OH})_2$ is:

1. 74
2. 37
3. 40
4. 20

Correct Answer: 2) 37

Solution: $74/2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. Normality of 1 M Ca(OH)_2 :

1. 1 N
2. 2 N
3. 0.5 N
4. 3 N

Correct Answer: 2) 2 N

Solution: Valency = 2

Ref: Physical Chemistry – O.P. Tandon

53. Molarity of 18 g water in 1 L:

1. 1 M
2. 2 M
3. 0.5 M
4. 3 M

Correct Answer: 1) 1 M

Solution: $18/18 = 1$ mole

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Molarity of 9 g water in 1 L:

1. 1 M
2. 0.5 M
3. 2 M
4. 3 M

Correct Answer: 2) 0.5 M

Solution: $9/18 = 0.5$ mole

Ref: Physical Chemistry – O.P. Tandon

55. Molarity of 2 moles in 500 ml:

1. 1 M
2. 2 M
3. 4 M
4. 0.5 M

Correct Answer: 3) 4 M

Solution: $2/0.5 = 4 \text{ M}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Normality of 2 M H_3PO_4 :

1. 2 N
2. 4 N
3. 6 N
4. 1 N

Correct Answer: 3) 6 N

Solution: $N = 2 \times 3$

Ref: Physical Chemistry – O.P. Tandon

57. Equivalent weight of H_3PO_4 is:

1. 98
2. 49
3. 32.67
4. 18

Correct Answer: 3) 32.67

Solution: $98/3$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. Moles in 32 g O₂:

1. 1
2. 2
3. 0.5
4. 4

Correct Answer: 1) 1

Solution: Molar mass = 32

Ref: Physical Chemistry – O.P. Tandon

59. Number of molecules in 1 mole:

1. 6.022×10^{23}
2. 3×10^8
3. 10^{23}
4. 1.6×10^{-19}

Correct Answer: 1) 6.022×10^{23}

Solution: Avogadro number

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Number of atoms in 1 mole O₂:

1. 6.022×10^{23}
2. 12.044×10^{23}
3. 3×10^{23}
4. 10^{23}

Correct Answer: 2) 12.044×10^{23}

Solution: 2 atoms per molecule

Ref: Physical Chemistry – O.P. Tandon

61. Molarity of 1 mole in 250 ml:

1. 1 M
2. 2 M
3. 4 M
4. 0.5 M

Correct Answer: 3) 4 M

Solution: $1/0.25 = 4$ M

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

62. Normality of 1 M Na_2CO_3 :

1. 1 N
2. 2 N
3. 3 N
4. 0.5 N

Correct Answer: 2) 2 N

Solution: Valency = 2

Ref: Physical Chemistry – O.P. Tandon

63. Equivalent weight of Na_2CO_3 is:

1. 106
2. 53
3. 23
4. 40

Correct Answer: 2) 53

Solution: $106/2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

64. Molarity of 106 g Na_2CO_3 in 1 L:

1. 1 M
2. 2 M
3. 0.5 M
4. 3 M

Correct Answer: 1) 1 M

Solution: $106/106 = 1$ mole

Ref: Physical Chemistry – O.P. Tandon

65. Normality of above solution:

1. 1 N
2. 2 N
3. 3 N
4. 4 N

Correct Answer: 2) 2 N

Solution: $N = M \times 2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Molarity depends on:

1. Temperature
2. Pressure
3. Mass
4. Density

Correct Answer: 1) Temperature

Solution: Volume varies with temperature

Ref: Physical Chemistry – O.P. Tandon

67. Molality depends on:

1. Volume
2. Temperature
3. Mass
4. Pressure

Correct Answer: 3) Mass

Solution: Independent of temperature

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Which is best concentration for temperature variation?

1. Molarity
2. Normality
3. Molality
4. Density

Correct Answer: 3) Molality

Solution: Mass-based

Ref: Physical Chemistry – O.P. Tandon

69. Which unit is used for molarity?

1. mol/kg
2. mol/L
3. g/L
4. eq/kg

Correct Answer: 2) mol/L

Solution: Standard unit

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

70. Which unit is used for normality?

1. mol/L
2. eq/L
3. g/L
4. mol/kg

Correct Answer: 2) eq/L

Solution: Definition

Ref: Physical Chemistry – O.P. Tandon

71. Dilution formula is:

1. $M_1V_1 = M_2V_2$
2. M_1/M_2
3. V_1/V_2
4. $M+V$

Correct Answer: 1) $M_1V_1 = M_2V_2$

Solution: Conservation of moles

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. If $M_1=2M$, $V_1=1L$, $V_2=2L \rightarrow M_2=?$

1. 1 M
2. 2 M
3. 0.5 M
4. 4 M

Correct Answer: 1) 1 M

Solution: $2 \times 1 = M_2 \times 2 \rightarrow M_2=1$

Ref: Physical Chemistry – O.P. Tandon

73. If 1L diluted to 2L, concentration becomes:

1. Same
2. Double
3. Half
4. Zero

Correct Answer: 3) Half

Solution: Inverse relation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

74. If volume halves, concentration becomes:

1. Half
2. Double
3. Same
4. Zero

Correct Answer: 2) Double

Solution: Inverse relation

Ref: Physical Chemistry – O.P. Tandon

75. Equivalent =

1. mass / eq wt
2. mass $\times$ eq wt
3. eq wt / mass
4. mass + eq wt

Correct Answer: 1) mass / eq wt

Solution: Standard formula

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. 49 g H_2SO_4 contains:

1. 1 eq
2. 2 eq
3. 0.5 eq
4. 3 eq

Correct Answer: 1) 1 eq

Solution: Equal to equivalent weight

Ref: Physical Chemistry – O.P. Tandon

77. 98 g H_2SO_4 contains:

1. 1 eq
2. 2 eq
3. 0.5 eq
4. 4 eq

Correct Answer: 2) 2 eq

Solution: $98/49 = 2$ eq

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which is primary standard?

1. HCl
2. NaOH
3. Na_2CO_3
4. NH_4OH

Correct Answer: 3) Na_2CO_3

Solution: Stable and pure

Ref: Physical Chemistry – O.P. Tandon

79. Which is secondary standard?

1. Na_2CO_3
2. NaCl
3. HCl
4. KCl

Correct Answer: 3) HCl

Solution: Needs standardization

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Which is standard solution?

1. Unknown concentration
2. Known concentration
3. Solid
4. Gas

Correct Answer: 2) Known concentration

Solution: Used in titration

Ref: Physical Chemistry – O.P. Tandon

81. Strength of solution depends on:

1. Volume
2. Mass
3. Concentration
4. Density

Correct Answer: 3) Concentration

Solution: Higher concentration $\rightarrow$ stronger

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

82. Which is dilute solution?

1. High solute
2. Low solute
3. High solvent
4. Both 2 & 3

Correct Answer: 4) Both 2 & 3

Solution: Less solute, more solvent

Ref: Physical Chemistry – O.P. Tandon

83. Which is concentrated solution?

1. Low solute
2. High solute
3. Low solvent
4. Both 2 & 3

Correct Answer: 4) Both 2 & 3

Solution: More solute, less solvent

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

84. Which solution is saturated?

1. No solute
2. Maximum solute
3. Minimum solute
4. No solvent

Correct Answer: 2) Maximum solute

Solution: Cannot dissolve more solute

Ref: Physical Chemistry – O.P. Tandon

85. Which is unsaturated solution?

1. Maximum solute
2. Less solute
3. No solute
4. No solvent

Correct Answer: 2) Less solute

Solution: Can dissolve more solute

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

86. Supersaturated solution is:

1. Stable
2. Unstable
3. Solid
4. Gas

Correct Answer: 2) Unstable

Solution: Exceeds solubility

Ref: Physical Chemistry – O.P. Tandon

87. Solubility increases with temperature for:

1. Gases
2. Solids
3. Liquids
4. Metals

Correct Answer: 2) Solids

Solution: Most solids dissolve better at higher temp

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

88. Solubility of gases increases with:

1. Temperature
2. Pressure
3. Volume
4. Mass

Correct Answer: 2) Pressure

Solution: Henry's law

Ref: Physical Chemistry – O.P. Tandon

89. Which law relates gas solubility to pressure?

1. Boyle's law
2. Charles law
3. Henry's law
4. Avogadro law

Correct Answer: 3) Henry's law

Solution: Gas solubility $\propto$ pressure

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. Which decreases gas solubility?

1. Pressure
2. Temperature
3. Volume
4. Density

Correct Answer: 2) Temperature

Solution: Higher temp $\rightarrow$ gas escapes

Ref: Physical Chemistry – O.P. Tandon

91. Molarity of 5 g NaCl (MW = 58.5) in 500 ml solution is:

1. 0.17 M
2. 0.085 M
3. 0.34 M
4. 0.5 M

Correct Answer: 1) 0.17 M

Solution:

$$\text{Moles} = 5/58.5 \approx 0.085$$

$$M = 0.085 / 0.5 = 0.17 \text{ M}$$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

92. Normality of above solution:

1. 0.17 N
2. 0.085 N
3. 0.34 N
4. 0.5 N

Correct Answer: 1) 0.17 N

Solution: NaCl valency = 1 $\rightarrow$ N = M

Ref: Physical Chemistry – O.P. Tandon

93. Molarity of 9.8 g H₂SO₄ (MW=98) in 1 L solution:

1. 0.1 M
2. 1 M
3. 0.01 M
4. 2 M

Correct Answer: 1) 0.1 M

Solution: $9.8/98 = 0.1 \text{ mole}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

94. Normality of above solution:

1. 0.1 N
2. 0.2 N
3. 1 N
4. 2 N

Correct Answer: 2) 0.2 N

Solution: $N = M \times 2 = 0.2$

Ref: Physical Chemistry – O.P. Tandon

95. Molarity of 40 g NaOH (MW=40) in 2 L solution:

1. 1 M
2. 0.5 M
3. 2 M
4. 0.25 M

Correct Answer: 2) 0.5 M

Solution: $1 \text{ mole} / 2 \text{ L} = 0.5 \text{ M}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

96. Normality of above solution:

1. 0.5 N
2. 1 N
3. 2 N
4. 0.25 N

Correct Answer: 1) 0.5 N

Solution: NaOH valency = 1

Ref: Physical Chemistry – O.P. Tandon

97. Moles in 4.9 g H₂SO₄:

1. 0.05
2. 0.1
3. 0.2
4. 1

Correct Answer: 1) 0.05

Solution: $4.9/98 = 0.05$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

98. Molarity of above in 500 ml:

1. 0.1 M
2. 0.05 M
3. 0.2 M
4. 1 M

Correct Answer: 1) 0.1 M

Solution: $0.05 / 0.5 = 0.1 \text{ M}$

Ref: Physical Chemistry – O.P. Tandon

99. Equivalent weight of H₃PO₄ is:

1. 98
2. 49
3. 32.67
4. 18

Correct Answer: 3) 32.67

Solution: $98/3$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

100. 32.67 g H_3PO_4 equals:

1. 1 eq
2. 2 eq
3. 0.5 eq
4. 3 eq

Correct Answer: 1) 1 eq

Solution: Equal to equivalent weight

Ref: Physical Chemistry – O.P. Tandon

101. Molarity of 1 eq in 1 L (valency=2):

1. 1 M
2. 0.5 M
3. 2 M
4. 4 M

Correct Answer: 2) 0.5 M

Solution: $M = N/\text{valency} = 1/2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

102. 1 N solution diluted to 2 L from 1 L $\rightarrow$ new N:

1. 1 N
2. 0.5 N
3. 2 N
4. 0.25 N

Correct Answer: 2) 0.5 N

Solution: $N_1V_1 = N_2V_2$

Ref: Physical Chemistry – O.P. Tandon

103. 2 M solution diluted to 4 times volume → new M:

1. 2 M
2. 1 M
3. 0.5 M
4. 4 M

Correct Answer: 3) 0.5 M

Solution: Inverse relation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

104. If 500 ml becomes 1 L, concentration:

1. Doubles
2. Halves
3. Same
4. Zero

Correct Answer: 2) Halves

Solution: Volume doubles → concentration halves

Ref: Physical Chemistry – O.P. Tandon

105. Number of moles in 22 g CO₂:

1. 0.5
2. 1
3. 2
4. 0.25

Correct Answer: 1) 0.5

Solution: $22/44 = 0.5$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

106. Molarity of above in 1 L:

1. 1 M
2. 0.5 M
3. 2 M
4. 0.25 M

Correct Answer: 2) 0.5 M

Solution: 0.5 mole / 1 L

Ref: Physical Chemistry – O.P. Tandon

107. Number of moles in 11 g CO₂:

1. 0.25
2. 0.5
3. 1
4. 2

Correct Answer: 1) 0.25

Solution: $11/44 = 0.25$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

108. Equivalent weight of CaCO₃ is:

1. 100
2. 50
3. 40
4. 20

Correct Answer: 2) 50

Solution: $100/2$

Ref: Physical Chemistry – O.P. Tandon

109. 50 g CaCO_3 equals:

1. 1 eq
2. 2 eq
3. 0.5 eq
4. 3 eq

Correct Answer: 1) 1 eq

Solution: Equal to eq weight

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

110. Molarity of 100 g CaCO_3 in 1 L:

1. 1 M
2. 2 M
3. 0.5 M
4. 3 M

Correct Answer: 1) 1 M

Solution: $100/100 = 1$ mole

Ref: Physical Chemistry – O.P. Tandon

UNIT 4 - ACIDS & BASES

1. According to Arrhenius, an acid is a substance which produces:

1. OH^- ions
2. H^+ ions
3. Electrons
4. Neutrons

Correct Answer: 2) H^+ ions

Solution: Arrhenius acid increases H^+ concentration in aqueous solution.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. According to Arrhenius, a base produces:

1. H^+
2. OH^-
3. H_2O
4. e^-

Correct Answer: 2) OH^-

Solution: Base increases OH^- concentration.

Ref: Physical Chemistry – O.P. Tandon

3. Example of Arrhenius acid:

1. NaOH
2. HCl
3. KOH
4. NH_4OH

Correct Answer: 2) HCl

Solution: Releases H^+ ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Example of Arrhenius base:

1. HCl
2. H₂SO₄
3. NaOH
4. HNO₃

Correct Answer: 3) NaOH

Solution: Produces OH⁻ ions

Ref: Physical Chemistry – O.P. Tandon

5. Bronsted-Lowry acid is:

1. Electron donor
2. Proton donor
3. Proton acceptor
4. Ion donor

Correct Answer: 2) Proton donor

Solution: Acid donates H⁺

Ref: Concise Inorganic Chemistry – J.D. Lee

6. Bronsted base is:

1. Proton donor
2. Proton acceptor
3. Electron donor
4. Neutral

Correct Answer: 2) Proton acceptor

Solution: Base accepts H⁺

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

7. Conjugate acid is formed by:

1. Loss of H^+
2. Gain of H^+
3. Loss of electron
4. Gain of electron

Correct Answer: 2) Gain of H^+

Solution: $\text{Base} + H^+ \rightarrow \text{conjugate acid}$

Ref: Physical Chemistry – O.P. Tandon

8. Conjugate base is formed by:

1. Gain of H^+
2. Loss of H^+
3. Gain of electron
4. Neutralization

Correct Answer: 2) Loss of H^+

Solution: $\text{Acid} - H^+ \rightarrow \text{conjugate base}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

9. Which is conjugate acid of NH_3 ?

1. NH_2^-
2. NH_4^+
3. NH_3^+
4. NH

Correct Answer: 2) NH_4^+

Solution: $NH_3 + H^+ \rightarrow NH_4^+$

Ref: Concise Inorganic Chemistry – J.D. Lee

10. Which is conjugate base of HCl?

1. Cl^-
2. H^+
3. HCl^+
4. OH^-

Correct Answer: 1) Cl^-

Solution: $\text{HCl} - \text{H}^+ \rightarrow \text{Cl}^-$

Ref: Physical Chemistry – O.P. Tandon

11. Ionic product of water (K_w) is:

1. 10^{-7}
2. 10^{-14}
3. 10^7
4. 1

Correct Answer: 2) 10^{-14}

Solution: $K_w = [\text{H}^+][\text{OH}^-]$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. pH is defined as:

1. $\log[\text{H}^+]$
2. $-\log[\text{H}^+]$
3. $\log[\text{OH}^-]$
4. $-\log[\text{OH}^-]$

Correct Answer: 2) $-\log[\text{H}^+]$

Solution: Standard definition

Ref: Physical Chemistry – O.P. Tandon

13. pOH is:

1. $\log[\text{OH}^-]$
2. $-\log[\text{OH}^-]$
3. $\log[\text{H}^+]$
4. $-\log[\text{H}^+]$

Correct Answer: 2) $-\log[\text{OH}^-]$

Solution: Definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Relation between pH and pOH:

1. $\text{pH} + \text{pOH} = 7$
2. $\text{pH} + \text{pOH} = 14$
3. $\text{pH} \times \text{pOH} = 14$
4. $\text{pH} = \text{pOH}$

Correct Answer: 2) $\text{pH} + \text{pOH} = 14$

Solution: At 25°C

Ref: Physical Chemistry – O.P. Tandon

15. pH of pure water is:

1. 0
2. 7
3. 14
4. 1

Correct Answer: 2) 7

Solution: Neutral solution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. If $\text{pH} < 7$, solution is:

1. Basic
2. Neutral
3. Acidic
4. Salt

Correct Answer: 3) Acidic

Solution: Higher H^+ concentration

Ref: Physical Chemistry – O.P. Tandon

17. If $\text{pH} > 7$, solution is:

1. Acidic
2. Neutral
3. Basic
4. Salt

Correct Answer: 3) Basic

Solution: Higher OH^-

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Strong acid example:

1. CH_3COOH
2. HCl
3. NH_4OH
4. H_2O

Correct Answer: 2) HCl

Solution: Fully ionizes

Ref: Physical Chemistry – O.P. Tandon

19. Weak acid example:

1. HCl
2. HNO₃
3. CH₃COOH
4. H₂SO₄

Correct Answer: 3) CH₃COOH

Solution: Partial ionization

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Strong base example:

1. NH₄OH
2. NaOH
3. H₂O
4. CO₂

Correct Answer: 2) NaOH

Solution: Fully ionizes

Ref: Physical Chemistry – O.P. Tandon

21. Weak base example:

1. NaOH
2. KOH
3. NH₄OH
4. Ca(OH)₂

Correct Answer: 3) NH₄OH

Solution: Weak electrolyte

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Neutralization reaction produces:

1. Acid
2. Base
3. Salt + water
4. Gas

Correct Answer: 3) Salt + water

Solution: Acid + Base $\rightarrow$ Salt + H₂O

Ref: Physical Chemistry – O.P. Tandon

23. Which is neutral salt?

1. NaCl
2. NH₄Cl
3. Na₂CO₃
4. CH₃COONa

Correct Answer: 1) NaCl

Solution: Strong acid + strong base

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Which is acidic salt?

1. NaCl
2. NH₄Cl
3. Na₂CO₃
4. KCl

Correct Answer: 2) NH₄Cl

Solution: Weak base + strong acid

Ref: Physical Chemistry – O.P. Tandon

25. Which is basic salt?

1. NaCl
2. NH_4Cl
3. Na_2CO_3
4. HCl

Correct Answer: 3) Na_2CO_3

Solution: Strong base + weak acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Which has lowest pH?

1. NaOH
2. HCl
3. NH_3
4. H_2O

Correct Answer: 2) HCl

Solution: Strong acid

Ref: Physical Chemistry – O.P. Tandon

27. Which has highest pH?

1. HCl
2. H_2SO_4
3. NaOH
4. CH_3COOH

Correct Answer: 3) NaOH

Solution: Strong base

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. If $[H^+] = 10^{-3}$, pH =

1. 3
2. 11
3. 7
4. 1

Correct Answer: 1) 3

Solution: $pH = -\log(10^{-3}) = 3$

Ref: Physical Chemistry – O.P. Tandon

29. If $[H^+] = 10^{-7}$, pH =

1. 7
2. 14
3. 0
4. 1

Correct Answer: 1) 7

Solution: Neutral

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. If $[OH^-] = 10^{-2}$, pOH =

1. 2
2. 12
3. 7
4. 1

Correct Answer: 1) 2

Solution: $pOH = -\log(10^{-2})$

Ref: Physical Chemistry – O.P. Tandon

31. pH of strong acid solution is:

1. High
2. Low
3. Neutral
4. Zero always

Correct Answer: 2) Low

Solution: High H^+ concentration

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. pH of strong base is:

1. Low
2. High
3. Neutral
4. Zero

Correct Answer: 2) High

Solution: High OH^-

Ref: Physical Chemistry – O.P. Tandon

33. Buffer solution resists change in:

1. Temperature
2. Pressure
3. pH
4. Volume

Correct Answer: 3) pH

Solution: Maintains constant pH

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. Example of buffer solution:

1. $\text{HCl} + \text{NaCl}$
2. $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$
3. $\text{NaOH} + \text{NaCl}$
4. $\text{HCl} + \text{H}_2\text{SO}_4$

Correct Answer: 2) $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

Solution: Weak base + its salt

Ref: Physical Chemistry – O.P. Tandon

35. Buffer contains:

1. Strong acid
2. Weak acid + salt
3. Only base
4. Only salt

Correct Answer: 2) Weak acid + salt

Solution: Or weak base + its salt

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Which is acidic buffer?

1. $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$
2. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$
3. $\text{NaOH} + \text{NaCl}$
4. $\text{HCl} + \text{NaCl}$

Correct Answer: 2) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$

Solution: Weak acid + salt

Ref: Physical Chemistry – O.P. Tandon

37. Which is basic buffer?

1. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$
2. $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$
3. $\text{HCl} + \text{NaCl}$
4. $\text{NaOH} + \text{KCl}$

Correct Answer: 2) $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

Solution: Weak base + salt

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. pH of acidic buffer is:

1. 7
2. <7
3. $=7$
4. 14

Correct Answer: 2) <7

Solution: Acidic nature

Ref: Physical Chemistry – O.P. Tandon

39. pH of basic buffer is:

1. <7
2. $=7$
3. 7
4. 0

Correct Answer: 3) >7

Solution: Basic nature

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Indicator changes color based on:

1. Temperature
2. Pressure
3. pH
4. Volume

Correct Answer: 3) pH

Solution: Depends on acidity/basicity

Ref: Physical Chemistry – O.P. Tandon

41. If $[H^+] = 10^{-2}$, pH =

1. 2
2. 12
3. 7
4. 1

Correct Answer: 1) 2

Solution: $pH = -\log(10^{-2}) = 2$

Ref: Physical Chemistry – O.P. Tandon

42. If $[H^+] = 10^{-5}$, pH =

1. 5
2. 9
3. 7
4. 2

Correct Answer: 1) 5

Solution: $pH = -\log(10^{-5}) = 5$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

43. If pH = 3, $[H^+]$ =

1. 10^{-3}
2. 10^3
3. 3
4. 0.001

Correct Answer: 1) 10^{-3}

Solution: $[H^+] = 10^{-pH}$

Ref: Physical Chemistry – O.P. Tandon

44. If pH = 7, $[H^+]$ =

1. 10^{-7}
2. 10^7
3. 7
4. 1

Correct Answer: 1) 10^{-7}

Solution: Neutral solution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

45. If pH = 9, $[H^+]$ =

1. 10^{-9}
2. 10^{-5}
3. 10^{-2}
4. 10^{-1}

Correct Answer: 1) 10^{-9}

Solution: $[H^+] = 10^{-9}$

Ref: Physical Chemistry – O.P. Tandon

46. If $\text{pOH} = 4$, $\text{pH} =$

1. 4
2. 10
3. 14
4. 7

Correct Answer: 2) 10

Solution: $\text{pH} = 14 - \text{pOH} = 10$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

47. If $\text{pOH} = 9$, $\text{pH} =$

1. 5
2. 9
3. 14
4. 7

Correct Answer: 1) 5

Solution: $\text{pH} = 14 - 9$

Ref: Physical Chemistry – O.P. Tandon

48. If $[\text{OH}^-] = 10^{-3}$, $\text{pOH} =$

1. 3
2. 11
3. 7
4. 1

Correct Answer: 1) 3

Solution: $\text{pOH} = -\log(10^{-3})$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

49. If $[\text{OH}^-] = 10^{-6}$, pH =

1. 6
2. 8
3. 7
4. 10

Correct Answer: 2) 8

Solution: $\text{pOH}=6 \rightarrow \text{pH}=14-6=8$

Ref: Physical Chemistry – O.P. Tandon

50. pH of 0.01 M HCl is:

1. 2
2. 12
3. 7
4. 1

Correct Answer: 1) 2

Solution: Strong acid $\rightarrow [\text{H}^+]=10^{-2}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

51. pH of 0.001 M HCl is:

1. 3
2. 11
3. 7
4. 1

Correct Answer: 1) 3

Solution: $[\text{H}^+]=10^{-3}$

Ref: Physical Chemistry – O.P. Tandon

52. pH of 0.1 M HCl is:

1. 1
2. 2
3. 3
4. 0

Correct Answer: 1) 1

Solution: $[H^+] = 10^{-1}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

53. pH of 0.01 M NaOH is:

1. 2
2. 12
3. 7
4. 1

Correct Answer: 2) 12

Solution: $pOH=2 \rightarrow pH=12$

Ref: Physical Chemistry – O.P. Tandon

54. pH of 0.001 M NaOH is:

1. 3
2. 11
3. 7
4. 1

Correct Answer: 2) 11

Solution: $pOH=3 \rightarrow pH=11$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

55. pH of strong acid is generally:

1. 0–3
2. 4–7
3. 7
4. 8–14

Correct Answer: 1) 0–3

Solution: High H^+ concentration

Ref: Physical Chemistry – O.P. Tandon

56. pH of strong base is:

1. 0–3
2. 4–7
3. 7
4. 11–14

Correct Answer: 4) 11–14

Solution: High OH^-

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

57. If pH decreases, acidity:

1. Decreases
2. Increases
3. Same
4. Zero

Correct Answer: 2) Increases

Solution: More H^+

Ref: Physical Chemistry – O.P. Tandon

58. If pH increases, basicity:

1. Decreases
2. Increases
3. Same
4. Zero

Correct Answer: 2) Increases

Solution: More OH^-

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

59. Which has highest acidity?

1. $\text{pH}=1$
2. $\text{pH}=3$
3. $\text{pH}=5$
4. $\text{pH}=7$

Correct Answer: 1) $\text{pH}=1$

Solution: Lower $\text{pH} \rightarrow$ higher acidity

Ref: Physical Chemistry – O.P. Tandon

60. Which has highest basicity?

1. $\text{pH}=7$
2. $\text{pH}=9$
3. $\text{pH}=12$
4. $\text{pH}=14$

Correct Answer: 4) $\text{pH}=14$

Solution: Highest OH^-

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

61. Buffer solution resists change in:

1. Volume
2. Temperature
3. pH
4. Mass

Correct Answer: 3) pH

Solution: Maintains constant pH

Ref: Physical Chemistry – O.P. Tandon

62. Buffer works by:

1. Neutralization
2. Ionization
3. Common ion effect
4. Dilution

Correct Answer: 3) Common ion effect

Solution: Suppresses ionization

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

63. Acidic buffer contains:

1. Strong acid + base
2. Weak acid + salt
3. Strong base + salt
4. Neutral solution

Correct Answer: 2) Weak acid + salt

Solution: Example $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$

Ref: Physical Chemistry – O.P. Tandon

64. Basic buffer contains:

1. Weak base + salt
2. Strong acid
3. Weak acid
4. Strong base

Correct Answer: 1) Weak base + salt

Solution: $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

65. Buffer action is maximum when:

1. Acid $\gg$ salt
2. Salt $\gg$ acid
3. Equal amounts
4. No salt

Correct Answer: 3) Equal amounts

Solution: Best resistance

Ref: Physical Chemistry – O.P. Tandon

66. If acid is added to buffer:

1. pH increases
2. pH decreases slightly
3. No change
4. pH becomes zero

Correct Answer: 2) pH decreases slightly

Solution: Buffer resists change

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

67. If base added to buffer:

1. pH increases slightly
2. pH decreases
3. No change
4. pH zero

Correct Answer: 1) pH increases slightly

Solution: Buffer neutralizes added base

Ref: Physical Chemistry – O.P. Tandon

68. Which solution has highest pH?

1. 0.1 M HCl
2. 0.01 M HCl
3. 0.001 M HCl
4. 1 M HCl

Correct Answer: 3) 0.001 M HCl

Solution: Lowest concentration → highest pH

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

69. Which has lowest pH?

1. 0.1 M HCl
2. 0.01 M HCl
3. 0.001 M HCl
4. Water

Correct Answer: 1) 0.1 M HCl

Solution: Highest concentration

Ref: Physical Chemistry – O.P. Tandon

70. If HCl diluted 10 times, pH:

1. Decreases
2. Increases
3. Same
4. Zero

Correct Answer: 2) Increases

Solution: H^+ decreases

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

71. Which is amphoteric?

1. HCl
2. NaOH
3. H_2O
4. NH_3

Correct Answer: 3) H_2O

Solution: Acts as acid and base

Ref: Physical Chemistry – O.P. Tandon

72. Which acts as both acid and base?

1. NaCl
2. H_2O
3. CO_2
4. HCl

Correct Answer: 2) H_2O

Solution: Amphoteric

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

73. Which increases pH?

1. Acid
2. Base
3. Salt
4. Water

Correct Answer: 2) Base

Solution: Increases OH^-

Ref: Physical Chemistry – O.P. Tandon

74. Which decreases pH?

1. Base
2. Acid
3. Salt
4. Water

Correct Answer: 2) Acid

Solution: Increases H^+

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

75. Indicator used in acid-base titration:

1. Phenolphthalein
2. KMnO_4
3. NaCl
4. H_2SO_4

Correct Answer: 1) Phenolphthalein

Solution: Changes color with pH

Ref: Physical Chemistry – O.P. Tandon

76. Phenolphthalein color in acid:

1. Pink
2. Colorless
3. Blue
4. Green

Correct Answer: 2) Colorless

Solution: Turns pink in base

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

77. Phenolphthalein color in base:

1. Colorless
2. Pink
3. Blue
4. Yellow

Correct Answer: 2) Pink

Solution: Indicator behavior

Ref: Physical Chemistry – O.P. Tandon

78. Methyl orange color in acid:

1. Yellow
2. Red
3. Blue
4. Green

Correct Answer: 2) Red

Solution: Indicator property

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

79. Methyl orange color in base:

1. Red
2. Yellow
3. Blue
4. Green

Correct Answer: 2) Yellow

Solution: Indicator behavior

Ref: Physical Chemistry – O.P. Tandon

80. Which is strong electrolyte?

1. CH_3COOH
2. NH_3
3. HCl
4. Sugar

Correct Answer: 3) HCl

Solution: Fully ionizes

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

UNIT 5 - ELECTROCHEMISTRY

1. Electrochemistry deals with:

1. Heat energy
2. Electrical energy and chemical reactions
3. Light energy
4. Nuclear energy

Correct Answer: 2) Electrical energy and chemical reactions

Solution: It studies interconversion of chemical and electrical energy.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Substance that conducts electricity in molten state is:

1. Insulator
2. Electrolyte
3. Metal
4. Gas

Correct Answer: 2) Electrolyte

Solution: Electrolytes conduct due to ions.

Ref: Physical Chemistry – O.P. Tandon

3. Which is an electrolyte?

1. Sugar
2. Urea
3. NaCl
4. Alcohol

Correct Answer: 3) NaCl

Solution: Produces ions in solution.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Which is non-electrolyte?

1. NaCl
2. KCl
3. Sugar
4. HCl

Correct Answer: 3) Sugar

Solution: Does not ionize.

Ref: Physical Chemistry – O.P. Tandon

5. Strong electrolyte example:

1. CH_3COOH
2. NH_4OH
3. NaCl
4. Sugar

Correct Answer: 3) NaCl

Solution: Fully ionizes.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Weak electrolyte example:

1. NaCl
2. HCl
3. CH_3COOH
4. KCl

Correct Answer: 3) CH_3COOH

Solution: Partial ionization.

Ref: Physical Chemistry – O.P. Tandon

7. Electrolysis is:

1. Chemical $\rightarrow$ electrical
2. Electrical $\rightarrow$ chemical
3. Heat $\rightarrow$ electrical
4. Light $\rightarrow$ chemical

Correct Answer: 2) Electrical $\rightarrow$ chemical

Solution: Electrical energy drives chemical reaction.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Device converting chemical to electrical energy is:

1. Electrolytic cell
2. Galvanic cell
3. Battery charger
4. Transformer

Correct Answer: 2) Galvanic cell

Solution: Spontaneous reaction produces electricity.

Ref: Physical Chemistry – O.P. Tandon

9. In galvanic cell, reaction is:

1. Non-spontaneous
2. Spontaneous
3. Neutral
4. Zero

Correct Answer: 2) Spontaneous

Solution: Produces electrical energy.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. In electrolytic cell, reaction is:

1. Spontaneous
2. Non-spontaneous
3. Neutral
4. Zero

Correct Answer: 2) Non-spontaneous

Solution: Requires external energy.

Ref: Physical Chemistry – O.P. Tandon

11. Oxidation is:

1. Gain of electrons
2. Loss of electrons
3. Gain of protons
4. Loss of protons

Correct Answer: 2) Loss of electrons

Solution: Standard definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. Reduction is:

1. Loss of electrons
2. Gain of electrons
3. Loss of protons
4. Gain of neutrons

Correct Answer: 2) Gain of electrons

Solution: Standard definition

Ref: Physical Chemistry – O.P. Tandon

13. Oxidation occurs at:

1. Cathode
2. Anode
3. Electrolyte
4. Salt bridge

Correct Answer: 2) Anode

Solution: Oxidation always at anode

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Reduction occurs at:

1. Anode
2. Cathode
3. Salt bridge
4. Wire

Correct Answer: 2) Cathode

Solution: Reduction at cathode

Ref: Physical Chemistry – O.P. Tandon

15. Anode is:

1. Positive electrode
2. Negative electrode
3. Neutral
4. Insulator

Correct Answer: 2) Negative electrode (in galvanic cell)

Solution: Oxidation site

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Cathode is:

1. Positive electrode
2. Negative electrode
3. Neutral
4. Insulator

Correct Answer: 1) Positive electrode (in galvanic cell)

Solution: Reduction site

Ref: Physical Chemistry – O.P. Tandon

17. Electron flow is from:

1. Cathode to anode
2. Anode to cathode
3. Electrolyte to electrode
4. Salt bridge to wire

Correct Answer: 2) Anode to cathode

Solution: Electrons move from oxidation to reduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Salt bridge function is:

1. Conduct electrons
2. Maintain electrical neutrality
3. Increase voltage
4. Decrease current

Correct Answer: 2) Maintain electrical neutrality

Solution: Prevents charge accumulation

Ref: Physical Chemistry – O.P. Tandon

19. Common salt bridge electrolyte:

1. NaCl
2. KCl
3. HCl
4. NaOH

Correct Answer: 2) KCl

Solution: Inert electrolyte

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. EMF is:

1. Current
2. Voltage
3. Resistance
4. Power

Correct Answer: 2) Voltage

Solution: Potential difference

Ref: Physical Chemistry – O.P. Tandon

21. Unit of EMF:

1. Ampere
2. Volt
3. Ohm
4. Watt

Correct Answer: 2) Volt

Solution: Standard unit

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Standard hydrogen electrode potential is:

1. 1 V
2. 0 V
3. -1 V
4. 2 V

Correct Answer: 2) 0 V

Solution: Reference electrode

Ref: Physical Chemistry – O.P. Tandon

23. Cell potential formula:

1. $E_{\text{cell}} = E_{\text{cathode}} - E_{\text{anode}}$
2. $E_{\text{cell}} = E_{\text{anode}} - E_{\text{cathode}}$
3. $E_{\text{cell}} = \text{sum}$
4. $E_{\text{cell}} = \text{zero}$

Correct Answer: 1) $E_{\text{cell}} = E_{\text{cathode}} - E_{\text{anode}}$

Solution: Standard formula

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. If E_{cell} is positive, reaction is:

1. Non-spontaneous
2. Spontaneous
3. Neutral
4. Impossible

Correct Answer: 2) Spontaneous

Solution: Positive EMF

Ref: Physical Chemistry – O.P. Tandon

25. If Ecell is negative:

1. Spontaneous
2. Non-spontaneous
3. Neutral
4. Zero

Correct Answer: 2) Non-spontaneous

Solution: Needs energy

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Which electrode loses mass?

1. Cathode
2. Anode
3. Both
4. None

Correct Answer: 2) Anode

Solution: Oxidation → metal dissolves

Ref: Physical Chemistry – O.P. Tandon

27. Which electrode gains mass?

1. Anode
2. Cathode
3. Both
4. None

Correct Answer: 2) Cathode

Solution: Deposition occurs

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. In Daniell cell, anode is:

1. Cu
2. Zn
3. Fe
4. Ag

Correct Answer: 2) Zn

Solution: $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$

Ref: Physical Chemistry – O.P. Tandon

29. In Daniell cell, cathode is:

1. Zn
2. Cu
3. Fe
4. Ag

Correct Answer: 2) Cu

Solution: Cu^{2+} gains electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Reaction at anode in Daniell cell:

1. $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
2. $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$
3. $\text{Cu} \rightarrow \text{Cu}^{2+}$
4. $\text{Zn}^{2+} + 2\text{e}^-$

Correct Answer: 2) $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$

Solution: Oxidation

Ref: Physical Chemistry – O.P. Tandon

31. Reaction at cathode in Daniell cell:

1. $\text{Zn} \rightarrow \text{Zn}^{2+}$
2. $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
3. $\text{Cu} \rightarrow \text{Cu}^{2+}$
4. Zn^{2+}

Correct Answer: 2) $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$

Solution: Reduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. Which metal is more reactive?

1. Cu
2. Zn
3. Ag
4. Au

Correct Answer: 2) Zn

Solution: Higher tendency to oxidize

Ref: Physical Chemistry – O.P. Tandon

33. Which has higher reduction potential?

1. Zn
2. Cu
3. Fe
4. Al

Correct Answer: 2) Cu

Solution: Less reactive metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. Standard EMF of Daniell cell is about:

1. 0 V
2. 1.1 V
3. 2 V
4. 3 V

Correct Answer: 2) 1.1 V

Solution: Known value

Ref: Physical Chemistry – O.P. Tandon

35. Oxidizing agent is:

1. Gives electrons
2. Accepts electrons
3. Neutral
4. No reaction

Correct Answer: 2) Accepts electrons

Solution: Gets reduced

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Reducing agent is:

1. Accepts electrons
2. Gives electrons
3. Neutral
4. No reaction

Correct Answer: 2) Gives electrons

Solution: Gets oxidized

Ref: Physical Chemistry – O.P. Tandon

37. Which is oxidizing agent in Daniell cell?

1. Zn
2. Cu^{2+}
3. Cu
4. Zn^{2+}

Correct Answer: 2) Cu^{2+}

Solution: Gains electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Which is reducing agent?

1. Zn
2. Cu^{2+}
3. Cu
4. Ag

Correct Answer: 1) Zn

Solution: Loses electrons

Ref: Physical Chemistry – O.P. Tandon

39. Electrochemical series is arrangement of:

1. Mass
2. Potential
3. Volume
4. Density

Correct Answer: 2) Potential

Solution: Based on reduction potential

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Metal higher in series is:

1. Less reactive
2. More reactive
3. Neutral
4. Stable

Correct Answer: 2) More reactive

Solution: Easily oxidized

Ref: Physical Chemistry – O.P. Tandon

41. Faraday's first law states that mass deposited is proportional to:

1. Voltage
2. Current
3. Charge
4. Resistance

Correct Answer: 3) Charge

Solution: $m \propto Q$ ($Q = It$)

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Faraday's second law states:

1. $m \propto I$
2. $m \propto t$
3. $m \propto \text{equivalent weight}$
4. $m \propto \text{resistance}$

Correct Answer: 3) $m \propto \text{equivalent weight}$

Solution: Mass $\propto$ equivalent weight

Ref: Physical Chemistry – O.P. Tandon

43. Faraday constant is:

1. 96500 C
2. 1000 C
3. 50000 C
4. 1 C

Correct Answer: 1) 96500 C

Solution: Charge of 1 mole electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

44. Charge (Q) is given by:

1. I/t
2. $I \times t$
3. t/I
4. I^2t

Correct Answer: 2) $I \times t$

Solution: $Q = \text{current} \times \text{time}$

Ref: Physical Chemistry – O.P. Tandon

45. 1 Faraday =

1. 1 coulomb
2. 96500 coulomb
3. 1000 coulomb
4. 10 coulomb

Correct Answer: 2) 96500 coulomb

Solution: Standard constant

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

46. Mass deposited (m) =

1. $Q \times E$
2. $Q \times E / F$
3. Q / F
4. F / Q

Correct Answer: 2) $Q \times E / F$

Solution: Standard formula

Ref: Physical Chemistry – O.P. Tandon

47. If current doubles, mass deposited:

1. Same
2. Doubles
3. Halves
4. Zero

Correct Answer: 2) Doubles

Solution: $m \propto I$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. If time doubles, mass deposited:

1. Same
2. Doubles
3. Halves
4. Zero

Correct Answer: 2) Doubles

Solution: $m \propto t$

Ref: Physical Chemistry – O.P. Tandon

49. Equivalent weight is:

1. $M \times \text{valency}$
2. $M / \text{valency}$
3. $\text{valency} / M$
4. M^2

Correct Answer: 2) $M / \text{valency}$

Solution: Standard formula

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Charge required to deposit 1 eq substance is:

1. 1 C
2. 96500 C
3. 1000 C
4. 10 C

Correct Answer: 2) 96500 C

Solution: 1 Faraday

Ref: Physical Chemistry – O.P. Tandon

51. 1 ampere =

1. 1 C/sec
2. 1 C/min
3. 1 C/hr
4. 1000 C

Correct Answer: 1) 1 C/sec

Solution: Definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. Time in seconds for 1 hour is:

1. 60
2. 3600
3. 600
4. 1000

Correct Answer: 2) 3600

Solution: 60×60

Ref: Physical Chemistry – O.P. Tandon

53. If 1A current for 1 sec, charge =

1. 1 C
2. 2 C
3. 0.5 C
4. 10 C

Correct Answer: 1) 1 C

Solution: $Q = It$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. If 2A for 10 sec, Q =

1. 20 C
2. 10 C
3. 5 C
4. 2 C

Correct Answer: 1) 20 C

Solution: $Q = 2 \times 10$

Ref: Physical Chemistry – O.P. Tandon

55. Mass deposited depends on:

1. Current
2. Time
3. Equivalent weight
4. All

Correct Answer: 4) All

Solution: $m = (ItE)/F$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Which has higher deposition?

1. Higher E
2. Lower E
3. Same
4. Zero

Correct Answer: 1) Higher E

Solution: $m \propto E$

Ref: Physical Chemistry – O.P. Tandon

57. If current is zero, deposition is:

1. Maximum
2. Zero
3. Same
4. Double

Correct Answer: 2) Zero

Solution: No current $\rightarrow$ no deposition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. If time is zero, deposition is:

1. Maximum
2. Zero
3. Same
4. Double

Correct Answer: 2) Zero

Solution: No time $\rightarrow$ no reaction

Ref: Physical Chemistry – O.P. Tandon

59. If valency increases, equivalent weight:

1. Increases
2. Decreases
3. Same
4. Zero

Correct Answer: 2) Decreases

Solution: $E = M/\text{valency}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Which deposits faster?

1. Higher valency
2. Lower valency
3. Same
4. Zero

Correct Answer: 2) Lower valency

Solution: Higher $E \rightarrow$ more deposition

Ref: Physical Chemistry – O.P. Tandon

61. Electrolysis of water produces:

1. $\text{H}_2 + \text{O}_2$
2. CO_2
3. NaCl
4. HCl

Correct Answer: 1) $\text{H}_2 + \text{O}_2$

Solution: Water splits

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

62. Hydrogen is released at:

1. Anode
2. Cathode
3. Salt bridge
4. Electrolyte

Correct Answer: 2) Cathode

Solution: Reduction

Ref: Physical Chemistry – O.P. Tandon

63. Oxygen released at:

1. Cathode
2. Anode
3. Both
4. None

Correct Answer: 2) Anode

Solution: Oxidation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

64. Which ion moves to cathode?

1. Anion
2. Cation
3. Both
4. None

Correct Answer: 2) Cation

Solution: Positive ions

Ref: Physical Chemistry – O.P. Tandon

65. Which ion moves to anode?

1. Cation
2. Anion
3. Both
4. None

Correct Answer: 2) Anion

Solution: Negative ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Electrolysis requires:

1. Chemical energy
2. Electrical energy
3. Heat
4. Light

Correct Answer: 2) Electrical energy

Solution: Drives reaction

Ref: Physical Chemistry – O.P. Tandon

67. Unit of current is:

1. Volt
2. Ampere
3. Ohm
4. Watt

Correct Answer: 2) Ampere

Solution: SI unit

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Unit of resistance:

1. Volt
2. Ampere
3. Ohm
4. Watt

Correct Answer: 3) Ohm

Solution: Standard unit

Ref: Physical Chemistry – O.P. Tandon

69. Conductivity depends on:

1. Ions
2. Temperature
3. Concentration
4. All

Correct Answer: 4) All

Solution: All factors affect conductivity

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

70. Strong electrolyte has:

1. Few ions
2. Many ions
3. No ions
4. Neutral

Correct Answer: 2) Many ions

Solution: Fully ionized

Ref: Physical Chemistry – O.P. Tandon

71. Weak electrolyte has:

1. Many ions
2. Few ions
3. No ions
4. Neutral

Correct Answer: 2) Few ions

Solution: Partial ionization

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. Conductivity increases with:

1. Temperature
2. Decrease in ions
3. Pressure
4. Volume

Correct Answer: 1) Temperature

Solution: More ion mobility

Ref: Physical Chemistry – O.P. Tandon

73. Electroplating is:

1. Removal
2. Deposition of metal
3. Heating
4. Cooling

Correct Answer: 2) Deposition of metal

Solution: Coating metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

74. Example of electroplating:

1. Rusting
2. Silver plating
3. Boiling
4. Cooling

Correct Answer: 2) Silver plating

Solution: Common application

Ref: Physical Chemistry – O.P. Tandon

75. Electroplating is used for:

1. Decoration
2. Protection
3. Both
4. None

Correct Answer: 3) Both

Solution: Prevent corrosion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. Battery is:

1. Electrolyte
2. Galvanic cell
3. Insulator
4. Conductor

Correct Answer: 2) Galvanic cell

Solution: Converts chemical energy

Ref: Physical Chemistry – O.P. Tandon

77. Dry cell is example of:

1. Electrolytic cell
2. Galvanic cell
3. Insulator
4. Metal

Correct Answer: 2) Galvanic cell

Solution: Chemical → electrical

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which produces electricity?

1. Electrolysis
2. Galvanic cell
3. Heating
4. Cooling

Correct Answer: 2) Galvanic cell

Solution: Spontaneous reaction

Ref: Physical Chemistry – O.P. Tandon

79. Which consumes electricity?

1. Galvanic cell
2. Electrolytic cell
3. Battery
4. Fuel cell

Correct Answer: 2) Electrolytic cell

Solution: Non-spontaneous

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Which electrode is positive in electrolytic cell?

1. Anode
2. Cathode
3. Both
4. None

Correct Answer: 1) Anode

Solution: External source applied

Ref: Physical Chemistry – O.P. Tandon

81. Which electrode is negative in electrolytic cell?

1. Anode
2. Cathode
3. Both
4. None

Correct Answer: 2) Cathode

Solution: Reduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

82. Which reaction occurs at cathode?

1. Oxidation
2. Reduction
3. Neutral
4. No reaction

Correct Answer: 2) Reduction

Solution: Gain of electrons

Ref: Physical Chemistry – O.P. Tandon

83. Which reaction occurs at anode?

1. Reduction
2. Oxidation
3. Neutral
4. No reaction

Correct Answer: 2) Oxidation

Solution: Loss of electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

84. Which increases conductivity?

1. Temperature
2. Impurities
3. Both
4. None

Correct Answer: 3) Both

Solution: More ions

Ref: Physical Chemistry – O.P. Tandon

85. Which decreases conductivity?

1. Dilution
2. Increase ions
3. Temperature
4. Pressure

Correct Answer: 1) Dilution

Solution: Fewer ions per volume

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

86. Faraday laws are used for:

1. Heat
2. Electricity
3. Electrolysis
4. Light

Correct Answer: 3) Electrolysis

Solution: Quantitative study

Ref: Physical Chemistry – O.P. Tandon

87. Which constant used in electrolysis?

1. Avogadro
2. Faraday
3. Planck
4. Boltzmann

Correct Answer: 2) Faraday

Solution: 96500 C

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

88. Which depends on current and time?

1. Voltage
2. Charge
3. Resistance
4. Power

Correct Answer: 2) Charge

Solution: $Q = It$

Ref: Physical Chemistry – O.P. Tandon

89. If current doubles, charge:

1. Same
2. Doubles
3. Half
4. Zero

Correct Answer: 2) Doubles

Solution: $Q \propto I$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. If time doubles, charge:

1. Same
2. Doubles
3. Half
4. Zero

Correct Answer: 2) Doubles

Solution: $Q \propto t$

Ref: Physical Chemistry – O.P. Tandon

UNIT 6 - WATER TECHNOLOGY

1. Hard water is water which:

1. Contains no salts
2. Contains dissolved salts
3. Contains gases
4. Pure

Correct Answer: 2) Contains dissolved salts

Solution: Ca^{2+} , Mg^{2+} salts cause hardness

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Soft water is:

1. Contains Ca^{2+}
2. Contains Mg^{2+}
3. Free from hardness salts
4. Contains NaCl

Correct Answer: 3) Free from hardness salts

Solution: No Ca/Mg ions

Ref: Physical Chemistry – O.P. Tandon

3. Temporary hardness is due to:

1. CaCl_2
2. CaSO_4
3. $\text{Ca}(\text{HCO}_3)_2$
4. NaCl

Correct Answer: 3) $\text{Ca}(\text{HCO}_3)_2$

Solution: Bicarbonates cause temporary hardness

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Permanent hardness is due to:

1. $\text{Ca}(\text{HCO}_3)_2$
2. $\text{Mg}(\text{HCO}_3)_2$
3. CaSO_4
4. CO_2

Correct Answer: 3) CaSO_4

Solution: Sulphates/chlorides

Ref: Physical Chemistry – O.P. Tandon

5. Temporary hardness can be removed by:

1. Filtration
2. Boiling
3. Distillation
4. Cooling

Correct Answer: 2) Boiling

Solution: Bicarbonates decompose

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Permanent hardness cannot be removed by:

1. Boiling
2. Chemical method
3. Ion exchange
4. Zeolite

Correct Answer: 1) Boiling

Solution: Needs chemical treatment

Ref: Physical Chemistry – O.P. Tandon

7. Example of hardness causing salt:

1. NaCl
2. KCl
3. CaSO₄
4. Sugar

Correct Answer: 3) CaSO₄

Solution: Calcium salts

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Unit of hardness is:

1. ppm
2. mol
3. litre
4. gram

Correct Answer: 1) ppm

Solution: Parts per million

Ref: Physical Chemistry – O.P. Tandon

9. 1 ppm =

1. 1 mg/L
2. 1 g/L
3. 1 kg/L
4. 10 mg/L

Correct Answer: 1) 1 mg/L

Solution: Standard definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Degree of hardness expressed as:

1. CaCO_3 equivalent
2. NaCl equivalent
3. HCl equivalent
4. CO_2 equivalent

Correct Answer: 1) CaCO_3 equivalent

Solution: Standard reference

Ref: Physical Chemistry – O.P. Tandon

11. Molecular weight of CaCO_3 :

1. 50
2. 100
3. 40
4. 60

Correct Answer: 2) 100

Solution: $40+12+48$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. Equivalent weight of CaCO_3 :

1. 100
2. 50
3. 25
4. 40

Correct Answer: 2) 50

Solution: $100/2$

Ref: Physical Chemistry – O.P. Tandon

13. Hardness is mainly due to:

1. Na^+
2. K^+
3. Ca^{2+} , Mg^{2+}
4. Cl^-

Correct Answer: 3) Ca^{2+} , Mg^{2+}

Solution: Responsible ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Water without hardness is:

1. Hard
2. Soft
3. Salty
4. Neutral

Correct Answer: 2) Soft

Solution: No Ca/Mg

Ref: Physical Chemistry – O.P. Tandon

15. Disadvantage of hard water:

1. Good taste
2. Scale formation
3. No effect
4. Better cleaning

Correct Answer: 2) Scale formation

Solution: Deposits in boilers

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Soap with hard water forms:

1. Foam
2. Lather
3. Scum
4. Gas

Correct Answer: 3) Scum

Solution: Insoluble precipitate

Ref: Physical Chemistry – O.P. Tandon

17. Hard water consumes more:

1. Soap
2. Salt
3. Acid
4. Base

Correct Answer: 1) Soap

Solution: Forms scum

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Boiler scale contains:

1. CaCO_3
2. NaCl
3. Sugar
4. HCl

Correct Answer: 1) CaCO_3

Solution: Deposits

Ref: Physical Chemistry – O.P. Tandon

19. Scale formation leads to:

1. Efficiency increase
2. Heat loss
3. Cooling
4. Purification

Correct Answer: 2) Heat loss

Solution: Insulates boiler

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Which removes temporary hardness?

1. Boiling
2. Filtration
3. Cooling
4. Pressure

Correct Answer: 1) Boiling

Solution: Decomposition

Ref: Physical Chemistry – O.P. Tandon

21. Lime softening uses:

1. CaO
2. NaCl
3. HCl
4. CO₂

Correct Answer: 1) CaO

Solution: Removes hardness

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Zeolite process removes hardness by:

1. Filtration
2. Ion exchange
3. Distillation
4. Heating

Correct Answer: 2) Ion exchange

Solution: Na^+ replaces Ca^{2+}

Ref: Physical Chemistry – O.P. Tandon

23. Ion exchange method uses:

1. Resin
2. Salt
3. Acid
4. Base

Correct Answer: 1) Resin

Solution: Exchanges ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Zeolite replaces Ca^{2+} with:

1. K^+
2. Na^+
3. H^+
4. Cl^-

Correct Answer: 2) Na^+

Solution: Softening process

Ref: Physical Chemistry – O.P. Tandon

25. Ion exchange resins are:

1. Metals
2. Polymers
3. Liquids
4. Gases

Correct Answer: 2) Polymers

Solution: Synthetic materials

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Demineralization removes:

1. Only Ca
2. Only Mg
3. All ions
4. Only Na

Correct Answer: 3) All ions

Solution: Pure water

Ref: Physical Chemistry – O.P. Tandon

27. Softening reduces:

1. Hardness
2. Volume
3. Temperature
4. Pressure

Correct Answer: 1) Hardness

Solution: Removes Ca/Mg

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Hardness is expressed in:

1. ppm
2. atm
3. volt
4. ohm

Correct Answer: 1) ppm

Solution: Standard unit

Ref: Physical Chemistry – O.P. Tandon

29. Temporary hardness is also called:

1. Permanent
2. Carbonate hardness
3. Sulphate hardness
4. Chloride hardness

Correct Answer: 2) Carbonate hardness

Solution: Due to bicarbonates

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Permanent hardness is:

1. Carbonate
2. Non-carbonate
3. Temporary
4. Neutral

Correct Answer: 2) Non-carbonate

Solution: Due to sulphates/chlorides

Ref: Physical Chemistry – O.P. Tandon

31. Which causes permanent hardness?

1. $\text{Ca}(\text{HCO}_3)_2$
2. $\text{Mg}(\text{HCO}_3)_2$
3. CaCl_2
4. CO_2

Correct Answer: 3) CaCl_2

Solution: Chloride salt

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. Which removes permanent hardness?

1. Boiling
2. Chemical treatment
3. Cooling
4. Filtration

Correct Answer: 2) Chemical treatment

Solution: Lime-soda, zeolite

Ref: Physical Chemistry – O.P. Tandon

33. Lime-soda process removes:

1. Temporary hardness
2. Permanent hardness
3. Both
4. None

Correct Answer: 3) Both

Solution: Chemical softening

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. CaCO_3 forms by:

1. Decomposition
2. Precipitation
3. Heating
4. Cooling

Correct Answer: 2) Precipitation

Solution: During softening

Ref: Physical Chemistry – O.P. Tandon

35. Hard water is unsuitable for:

1. Drinking
2. Washing
3. Cooling
4. Storage

Correct Answer: 2) Washing

Solution: Soap consumption

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Which produces lather easily?

1. Hard water
2. Soft water
3. Sea water
4. Salty water

Correct Answer: 2) Soft water

Solution: No scum

Ref: Physical Chemistry – O.P. Tandon

37. Hardness is removed by ion exchange using:

1. Resin
2. Salt
3. Acid
4. Base

Correct Answer: 1) Resin

Solution: Ion exchange process

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Which water is best for boilers?

1. Hard water
2. Soft water
3. Sea water
4. Salty water

Correct Answer: 2) Soft water

Solution: No scale

Ref: Physical Chemistry – O.P. Tandon

39. Which is disadvantage of hard water?

1. Taste
2. Scale formation
3. Purity
4. Clarity

Correct Answer: 2) Scale formation

Solution: Boiler issues

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Which is best softening method?

1. Boiling
2. Filtration
3. Ion exchange
4. Cooling

Correct Answer: 3) Ion exchange

Solution: Removes all ions

Ref: Physical Chemistry – O.P. Tandon

41. Hardness of water is expressed in terms of:

1. NaCl
2. CaCO_3
3. HCl
4. CO_2

Correct Answer: 2) CaCO_3

Solution: Standard reference compound

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. 1 ppm hardness means:

1. 1 g/L
2. 1 mg/L
3. 10 mg/L
4. 100 mg/L

Correct Answer: 2) 1 mg/L

Solution: ppm = mg/L

Ref: Physical Chemistry – O.P. Tandon

43. Equivalent weight of CaCO_3 is:

1. 100
2. 50
3. 25
4. 40

Correct Answer: 2) 50

Solution: $100/2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

44. Hardness due to Ca^{2+} is converted to CaCO_3 by multiplying with:

1. 2.5
2. 1.25
3. $50/20$
4. $100/40$

Correct Answer: 4) $100/40$

Solution: Conversion factor

Ref: Physical Chemistry – O.P. Tandon

45. Hardness due to Mg^{2+} is converted using factor:

1. $100/24$
2. $100/20$
3. $50/20$
4. 2

Correct Answer: 1) $100/24$

Solution: Mg equivalent conversion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

46. If $\text{Ca}^{2+} = 40 \text{ mg/L}$, hardness as CaCO_3 is:

1. 50 ppm
2. 100 ppm
3. 40 ppm
4. 80 ppm

Correct Answer: 2) 100 ppm

Solution: $40 \times (100/40) = 100$

Ref: Physical Chemistry – O.P. Tandon

47. If $\text{Mg}^{2+} = 24 \text{ mg/L}$, hardness =

1. 100 ppm
2. 50 ppm
3. 24 ppm
4. 75 ppm

Correct Answer: 1) 100 ppm

Solution: $24 \times (100/24) = 100$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. Total hardness =

1. Ca hardness
2. Mg hardness
3. Both
4. None

Correct Answer: 3) Both

Solution: Sum of both

Ref: Physical Chemistry – O.P. Tandon

49. If Ca hardness = 100 ppm, Mg hardness = 50 ppm → total =

1. 150 ppm
2. 100 ppm
3. 50 ppm
4. 200 ppm

Correct Answer: 1) 150 ppm

Solution: Sum

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Temporary hardness is removed by:

1. Lime
2. Soda
3. Boiling
4. Resin

Correct Answer: 3) Boiling

Solution: Decomposition

Ref: Physical Chemistry – O.P. Tandon

51. Permanent hardness removed by:

1. Boiling
2. Lime-soda
3. Cooling
4. Filtration

Correct Answer: 2) Lime-soda

Solution: Chemical method

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. In lime-soda process, lime is:

1. CaO
2. Na_2CO_3
3. HCl
4. NaCl

Correct Answer: 1) CaO

Solution: Reacts with bicarbonates

Ref: Physical Chemistry – O.P. Tandon

53. Soda used is:

1. Na_2CO_3
2. NaCl
3. NaOH
4. HCl

Correct Answer: 1) Na_2CO_3

Solution: Removes Ca salts

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Lime removes:

1. Permanent hardness
2. Temporary hardness
3. Both
4. None

Correct Answer: 2) Temporary hardness

Solution: Removes bicarbonates

Ref: Physical Chemistry – O.P. Tandon

55. Soda removes:

1. Temporary hardness
2. Permanent hardness
3. Both
4. None

Correct Answer: 2) Permanent hardness

Solution: Removes Ca/Mg salts

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. $\text{Ca}(\text{HCO}_3)_2 + \text{Ca}(\text{OH})_2 \rightarrow$

1. CaCO_3
2. NaCl
3. MgCl_2
4. CO_2

Correct Answer: 1) CaCO_3

Solution: Precipitation

Ref: Physical Chemistry – O.P. Tandon

57. $\text{Mg}(\text{HCO}_3)_2 + \text{Ca}(\text{OH})_2 \rightarrow$

1. MgCO_3
2. CaCO_3
3. Both
4. None

Correct Answer: 3) Both

Solution: Forms CaCO_3 & $\text{Mg}(\text{OH})_2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. CaSO_4 removed by:

1. CaO
2. Na_2CO_3
3. HCl
4. NaCl

Correct Answer: 2) Na_2CO_3

Solution: Precipitation

Ref: Physical Chemistry – O.P. Tandon

59. MgSO_4 removed by:

1. Lime
2. Soda
3. Both
4. None

Correct Answer: 3) Both

Solution: Lime + soda process

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Ion exchange method removes hardness by:

1. Precipitation
2. Exchange
3. Boiling
4. Cooling

Correct Answer: 2) Exchange

Solution: Ion replacement

Ref: Physical Chemistry – O.P. Tandon

61. Resin replaces Ca^{2+} with:

1. Na^+
2. H^+
3. Cl^-
4. OH^-

Correct Answer: 1) Na^+

Solution: Softening

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

62. Demineralization removes:

1. Only Ca
2. Only Mg
3. All ions
4. Only Na

Correct Answer: 3) All ions

Solution: Pure water

Ref: Physical Chemistry – O.P. Tandon

63. Total hardness formula is:

1. $\text{Ca} + \text{Mg}$
2. Ca only
3. Mg only
4. None

Correct Answer: 1) $\text{Ca} + \text{Mg}$

Solution: Sum

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

64. If Ca = 20 mg/L, hardness =

1. 50 ppm
2. 100 ppm
3. 20 ppm
4. 40 ppm

Correct Answer: 1) 50 ppm

Solution: $20 \times (100/40)$

Ref: Physical Chemistry – O.P. Tandon

65. If Mg = 12 mg/L, hardness =

1. 50 ppm
2. 100 ppm
3. 25 ppm
4. 75 ppm

Correct Answer: 1) 50 ppm

Solution: $12 \times (100/24)$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Total hardness (above data) =

1. 100 ppm
2. 50 ppm
3. 150 ppm
4. 200 ppm

Correct Answer: 1) 100 ppm

Solution: $50 + 50$

Ref: Physical Chemistry – O.P. Tandon

67. Hardness increases with:

1. Ca^{2+}
2. Mg^{2+}
3. Both
4. None

Correct Answer: 3) Both

Solution: Responsible ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Hardness decreases by:

1. Boiling
2. Ion exchange
3. Lime-soda
4. All

Correct Answer: 4) All

Solution: All methods

Ref: Physical Chemistry – O.P. Tandon

69. Which gives maximum hardness?

1. CaCl_2
2. NaCl
3. KCl
4. Sugar

Correct Answer: 1) CaCl_2

Solution: Ca^{2+}

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

70. Which gives no hardness?

1. NaCl
2. CaCl₂
3. MgSO₄
4. CaCO₃

Correct Answer: 1) NaCl

Solution: No Ca/Mg

Ref: Physical Chemistry – O.P. Tandon

71. Lime-soda process produces:

1. Soluble salts
2. Insoluble precipitate
3. Gas
4. Liquid

Correct Answer: 2) Insoluble precipitate

Solution: CaCO₃, Mg(OH)₂

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. Precipitate formed is removed by:

1. Filtration
2. Cooling
3. Heating
4. Pressure

Correct Answer: 1) Filtration

Solution: Separation

Ref: Physical Chemistry – O.P. Tandon

73. Hardness due to bicarbonates is:

1. Permanent
2. Temporary
3. Neutral
4. Zero

Correct Answer: 2) Temporary

Solution: Carbonate hardness

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

74. Hardness due to sulphates is:

1. Temporary
2. Permanent
3. Neutral
4. Zero

Correct Answer: 2) Permanent

Solution: Non-carbonate

Ref: Physical Chemistry – O.P. Tandon

75. Which is best method for complete removal?

1. Boiling
2. Lime
3. Ion exchange
4. Cooling

Correct Answer: 3) Ion exchange

Solution: Removes all ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. Demineralization gives:

1. Hard water
2. Soft water
3. Pure water
4. Salty water

Correct Answer: 3) Pure water

Solution: No ions

Ref: Physical Chemistry – O.P. Tandon

77. Resin is regenerated using:

1. NaCl
2. Acid/base
3. Water
4. CO₂

Correct Answer: 2) Acid/base

Solution: Regeneration process

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which method is fastest?

1. Boiling
2. Lime-soda
3. Ion exchange
4. Cooling

Correct Answer: 3) Ion exchange

Solution: Efficient process

Ref: Physical Chemistry – O.P. Tandon

79. Hardness causes:

1. Corrosion
2. Scale
3. Purity
4. Cooling

Correct Answer: 2) Scale

Solution: Deposits

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Which removes both hardness types?

1. Boiling
2. Lime-soda
3. Cooling
4. Filtration

Correct Answer: 2) Lime-soda

Solution: Chemical method

Ref: Physical Chemistry – O.P. Tandon

81. Hardness in water is mainly due to:

1. Na^+
2. K^+
3. Ca^{2+} and Mg^{2+}
4. Cl^-

Correct Answer: 3) Ca^{2+} and Mg^{2+}

Solution: These ions form insoluble salts with soap.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

82. Temporary hardness is removed by:

1. Cooling
2. Boiling
3. Filtration
4. Distillation

Correct Answer: 2) Boiling

Solution: Bicarbonates decompose to insoluble carbonates.

Ref: Physical Chemistry – O.P. Tandon

83. Permanent hardness is due to:

1. Bicarbonates
2. Sulphates and chlorides
3. Carbonates
4. CO₂

Correct Answer: 2) Sulphates and chlorides

Solution: These salts do not decompose on boiling.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

84. Which salt causes temporary hardness?

1. CaSO₄
2. CaCl₂
3. Ca(HCO₃)₂
4. NaCl

Correct Answer: 3) Ca(HCO₃)₂

Solution: Bicarbonate salt

Ref: Physical Chemistry – O.P. Tandon

85. Which salt causes permanent hardness?

1. $\text{Ca}(\text{HCO}_3)_2$
2. $\text{Mg}(\text{HCO}_3)_2$
3. CaSO_4
4. CO_2

Correct Answer: 3) CaSO_4

Solution: Sulphate salt

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

86. Equivalent weight of CaCO_3 is:

1. 100
2. 50
3. 25
4. 40

Correct Answer: 2) 50

Solution: $100/2$

Ref: Physical Chemistry – O.P. Tandon

87. 1 ppm hardness equals:

1. 1 g/L
2. 1 mg/L
3. 10 mg/L
4. 100 mg/L

Correct Answer: 2) 1 mg/L

Solution: Definition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

88. Hardness is expressed as:

1. NaCl
2. CaCO₃
3. HCl
4. CO₂

Correct Answer: 2) CaCO₃

Solution: Standard reference

Ref: Physical Chemistry – O.P. Tandon

89. If Ca²⁺ = 40 mg/L, hardness is:

1. 40 ppm
2. 50 ppm
3. 100 ppm
4. 80 ppm

Correct Answer: 3) 100 ppm

Solution: $40 \times (100/40)$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. If Mg²⁺ = 24 mg/L, hardness is:

1. 50 ppm
2. 100 ppm
3. 24 ppm
4. 75 ppm

Correct Answer: 2) 100 ppm

Solution: $24 \times (100/24)$

Ref: Physical Chemistry – O.P. Tandon

UNIT 7 - CORROSION

1. Corrosion is defined as:

1. Formation of alloys
2. Deterioration of metal
3. Purification of metal
4. Melting

Correct Answer: 2) Deterioration of metal

Solution: Metal reacts with environment and degrades.

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Example of corrosion:

1. Rusting of iron
2. Boiling
3. Freezing
4. Distillation

Correct Answer: 1) Rusting of iron

Solution: Common corrosion process

Ref: Physical Chemistry – O.P. Tandon

3. Rust is chemically:

1. FeO
2. $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
3. FeCl₂
4. FeSO₄

Correct Answer: 2) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

Solution: Hydrated ferric oxide

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Corrosion occurs due to:

1. Oxygen
2. Moisture
3. Both
4. None

Correct Answer: 3) Both

Solution: Oxygen + water required

Ref: Physical Chemistry – O.P. Tandon

5. Type of corrosion is:

1. Chemical
2. Electrochemical
3. Both
4. None

Correct Answer: 3) Both

Solution: Two main types

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Electrochemical corrosion involves:

1. Heat
2. Electric current
3. Gas
4. Light

Correct Answer: 2) Electric current

Solution: Redox reactions

Ref: Physical Chemistry – O.P. Tandon

7. Oxidation in corrosion occurs at:

1. Cathode
2. Anode
3. Electrolyte
4. Salt bridge

Correct Answer: 2) Anode

Solution: Metal loses electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Reduction occurs at:

1. Anode
2. Cathode
3. Both
4. None

Correct Answer: 2) Cathode

Solution: Gain of electrons

Ref: Physical Chemistry – O.P. Tandon

9. Rusting requires:

1. Oxygen
2. Water
3. Both
4. None

Correct Answer: 3) Both

Solution: Essential conditions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Which metal corrodes easily?

1. Gold
2. Silver
3. Iron
4. Platinum

Correct Answer: 3) Iron

Solution: Highly reactive

Ref: Physical Chemistry – O.P. Tandon

11. Which metal resists corrosion?

1. Iron
2. Zinc
3. Gold
4. Copper

Correct Answer: 3) Gold

Solution: Noble metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. Corrosion rate increases with:

1. Dry air
2. Moisture
3. Vacuum
4. Cooling

Correct Answer: 2) Moisture

Solution: Electrolyte formation

Ref: Physical Chemistry – O.P. Tandon

13. Which factor affects corrosion?

1. Temperature
2. Humidity
3. Impurities
4. All

Correct Answer: 4) All

Solution: All influence rate

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Rusting is an example of:

1. Chemical corrosion
2. Electrochemical corrosion
3. Physical change
4. Neutral reaction

Correct Answer: 2) Electrochemical corrosion

Solution: Involves redox reactions

Ref: Physical Chemistry – O.P. Tandon

15. Anodic reaction in rusting:

1. $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$
2. $\text{O}_2 + \text{e}^-$
3. H_2 formation
4. CO_2 formation

Correct Answer: 1) $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$

Solution: Iron oxidizes

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Cathodic reaction in rusting:

1. Fe oxidation
2. O₂ reduction
3. CO₂ formation
4. HCl reaction

Correct Answer: 2) O₂ reduction

Solution: $O_2 + H_2O + e^-$

Ref: Physical Chemistry – O.P. Tandon

17. Which acts as electrolyte in corrosion?

1. Air
2. Water
3. Metal
4. Gas

Correct Answer: 2) Water

Solution: Conducts ions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Corrosion is faster in:

1. Dry air
2. Moist air
3. Vacuum
4. Cold conditions

Correct Answer: 2) Moist air

Solution: Water acts as electrolyte

Ref: Physical Chemistry – O.P. Tandon

19. Which metal is used for galvanization?

1. Copper
2. Zinc
3. Iron
4. Silver

Correct Answer: 2) Zinc

Solution: Protects iron

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Galvanization prevents:

1. Melting
2. Corrosion
3. Heating
4. Cooling

Correct Answer: 2) Corrosion

Solution: Zinc coating

Ref: Physical Chemistry – O.P. Tandon

21. Cathodic protection uses:

1. Gold
2. Silver
3. Sacrificial metal
4. Plastic

Correct Answer: 3) Sacrificial metal

Solution: More reactive metal protects

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Sacrificial metal example:

1. Cu
2. Ag
3. Zn
4. Au

Correct Answer: 3) Zn

Solution: More reactive

Ref: Physical Chemistry – O.P. Tandon

23. Corrosion can be prevented by:

1. Coating
2. Alloying
3. Cathodic protection
4. All

Correct Answer: 4) All

Solution: Multiple methods

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Painting protects metal by:

1. Reaction
2. Barrier
3. Cooling
4. Heating

Correct Answer: 2) Barrier

Solution: Prevents contact with air

Ref: Physical Chemistry – O.P. Tandon

25. Electroplating prevents corrosion by:

1. Heating
2. Coating
3. Cooling
4. Reaction

Correct Answer: 2) Coating

Solution: Protective layer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Which increases corrosion?

1. Pure metal
2. Impurities
3. Coating
4. Dry air

Correct Answer: 2) Impurities

Solution: Forms galvanic cells

Ref: Physical Chemistry – O.P. Tandon

27. Which decreases corrosion?

1. Moisture
2. Salt
3. Coating
4. Impurities

Correct Answer: 3) Coating

Solution: Prevents exposure

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Corrosion is fastest in:

1. Dry air
2. Sea water
3. Vacuum
4. Pure water

Correct Answer: 2) Sea water

Solution: Contains salts

Ref: Physical Chemistry – O.P. Tandon

29. Which environment increases corrosion?

1. Dry
2. Acidic
3. Neutral
4. Cold

Correct Answer: 2) Acidic

Solution: Accelerates reactions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Which method gives best protection?

1. Painting
2. Galvanizing
3. Cathodic protection
4. All

Correct Answer: 4) All

Solution: Effective methods

Ref: Physical Chemistry – O.P. Tandon

31. Corrosion leads to:

1. Strength increase
2. Damage
3. Purity
4. Cooling

Correct Answer: 2) Damage

Solution: Metal deterioration

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. Which metal forms protective oxide layer?

1. Iron
2. Aluminium
3. Copper
4. Zinc

Correct Answer: 2) Aluminium

Solution: Passive layer

Ref: Physical Chemistry – O.P. Tandon

33. Passivation means:

1. Corrosion
2. Protection by oxide layer
3. Reaction
4. Heating

Correct Answer: 2) Protection by oxide layer

Solution: Stops further corrosion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. Which metal undergoes least corrosion?

1. Iron
2. Zinc
3. Gold
4. Aluminium

Correct Answer: 3) Gold

Solution: Noble metal

Ref: Physical Chemistry – O.P. Tandon

35. Rusting is accelerated by:

1. Dry air
2. Moisture
3. Cooling
4. Vacuum

Correct Answer: 2) Moisture

Solution: Required for reaction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Which reduces corrosion?

1. Moisture
2. Salt
3. Coating
4. Acid

Correct Answer: 3) Coating

Solution: Barrier

Ref: Physical Chemistry – O.P. Tandon

37. Corrosion occurs faster in presence of:

1. Electrolyte
2. Vacuum
3. Dry air
4. Cold

Correct Answer: 1) Electrolyte

Solution: Ion conduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Which metal acts as sacrificial anode?

1. Cu
2. Zn
3. Ag
4. Au

Correct Answer: 2) Zn

Solution: More reactive

Ref: Physical Chemistry – O.P. Tandon

39. Cathodic protection protects metal by making it:

1. Anode
2. Cathode
3. Neutral
4. Insulator

Correct Answer: 2) Cathode

Solution: Prevents oxidation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Which is corrosion-resistant material?

1. Iron
2. Steel
3. Stainless steel
4. Copper

Correct Answer: 3) Stainless steel

Solution: Alloy protection

Ref: Physical Chemistry – O.P. Tandon

41. Corrosion is an example of:

1. Physical change
2. Chemical change
3. Nuclear reaction
4. Mechanical change

Correct Answer: 2) Chemical change

Solution: New substances are formed

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Rust formation requires:

1. Oxygen
2. Water
3. Both
4. None

Correct Answer: 3) Both

Solution: Essential conditions

Ref: Physical Chemistry – O.P. Tandon

43. In corrosion, anode is the region where:

1. Reduction occurs
2. Oxidation occurs
3. No reaction
4. Neutralization

Correct Answer: 2) Oxidation occurs

Solution: Metal loses electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

44. In corrosion, cathode is the region where:

1. Oxidation occurs
2. Reduction occurs
3. No reaction
4. Heating occurs

Correct Answer: 2) Reduction occurs

Solution: Oxygen gets reduced

Ref: Physical Chemistry – O.P. Tandon

45. In rusting, anodic reaction is:

1. $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$
2. $\text{O}_2 + \text{e}^-$
3. CO_2 formation
4. H_2 formation

Correct Answer: 1) $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$

Solution: Iron oxidizes

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

46. Cathodic reaction in rusting is:

1. Fe oxidation
2. O₂ reduction
3. CO₂ formation
4. HCl reaction

Correct Answer: 2) O₂ reduction

Solution: O₂ + H₂O + electrons

Ref: Physical Chemistry – O.P. Tandon

47. Corrosion cell requires:

1. Anode
2. Cathode
3. Electrolyte
4. All

Correct Answer: 4) All

Solution: Complete electrochemical cell

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. Composition cell is formed due to:

1. Same metal
2. Different metals
3. Same environment
4. No reaction

Correct Answer: 2) Different metals

Solution: Potential difference

Ref: Physical Chemistry – O.P. Tandon

49. Stress cell is formed due to:

1. Temperature
2. Pressure/stress
3. Gas
4. Water

Correct Answer: 2) Pressure/stress

Solution: Mechanical stress differences

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Concentration cell is due to:

1. Different metals
2. Different concentration
3. Same solution
4. Temperature

Correct Answer: 2) Different concentration

Solution: Creates potential difference

Ref: Physical Chemistry – O.P. Tandon

51. In composition cell, anode is:

1. Less reactive metal
2. More reactive metal
3. Noble metal
4. Same metal

Correct Answer: 2) More reactive metal

Solution: Oxidizes easily

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. In galvanic corrosion, metal which corrodes is:

1. Cathode
2. Anode
3. Electrolyte
4. Salt bridge

Correct Answer: 2) Anode

Solution: Oxidation occurs

Ref: Physical Chemistry – O.P. Tandon

53. In corrosion, electrons flow from:

1. Cathode to anode
2. Anode to cathode
3. Electrolyte to metal
4. Salt bridge

Correct Answer: 2) Anode to cathode

Solution: Oxidation to reduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Corrosion rate increases with:

1. Low temperature
2. High temperature
3. Vacuum
4. Dry air

Correct Answer: 2) High temperature

Solution: Faster reactions

Ref: Physical Chemistry – O.P. Tandon

55. Which environment increases corrosion?

1. Neutral
2. Acidic
3. Basic
4. Dry

Correct Answer: 2) Acidic

Solution: Accelerates oxidation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Corrosion in saline water is high due to:

1. Temperature
2. Salts
3. Pressure
4. Gas

Correct Answer: 2) Salts

Solution: Increase conductivity

Ref: Physical Chemistry – O.P. Tandon

57. Which metal is protected by galvanization?

1. Copper
2. Iron
3. Silver
4. Gold

Correct Answer: 2) Iron

Solution: Zinc coating

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. Galvanization uses:

1. Copper
2. Zinc
3. Silver
4. Gold

Correct Answer: 2) Zinc

Solution: Sacrificial metal

Ref: Physical Chemistry – O.P. Tandon

59. Zinc protects iron by:

1. Coating
2. Acting as anode
3. Both
4. None

Correct Answer: 3) Both

Solution: Barrier + sacrificial

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Cathodic protection makes metal:

1. Anode
2. Cathode
3. Neutral
4. Insulator

Correct Answer: 2) Cathode

Solution: Prevents oxidation

Ref: Physical Chemistry – O.P. Tandon

61. Impressed voltage method uses:

1. Battery
2. Heat
3. Gas
4. Light

Correct Answer: 1) Battery

Solution: External current

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

62. Sacrificial protection uses:

1. Noble metal
2. Reactive metal
3. Plastic
4. Gas

Correct Answer: 2) Reactive metal

Solution: Oxidizes instead

Ref: Physical Chemistry – O.P. Tandon

63. Example of sacrificial metal:

1. Cu
2. Ag
3. Zn
4. Au

Correct Answer: 3) Zn

Solution: More reactive

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

64. Which metal forms passive layer?

1. Iron
2. Aluminium
3. Copper
4. Zinc

Correct Answer: 2) Aluminium

Solution: Oxide layer

Ref: Physical Chemistry – O.P. Tandon

65. Passivation protects by:

1. Reaction
2. Coating
3. Oxide layer
4. Cooling

Correct Answer: 3) Oxide layer

Solution: Prevents further attack

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Stainless steel resists corrosion due to:

1. Iron
2. Chromium
3. Copper
4. Zinc

Correct Answer: 2) Chromium

Solution: Forms passive layer

Ref: Physical Chemistry – O.P. Tandon

67. Which increases corrosion?

1. Coating
2. Impurities
3. Dry air
4. Cooling

Correct Answer: 2) Impurities

Solution: Local cells formed

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Which decreases corrosion?

1. Moisture
2. Salt
3. Painting
4. Acid

Correct Answer: 3) Painting

Solution: Barrier protection

Ref: Physical Chemistry – O.P. Tandon

69. Corrosion is fastest in:

1. Pure water
2. Distilled water
3. Sea water
4. Dry air

Correct Answer: 3) Sea water

Solution: High ionic content

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

70. Which reduces corrosion rate?

1. Acid
2. Salt
3. Coating
4. Heat

Correct Answer: 3) Coating

Solution: Prevents exposure

Ref: Physical Chemistry – O.P. Tandon

71. Corrosion causes:

1. Strength increase
2. Damage
3. Purification
4. Cooling

Correct Answer: 2) Damage

Solution: Weakens metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. Corrosion prevention method:

1. Alloying
2. Coating
3. Cathodic protection
4. All

Correct Answer: 4) All

Solution: Various methods

Ref: Physical Chemistry – O.P. Tandon

73. Which metal is least corroded?

1. Iron
2. Zinc
3. Gold
4. Copper

Correct Answer: 3) Gold

Solution: Noble metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

74. Rusting is accelerated by:

1. Dry air
2. Moisture
3. Vacuum
4. Cooling

Correct Answer: 2) Moisture

Solution: Electrolyte formation

Ref: Physical Chemistry – O.P. Tandon

75. Which condition slows corrosion?

1. High humidity
2. Dry air
3. Salt water
4. Acid

Correct Answer: 2) Dry air

Solution: No electrolyte

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. Corrosion is reduced by:

1. Temperature increase
2. Coating
3. Salt
4. Moisture

Correct Answer: 2) Coating

Solution: Barrier

Ref: Physical Chemistry – O.P. Tandon

77. In corrosion, metal losing electrons is:

1. Cathode
2. Anode
3. Electrolyte
4. Salt

Correct Answer: 2) Anode

Solution: Oxidation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. In corrosion, metal gaining electrons is:

1. Anode
2. Cathode
3. Electrolyte
4. Salt

Correct Answer: 2) Cathode

Solution: Reduction

Ref: Physical Chemistry – O.P. Tandon

79. Corrosion is prevented by:

1. Painting
2. Greasing
3. Coating
4. All

Correct Answer: 4) All

Solution: Prevents exposure

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Which method is best for pipelines?

1. Painting
2. Cathodic protection
3. Cooling
4. Heating

Correct Answer: 2) Cathodic protection

Solution: Industrial method

Ref: Physical Chemistry – O.P. Tandon

81. Corrosion occurs due to:

1. Air
2. Moisture
3. Both
4. None

Correct Answer: 3) Both

Solution: Required for rusting

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

UNIT 8 - POLYMERS

1. Polymer is:

1. Small molecule
2. Large molecule made of repeating units
3. Metal
4. Gas

Correct Answer: 2) Large molecule made of repeating units

Solution: Polymers consist of monomers

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Monomer is:

1. Polymer
2. Repeating unit
3. Catalyst
4. Solvent

Correct Answer: 2) Repeating unit

Solution: Basic unit forming polymer

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

3. Polymerization is:

1. Breakdown process
2. Formation of polymer
3. Heating
4. Cooling

Correct Answer: 2) Formation of polymer

Solution: Monomers combine

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Types of polymerization are:

1. Addition
2. Condensation
3. Both
4. None

Correct Answer: 3) Both

Solution: Two main types

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

5. Addition polymerization involves:

1. Loss of molecule
2. No loss of molecule
3. Heat only
4. Cooling

Correct Answer: 2) No loss of molecule

Solution: Direct addition

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Condensation polymerization involves:

1. No loss
2. Loss of small molecule
3. Heat only
4. Cooling

Correct Answer: 2) Loss of small molecule

Solution: Water/HCl removed

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

7. Example of addition polymer:

1. Nylon
2. PVC
3. Bakelite
4. Polyester

Correct Answer: 2) PVC

Solution: Vinyl chloride polymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Example of condensation polymer:

1. Polyethylene
2. PVC
3. Nylon
4. Polystyrene

Correct Answer: 3) Nylon

Solution: Condensation process

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

9. Polymer of ethylene is:

1. PVC
2. Polythene
3. Nylon
4. Bakelite

Correct Answer: 2) Polythene

Solution: Addition polymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Polymer of styrene is:

1. PVC
2. Polystyrene
3. Nylon
4. Teflon

Correct Answer: 2) Polystyrene

Solution: Addition polymer

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

11. PVC stands for:

1. Poly vinyl chloride
2. Poly vinyl carbon
3. Plastic vinyl chloride
4. Polymer vinyl compound

Correct Answer: 1) Poly vinyl chloride

Solution: Common plastic

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. Teflon is polymer of:

1. Ethylene
2. Styrene
3. Tetrafluoroethylene
4. Propylene

Correct Answer: 3) Tetrafluoroethylene

Solution: PTFE polymer

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

13. Teflon is known for:

1. Low melting
2. High reactivity
3. Non-stick property
4. Softness

Correct Answer: 3) Non-stick property

Solution: Chemically inert

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Polystyrene is used for:

1. Pipes
2. Packaging
3. Wires
4. Rubber

Correct Answer: 2) Packaging

Solution: Lightweight material

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

15. Nylon is used for:

1. Pipes
2. Fibres
3. Paint
4. Gas

Correct Answer: 2) Fibres

Solution: Textile industry

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Plastics are:

1. Metals
2. Polymers
3. Gases
4. Liquids

Correct Answer: 2) Polymers

Solution: Synthetic materials

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

17. Thermoplastics can be:

1. Melted repeatedly
2. Used once
3. Burned only
4. Broken

Correct Answer: 1) Melted repeatedly

Solution: Reusable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Thermosetting plastics are:

1. Reusable
2. Non-reusable
3. Liquid
4. Gas

Correct Answer: 2) Non-reusable

Solution: Harden permanently

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

19. Example of thermoplastic:

1. Bakelite
2. PVC
3. Nylon
4. Both 2 & 3

Correct Answer: 4) Both 2 & 3

Solution: PVC, Nylon are thermoplastics

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Example of thermosetting plastic:

1. PVC
2. Nylon
3. Bakelite
4. Polystyrene

Correct Answer: 3) Bakelite

Solution: Hard and infusible

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

21. Elastomers are:

1. Rigid
2. Flexible
3. Metal
4. Gas

Correct Answer: 2) Flexible

Solution: Rubber-like

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Example of elastomer:

1. PVC
2. Nylon
3. Buna-S
4. Teflon

Correct Answer: 3) Buna-S

Solution: Synthetic rubber

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

23. Buna-S is made from:

1. Butadiene + Styrene
2. Ethylene
3. Vinyl chloride
4. Propylene

Correct Answer: 1) Butadiene + Styrene

Solution: Copolymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Neoprene is polymer of:

1. Ethylene
2. Chloroprene
3. Styrene
4. Vinyl chloride

Correct Answer: 2) Chloroprene

Solution: Synthetic rubber

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

25. Polymers are used in:

1. Packaging
2. Textiles
3. Electronics
4. All

Correct Answer: 4) All

Solution: Wide applications

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Polymer chain is:

1. Short
2. Long
3. Circular
4. None

Correct Answer: 2) Long

Solution: Repeating units

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

27. Natural polymer example:

1. PVC
2. Nylon
3. Rubber
4. Teflon

Correct Answer: 3) Rubber

Solution: Naturally occurring

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Synthetic polymer example:

1. Rubber
2. Cellulose
3. PVC
4. Protein

Correct Answer: 3) PVC

Solution: Man-made

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

29. Polymer with high elasticity is:

1. Plastic
2. Elastomer
3. Metal
4. Ceramic

Correct Answer: 2) Elastomer

Solution: Stretchable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Polymer used for non-stick cookware:

1. PVC
2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Inert material

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

31. Polymerization requires:

1. Catalyst
2. Heat
3. Pressure
4. All

Correct Answer: 4) All

Solution: Conditions vary

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

32. Degree of polymerization means:

1. Length of chain
2. Number of monomers
3. Weight
4. Density

Correct Answer: 2) Number of monomers

Solution: Repeating units count

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

33. Polymer is macromolecule because:

1. Small size
2. Large size
3. Gas
4. Liquid

Correct Answer: 2) Large size

Solution: High molecular weight

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

34. Cross-linked polymers are:

1. Weak
2. Strong
3. Liquid
4. Gas

Correct Answer: 2) Strong

Solution: Network structure

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

35. Bakelite is used for:

1. Electrical insulation
2. Clothing
3. Fuel
4. Gas

Correct Answer: 1) Electrical insulation

Solution: Heat resistant

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

36. Polymer used in pipes:

1. Nylon
2. PVC
3. Rubber
4. Teflon

Correct Answer: 2) PVC

Solution: Strong and durable

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

37. Polymer used in tyres:

1. PVC
2. Nylon
3. Buna-S
4. Teflon

Correct Answer: 3) Buna-S

Solution: Rubber

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

38. Polymerization without by-product is:

1. Condensation
2. Addition
3. Both
4. None

Correct Answer: 2) Addition

Solution: No elimination

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

39. Polymerization with by-product is:

1. Addition
2. Condensation
3. Both
4. None

Correct Answer: 2) Condensation

Solution: Water/HCl eliminated

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

40. Polymer is formed by:

1. Monomer
2. Atom
3. Ion
4. Molecule

Correct Answer: 1) Monomer

Solution: Basic unit

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

51. PVC is prepared from:

1. Ethylene
2. Vinyl chloride
3. Styrene
4. Propylene

Correct Answer: 2) Vinyl chloride

Solution: Addition polymerization of $\text{CH}_2=\text{CHCl}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. Teflon is chemically:

1. Polyethylene
2. Polypropylene
3. PTFE
4. PVC

Correct Answer: 3) PTFE

Solution: Polytetrafluoroethylene

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

53. Polystyrene is formed from:

1. Styrene
2. Ethylene
3. Propylene
4. Vinyl chloride

Correct Answer: 1) Styrene

Solution: Addition polymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Nylon is a:

1. Thermoplastic
2. Thermosetting
3. Elastomer
4. Metal

Correct Answer: 1) Thermoplastic

Solution: Can be remelted

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

55. Bakelite is formed by reaction of:

1. Ethylene + Cl_2
2. Phenol + Formaldehyde
3. Styrene + Butadiene
4. Ethylene + Oxygen

Correct Answer: 2) Phenol + Formaldehyde

Solution: Condensation polymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Bakelite is:

1. Thermoplastic
2. Thermosetting
3. Elastomer
4. Gas

Correct Answer: 2) Thermosetting

Solution: Cannot be remelted

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

57. Teflon is used in:

1. Pipes
2. Non-stick cookware
3. Clothing
4. Tyres

Correct Answer: 2) Non-stick cookware

Solution: Chemically inert

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. PVC is used for:

1. Clothes
2. Pipes
3. Tyres
4. Fuel

Correct Answer: 2) Pipes

Solution: Strong and durable

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

59. Polystyrene is used in:

1. Insulation
2. Packaging
3. Both
4. None

Correct Answer: 3) Both

Solution: Lightweight material

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Nylon is used in:

1. Tyres
2. Fibres
3. Pipes
4. Fuel

Correct Answer: 2) Fibres

Solution: Textile applications

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

61. Buna-S is used in:

1. Pipes
2. Tyres
3. Clothing
4. Fuel

Correct Answer: 2) Tyres

Solution: Synthetic rubber

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

62. Neoprene is resistant to:

1. Heat
2. Oil
3. Both
4. None

Correct Answer: 3) Both

Solution: Used in industrial applications

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

63. Polymer used for insulation:

1. PVC
2. Nylon
3. Rubber
4. All

Correct Answer: 4) All

Solution: Electrical insulation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

64. Polymer used in electrical switches:

1. PVC
2. Nylon
3. Bakelite
4. Rubber

Correct Answer: 3) Bakelite

Solution: Heat resistant

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

65. Thermoplastics soften on:

1. Cooling
2. Heating
3. Pressure
4. Reaction

Correct Answer: 2) Heating

Solution: Reversible

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

66. Thermosetting plastics become hard on:

1. Cooling
2. Heating
3. Pressure
4. Mixing

Correct Answer: 2) Heating

Solution: Irreversible

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

67. Polymer with cross-linking is:

1. Weak
2. Strong
3. Liquid
4. Gas

Correct Answer: 2) Strong

Solution: Network structure

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

68. Elastomers are characterized by:

1. Rigidity
2. Elasticity
3. Conductivity
4. Density

Correct Answer: 2) Elasticity

Solution: Stretchable

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

69. Natural rubber is:

1. Synthetic
2. Natural polymer
3. Metal
4. Gas

Correct Answer: 2) Natural polymer

Solution: Obtained from latex

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

70. Synthetic rubber example:

1. Natural rubber
2. Buna-S
3. Cellulose
4. Protein

Correct Answer: 2) Buna-S

Solution: Man-made

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

71. Polymer chain length affects:

1. Strength
2. Flexibility
3. Both
4. None

Correct Answer: 3) Both

Solution: Physical properties

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

72. Polymerization degree is:

1. Mass
2. Length
3. Number of units
4. Volume

Correct Answer: 3) Number of units

Solution: Repeating units

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

73. Which polymer is chemically inert?

1. PVC
2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Highly stable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

74. Which polymer is strongest?

1. Linear
2. Cross-linked
3. Branched
4. Random

Correct Answer: 2) Cross-linked

Solution: Network structure

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

75. Polymer used in bulletproof jackets:

1. PVC
2. Nylon
3. Kevlar
4. Rubber

Correct Answer: 3) Kevlar

Solution: High strength polymer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

76. Which polymer is flexible?

1. Bakelite
2. PVC
3. Rubber
4. Steel

Correct Answer: 3) Rubber

Solution: Elastomer

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

77. Which polymer is rigid?

1. Rubber
2. PVC
3. Bakelite
4. Nylon

Correct Answer: 3) Bakelite

Solution: Thermosetting

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which polymer is used in wires?

1. Nylon
2. PVC
3. Rubber
4. All

Correct Answer: 4) All

Solution: Insulation

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

79. Polymer with low density is:

1. Metal
2. Plastic
3. Ceramic
4. Gas

Correct Answer: 2) Plastic

Solution: Lightweight

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Polymerization requires initiator in:

1. Addition
2. Condensation
3. Both
4. None

Correct Answer: 1) Addition

Solution: Free radical mechanism

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

81. PVC is:

1. Thermosetting
2. Thermoplastic
3. Elastomer
4. Metal

Correct Answer: 2) Thermoplastic

Solution: Can be remelted

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

82. Teflon is:

1. Reactive
2. Inert
3. Soft
4. Weak

Correct Answer: 2) Inert

Solution: Chemical resistance

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

83. Nylon belongs to:

1. Addition polymer
2. Condensation polymer
3. Metal
4. Gas

Correct Answer: 2) Condensation polymer

Solution: Formed with elimination

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

84. Elastomers are:

1. Hard
2. Flexible
3. Brittle
4. Strong

Correct Answer: 2) Flexible

Solution: Rubber-like

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

85. Bakelite is used for:

1. Pipes
2. Switches
3. Tyres
4. Clothes

Correct Answer: 2) Switches

Solution: Electrical insulation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

86. Polymer used in tyres:

1. Nylon
2. PVC
3. Buna-S
4. Teflon

Correct Answer: 3) Buna-S

Solution: Rubber

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

87. Polymer used for packaging:

1. Nylon
2. Polystyrene
3. Bakelite
4. Rubber

Correct Answer: 2) Polystyrene

Solution: Lightweight

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

88. Polymer used in pipes:

1. Nylon
2. PVC
3. Rubber
4. Teflon

Correct Answer: 2) PVC

Solution: Strong

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

89. Polymer used in fibres:

1. Nylon
2. PVC
3. Rubber
4. Teflon

Correct Answer: 1) Nylon

Solution: Textile use

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. Polymer used in insulation:

1. PVC
2. Rubber
3. Nylon
4. All

Correct Answer: 4) All

Solution: Electrical insulation

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

UNIT 9 - FUELS

1. Fuel is defined as:

1. Substance that cools
2. Substance that produces heat on combustion
3. Substance that absorbs heat
4. Gas

Correct Answer: 2) Substance that produces heat on combustion

Solution: Fuel releases energy

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Fuel produces energy in form of:

1. Light
2. Heat
3. Sound
4. Pressure

Correct Answer: 2) Heat

Solution: Combustion releases heat

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

3. Fuels are classified based on:

1. Size
2. Occurrence
3. Color
4. Shape

Correct Answer: 2) Occurrence

Solution: Natural and artificial

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Natural fuel example:

1. Coke
2. Coal
3. Charcoal
4. LPG

Correct Answer: 2) Coal

Solution: Occurs naturally

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

5. Artificial fuel example:

1. Wood
2. Coal
3. Coke
4. Gas

Correct Answer: 3) Coke

Solution: Derived fuel

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Primary fuels are:

1. Artificial
2. Natural
3. Synthetic
4. Mixed

Correct Answer: 2) Natural

Solution: Occur in nature

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

7. Secondary fuels are:

1. Natural
2. Artificial
3. Gases
4. Liquids

Correct Answer: 2) Artificial

Solution: Derived from primary

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Solid fuel example:

1. LPG
2. Petrol
3. Coal
4. Diesel

Correct Answer: 3) Coal

Solution: Solid state

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

9. Liquid fuel example:

1. Coal
2. Wood
3. Petrol
4. Coke

Correct Answer: 3) Petrol

Solution: Liquid fuel

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Gaseous fuel example:

1. Coal
2. Petrol
3. LPG
4. Coke

Correct Answer: 3) LPG

Solution: Gas fuel

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

11. Calorific value means:

1. Temperature
2. Heat produced by fuel
3. Volume
4. Pressure

Correct Answer: 2) Heat produced by fuel

Solution: Energy content

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. Unit of calorific value:

1. Joule/kg
2. Volt
3. Ampere
4. Ohm

Correct Answer: 1) Joule/kg

Solution: Energy per mass

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

13. Good fuel should have:

1. Low calorific value
2. High calorific value
3. High ash
4. High moisture

Correct Answer: 2) High calorific value

Solution: More energy output

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. Which is best fuel?

1. Low CV
2. High CV
3. High ash
4. High moisture

Correct Answer: 2) High CV

Solution: Efficient

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

15. Coal is:

1. Liquid fuel
2. Solid fuel
3. Gas
4. Metal

Correct Answer: 2) Solid fuel

Solution: Natural fuel

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Coke is:

1. Natural
2. Artificial
3. Gas
4. Liquid

Correct Answer: 2) Artificial

Solution: Derived from coal

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

17. Charcoal is obtained from:

1. Coal
2. Wood
3. Petrol
4. Gas

Correct Answer: 2) Wood

Solution: Destructive distillation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. LPG stands for:

1. Liquid petroleum gas
2. Low pressure gas
3. Liquid propane gas
4. Light petroleum gas

Correct Answer: 1) Liquid petroleum gas

Solution: Common fuel

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

19. LPG is mainly composed of:

1. Methane
2. Propane + Butane
3. CO₂
4. Hydrogen

Correct Answer: 2) Propane + Butane

Solution: Hydrocarbon gases

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Biogas is produced from:

1. Coal
2. Petrol
3. Organic waste
4. Gas

Correct Answer: 3) Organic waste

Solution: Anaerobic digestion

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

21. Main component of biogas:

1. CO₂
2. CH₄
3. O₂
4. N₂

Correct Answer: 2) CH₄

Solution: Methane dominant

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Biogas is:

1. Solid fuel
2. Liquid fuel
3. Gaseous fuel
4. Metal

Correct Answer: 3) Gaseous fuel

Solution: Gas mixture

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

23. Advantage of gaseous fuel:

1. Smoke
2. Clean burning
3. Ash
4. Residue

Correct Answer: 2) Clean burning

Solution: Less pollution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Disadvantage of solid fuel:

1. Easy storage
2. Smoke
3. Clean
4. Efficient

Correct Answer: 2) Smoke

Solution: Pollution

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

25. Fuel efficiency depends on:

1. Color
2. Calorific value
3. Shape
4. Size

Correct Answer: 2) Calorific value

Solution: Energy output

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Which fuel produces least pollution?

1. Coal
2. Petrol
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Clean combustion

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

27. Which fuel produces maximum smoke?

1. Gas
2. Liquid
3. Solid
4. LPG

Correct Answer: 3) Solid

Solution: Incomplete combustion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Best domestic fuel is:

1. Coal
2. LPG
3. Wood
4. Coke

Correct Answer: 2) LPG

Solution: Clean and efficient

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

29. Fuel should have:

1. High moisture
2. Low moisture
3. High ash
4. High smoke

Correct Answer: 2) Low moisture

Solution: Better combustion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Good fuel has:

1. High ash
2. Low ash
3. High residue
4. Low CV

Correct Answer: 2) Low ash

Solution: Clean burning

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

51. Biogas is produced by:

1. Aerobic process
2. Anaerobic digestion
3. Combustion
4. Distillation

Correct Answer: 2) Anaerobic digestion

Solution: Occurs without oxygen

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. Main component of biogas is:

1. CO_2
2. CH_4
3. O_2
4. H_2

Correct Answer: 2) CH_4

Solution: Methane is major component

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

53. Biogas also contains:

1. Nitrogen
2. CO_2
3. Oxygen
4. Hydrogen

Correct Answer: 2) CO_2

Solution: Along with methane

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Biogas plant uses:

1. Coal
2. Petrol
3. Organic waste
4. LPG

Correct Answer: 3) Organic waste

Solution: Cow dung, plant waste

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

55. Biogas is eco-friendly because:

1. Produces smoke
2. Renewable
3. High ash
4. Expensive

Correct Answer: 2) Renewable

Solution: Sustainable source

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Biogas is used for:

1. Cooking
2. Lighting
3. Both
4. None

Correct Answer: 3) Both

Solution: Domestic use

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

57. Advantage of gaseous fuel:

1. Difficult handling
2. Clean combustion
3. High ash
4. Residue

Correct Answer: 2) Clean combustion

Solution: Less pollution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. Disadvantage of gaseous fuel:

1. Clean
2. Storage difficulty
3. Efficient
4. High CV

Correct Answer: 2) Storage difficulty

Solution: Needs cylinders

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

59. Liquid fuels are:

1. Easy to transport
2. Difficult to handle
3. Solid
4. Gases

Correct Answer: 1) Easy to transport

Solution: Pipeline transport

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Solid fuels are:

1. Clean
2. Polluting
3. Efficient
4. Gas

Correct Answer: 2) Polluting

Solution: Smoke formation

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

UNIT 10 - ENVIRONMENTAL CHEMISTRY

1. Environment means:

1. Surroundings
2. Air only
3. Water only
4. Soil only

Correct Answer: 1) Surroundings

Solution: Includes all living and non-living things

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Lithosphere refers to:

1. Air
2. Water
3. Land
4. Space

Correct Answer: 3) Land

Solution: Earth's crust

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

3. Hydrosphere refers to:

1. Air
2. Water
3. Land
4. Soil

Correct Answer: 2) Water

Solution: Oceans, rivers

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

4. Atmosphere refers to:

1. Soil
2. Water
3. Air
4. Land

Correct Answer: 3) Air

Solution: Surrounding gases

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

5. Biosphere includes:

1. Living organisms
2. Non-living only
3. Air only
4. Water only

Correct Answer: 1) Living organisms

Solution: Life-supporting zone

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

6. Pollutant is:

1. Useful substance
2. Harmful substance
3. Natural element
4. Metal

Correct Answer: 2) Harmful substance

Solution: Causes pollution

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

7. Receptor is:

1. Source
2. Pollutant
3. Affected object
4. Gas

Correct Answer: 3) Affected object

Solution: Receives pollution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

8. Sink is:

1. Source
2. Absorbing medium
3. Pollutant
4. Gas

Correct Answer: 2) Absorbing medium

Solution: Accumulates pollutants

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

9. Air pollution is:

1. Clean air
2. Contaminated air
3. Pure gas
4. Oxygen

Correct Answer: 2) Contaminated air

Solution: Harmful substances present

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

10. Water pollution is:

1. Pure water
2. Contaminated water
3. Drinking water
4. Clean water

Correct Answer: 2) Contaminated water

Solution: Harmful substances present

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

11. DO stands for:

1. Dissolved Oxygen
2. Direct Oxygen
3. Double Oxygen
4. Dynamic Oxygen

Correct Answer: 1) Dissolved Oxygen

Solution: Oxygen in water

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

12. BOD stands for:

1. Biological Oxygen Demand
2. Basic Oxygen Demand
3. Balanced Oxygen Demand
4. None

Correct Answer: 1) Biological Oxygen Demand

Solution: Oxygen required by microbes

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

13. COD stands for:

1. Chemical Oxygen Demand
2. Carbon Oxygen Demand
3. Combined Oxygen Demand
4. None

Correct Answer: 1) Chemical Oxygen Demand

Solution: Oxygen for chemical oxidation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

14. High BOD indicates:

1. Clean water
2. Polluted water
3. Pure water
4. Safe water

Correct Answer: 2) Polluted water

Solution: More organic matter

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

15. Acid rain is caused by:

1. CO_2
2. SO_2 , NO_x
3. O_2
4. H_2

Correct Answer: 2) SO_2 , NO_x

Solution: Forms acids in atmosphere

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

16. Greenhouse effect is due to:

1. O₂
2. CO₂
3. N₂
4. H₂

Correct Answer: 2) CO₂

Solution: Traps heat

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

17. Ozone layer protects from:

1. Heat
2. UV rays
3. Rain
4. Wind

Correct Answer: 2) UV rays

Solution: Absorbs harmful radiation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

18. Ozone depletion is caused by:

1. CO₂
2. CFCs
3. O₂
4. N₂

Correct Answer: 2) CFCs

Solution: Destroy ozone

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

19. Air pollution causes:

1. Health issues
2. Climate change
3. Acid rain
4. All

Correct Answer: 4) All

Solution: Multiple effects

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

20. Water pollution causes:

1. Disease
2. Death of aquatic life
3. Contamination
4. All

Correct Answer: 4) All

Solution: Harmful effects

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

21. Threshold limit value (TLV) is:

1. Minimum pollution
2. Safe exposure level
3. Maximum pollution
4. Gas level

Correct Answer: 2) Safe exposure level

Solution: Permissible limit

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

22. Particulate matter is:

1. Gas
2. Solid particles
3. Liquid
4. Metal

Correct Answer: 2) Solid particles

Solution: Dust, smoke

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

23. Main air pollutant:

1. O₂
2. CO
3. N₂
4. H₂

Correct Answer: 2) CO

Solution: Toxic gas

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

24. Main water pollutant:

1. Oxygen
2. Waste
3. Nitrogen
4. Hydrogen

Correct Answer: 2) Waste

Solution: Industrial/domestic waste

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

25. Control of air pollution includes:

1. Filters
2. Scrubbers
3. Catalytic converters
4. All

Correct Answer: 4) All

Solution: Pollution control methods

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

26. Control of water pollution includes:

1. Treatment
2. Filtration
3. Recycling
4. All

Correct Answer: 4) All

Solution: Purification methods

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

27. Which gas causes global warming?

1. O₂
2. CO₂
3. N₂
4. H₂

Correct Answer: 2) CO₂

Solution: Greenhouse gas

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

28. Which gas causes acid rain?

1. CO₂
2. SO₂
3. O₂
4. H₂

Correct Answer: 2) SO₂

Solution: Forms H₂SO₄

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

29. Which layer protects Earth?

1. CO₂
2. Ozone
3. Nitrogen
4. Hydrogen

Correct Answer: 2) Ozone

Solution: UV protection

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

30. Which pollution affects lungs?

1. Water
2. Air
3. Soil
4. Noise

Correct Answer: 2) Air

Solution: Respiratory problems

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

41. Air pollution mainly affects:

1. Soil
2. Water
3. Human health
4. Rocks

Correct Answer: 3) Human health

Solution: Causes respiratory diseases

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

42. Water pollution mainly affects:

1. Air
2. Land
3. Aquatic life
4. Sun

Correct Answer: 3) Aquatic life

Solution: Reduces oxygen

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

43. High BOD leads to:

1. More oxygen
2. Less oxygen
3. Pure water
4. Clean water

Correct Answer: 2) Less oxygen

Solution: Microbes consume oxygen

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

44. High COD indicates:

1. Clean water

2. Polluted water
3. Pure water
4. Neutral water

Correct Answer: 2) Polluted water

Solution: High chemical demand

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

45. Dissolved oxygen is essential for:

1. Plants
2. Animals
3. Aquatic life
4. Soil

Correct Answer: 3) Aquatic life

Solution: Required for respiration

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

46. Acid rain damages:

1. Buildings
2. Crops
3. Soil
4. All

Correct Answer: 4) All

Solution: Harmful acidic effect

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

47. Greenhouse effect causes:

1. Cooling
2. Global warming
3. Rain
4. Snow

Correct Answer: 2) Global warming

Solution: Heat trapping

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

48. Ozone depletion leads to:

1. Cooling
2. UV radiation increase
3. Rain
4. Wind

Correct Answer: 2) UV radiation increase

Solution: Harmful rays reach Earth

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

49. Main cause of air pollution:

1. Vehicles
2. Industries
3. Burning fuels
4. All

Correct Answer: 4) All

Solution: Multiple sources

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

50. Main cause of water pollution:

1. Sewage
2. Industrial waste
3. Agricultural runoff
4. All

Correct Answer: 4) All

Solution: Various sources

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

51. Control of air pollution includes:

1. Electrostatic precipitator
2. Scrubber
3. Filter
4. All

Correct Answer: 4) All

Solution: Devices used

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

52. Control of water pollution includes:

1. Treatment plants
2. Filtration
3. Recycling
4. All

Correct Answer: 4) All

Solution: Purification methods

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

53. Which reduces air pollution?

1. Trees
2. Vehicles
3. Factories
4. Burning

Correct Answer: 1) Trees

Solution: Absorb CO₂

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

54. Which increases water pollution?

1. Treatment
2. Waste discharge
3. Recycling
4. Filtration

Correct Answer: 2) Waste discharge

Solution: Adds contaminants

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

55. Noise pollution affects:

1. Hearing
2. Vision
3. Taste
4. Smell

Correct Answer: 1) Hearing

Solution: Causes hearing loss

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

56. Soil pollution is caused by:

1. Fertilizers
2. Pesticides
3. Waste
4. All

Correct Answer: 4) All

Solution: Contamination of soil

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

57. Which gas is toxic?

1. CO
2. O₂
3. N₂
4. H₂

Correct Answer: 1) CO

Solution: Carbon monoxide is poisonous

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

58. Which reduces global warming?

1. Deforestation
2. Pollution
3. Afforestation
4. Burning

Correct Answer: 3) Afforestation

Solution: More trees absorb CO₂

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

59. Which pollutant causes smog?

1. CO₂
2. NO_x
3. O₂
4. H₂

Correct Answer: 2) NO_x

Solution: Forms photochemical smog

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

60. Smog is mixture of:

1. Smoke + fog
2. Gas + liquid
3. Water + air
4. Soil + air

Correct Answer: 1) Smoke + fog

Solution: Air pollution type

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

61. Which reduces pollution?

1. Recycling
2. Reuse
3. Reduce
4. All

Correct Answer: 4) All

Solution: 3R principle

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

 GRAND TEST – 1 (AP ECET CHEMISTRY)

76. pH of 0.0001 M HCl is:

1. 2
2. 3
3. 4
4. 5

Correct Answer: 3) 4

Solution: $\text{pH} = -\log(10^{-4}) = 4$

Ref: Physical Chemistry – O.P. Tandon

77. Which polymer is formed by condensation polymerization?

1. PVC
2. Teflon
3. Nylon
4. Polystyrene

Correct Answer: 3) Nylon

Solution: Eliminates small molecules

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Corrosion is prevented by:

1. Coating
2. Alloying
3. Cathodic protection
4. All

Correct Answer: 4) All

Solution: All methods effective

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

79. Main component of biogas is:

1. CO_2
2. CH_4
3. O_2
4. N_2

Correct Answer: 2) CH_4

Solution: Methane dominant

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

80. Which gas causes acid rain?

1. CO_2
2. SO_2
3. O_2
4. H_2

Correct Answer: 2) SO_2

Solution: Forms sulphuric acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

81. If $\text{pOH} = 5$, $\text{pH} =$

1. 5
2. 7
3. 9
4. 14

Correct Answer: 3) 9

Solution: $\text{pH} = 14 - 5$

Ref: Physical Chemistry – O.P. Tandon

82. Which is strongest acid?

1. CH_3COOH
2. HCl
3. NH_4OH
4. H_2O

Correct Answer: 2) HCl

Solution: Strong acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. Which is basic buffer?

1. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$
2. $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$
3. $\text{HCl} + \text{NaCl}$
4. NaOH only

Correct Answer: 2) $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

Solution: Weak base + salt

Ref: Physical Chemistry – O.P. Tandon

84. Which polymer is thermosetting?

1. PVC
2. Nylon
3. Bakelite
4. Rubber

Correct Answer: 3) Bakelite

Solution: Cannot be remelted

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. Rust is:

1. FeO
2. $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
3. FeCl_2
4. FeSO_4

Correct Answer: 2) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

Solution: Hydrated ferric oxide

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

86. Which fuel is renewable?

1. Coal
2. Petrol
3. Biogas
4. Diesel

Correct Answer: 3) Biogas

Solution: Renewable source

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

87. BOD measures:

1. Oxygen produced
2. Oxygen consumed by microbes
3. Oxygen dissolved
4. Oxygen in air

Correct Answer: 2) Oxygen consumed by microbes

Solution: Indicates pollution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

88. Which gas causes global warming?

1. O₂
2. CO₂
3. N₂
4. H₂

Correct Answer: 2) CO₂

Solution: Greenhouse gas

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

89. Which metal is used in galvanization?

1. Cu
2. Zn
3. Ag
4. Au

Correct Answer: 2) Zn

Solution: Protects iron

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

90. Which polymer is used in tyres?

1. PVC
2. Nylon
3. Buna-S
4. Teflon

Correct Answer: 3) Buna-S

Solution: Synthetic rubber

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

91. Which fuel produces least pollution?

1. Coal
2. Wood
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Clean combustion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

92. Which solution has highest pH?

1. 0.1 M HCl
2. 0.01 M HCl
3. 0.001 M HCl
4. 1 M HCl

Correct Answer: 3) 0.001 M HCl

Solution: Least acidic

Ref: Physical Chemistry – O.P. Tandon

93. Which pollutant causes smog?

1. CO₂
2. NO_x
3. O₂
4. H₂

Correct Answer: 2) NO_x

Solution: Photochemical smog

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

94. Which polymer is chemically inert?

1. PVC
2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Highly stable

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

95. Which decreases corrosion?

1. Moisture
2. Salt
3. Coating
4. Acid

Correct Answer: 3) Coating

Solution: Prevents contact

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

96. If $[H^+] = 10^{-2}$, pH =

1. 1
2. 2
3. 3
4. 4

Correct Answer: 2) 2

Solution: $pH = -\log(10^{-2})$

Ref: Physical Chemistry – O.P. Tandon

97. Which is greenhouse gas?

1. O₂
2. CO₂
3. N₂
4. H₂

Correct Answer: 2) CO₂

Solution: Traps heat

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

98. Which is thermoplastic?

1. Bakelite
2. PVC
3. Rubber
4. Glass

Correct Answer: 2) PVC

Solution: Reusable

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

99. Which increases water pollution?

1. Treatment
2. Filtration
3. Industrial waste
4. Recycling

Correct Answer: 3) Industrial waste

Solution: Adds contaminants

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

100. Which statement is correct?

1. Good fuel has low calorific value
2. Good fuel has high ash
3. Good fuel has high calorific value
4. Good fuel has high moisture

Correct Answer: 3) Good fuel has high calorific value

Solution: Efficient fuel

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

 GRAND TEST – 2 (AP ECET CHEMISTRY)

75. pH of 0.01 M HCl is:

1. 1
2. 2
3. 3
4. 4

Correct Answer: 2) 2

Solution: $\text{pH} = -\log(10^{-2}) = 2$

Ref: Physical Chemistry – O.P. Tandon

76. If pH = 3, then $[\text{H}^+]$ =

1. 10^{-3}
2. 10^{-2}
3. 10^{-5}
4. 10^{-1}

Correct Answer: 1) 10^{-3}

Solution: $[\text{H}^+] = 10^{-\text{pH}}$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

77. Which has lowest pH?

1. 0.1 M HCl
2. 0.01 M HCl
3. 0.001 M HCl
4. Water

Correct Answer: 1) 0.1 M HCl

Solution: Highest concentration

Ref: Physical Chemistry – O.P. Tandon

78. Which solution is basic?

1. HCl
2. NaOH
3. H₂SO₄
4. HNO₃

Correct Answer: 2) NaOH

Solution: Strong base

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

79. Which polymer is addition polymer?

1. Nylon
2. Bakelite
3. PVC
4. Polyester

Correct Answer: 3) PVC

Solution: No by-product

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

80. Which polymer is elastomer?

1. PVC
2. Nylon
3. Rubber
4. Bakelite

Correct Answer: 3) Rubber

Solution: Highly elastic

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

81. Which polymer is used in non-stick coating?

1. PVC

2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Chemically inert

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

82. Rusting requires:

1. Oxygen
2. Water
3. Both
4. None

Correct Answer: 3) Both

Solution: Necessary conditions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. In corrosion, oxidation occurs at:

1. Cathode
2. Anode
3. Electrolyte
4. Salt

Correct Answer: 2) Anode

Solution: Metal loses electrons

Ref: Physical Chemistry – O.P. Tandon

84. Which metal resists corrosion?

1. Iron
2. Zinc
3. Gold

4. Copper

Correct Answer: 3) Gold

Solution: Noble metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. Which fuel has highest calorific value?

1. Wood
2. Coal
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Efficient combustion

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

86. Main component of LPG is:

1. Methane
2. Propane + Butane
3. CO₂
4. Hydrogen

Correct Answer: 2) Propane + Butane

Solution: Hydrocarbon gases

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

87. Which fuel is renewable?

1. Coal
2. Diesel
3. Biogas
4. Petrol

Correct Answer: 3) Biogas

Solution: Renewable energy

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

88. Which gas causes ozone depletion?

1. CO₂
2. CFC
3. O₂
4. N₂

Correct Answer: 2) CFC

Solution: Destroys ozone layer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

89. Which gas causes acid rain?

1. CO₂
2. SO₂
3. O₂
4. H₂

Correct Answer: 2) SO₂

Solution: Forms sulphuric acid

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

90. Which gas is greenhouse gas?

1. O₂
2. N₂
3. CO₂
4. H₂

Correct Answer: 3) CO₂

Solution: Heat trapping

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

91. BOD indicates:

1. Clean water
2. Oxygen demand
3. Oxygen production
4. Gas

Correct Answer: 2) Oxygen demand

Solution: Measures pollution level

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

92. Which reduces air pollution?

1. Vehicles
2. Trees
3. Burning
4. Industries

Correct Answer: 2) Trees

Solution: Absorb CO₂

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

93. Which polymer is thermoplastic?

1. Bakelite
2. PVC
3. Rubber
4. Glass

Correct Answer: 2) PVC

Solution: Reusable

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

94. Which polymer is thermosetting?

1. PVC
2. Nylon
3. Bakelite
4. Rubber

Correct Answer: 3) Bakelite

Solution: Cannot be remelted

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

95. Which decreases corrosion?

1. Moisture
2. Salt
3. Coating
4. Acid

Correct Answer: 3) Coating

Solution: Prevents exposure

Ref: Physical Chemistry – O.P. Tandon

96. If $pOH = 2$, $pH =$

1. 2
2. 10
3. 12
4. 14

Correct Answer: 3) 12

Solution: $pH = 14 - 2$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

97. Which has highest pH?

1. 0.1 M HCl
2. 0.01 M HCl

3. 0.001 M HCl
4. 1 M HCl

Correct Answer: 3) 0.001 M HCl

Solution: Least acidic

Ref: Physical Chemistry – O.P. Tandon

98. Which pollutant causes smog?

1. CO₂
2. NO_x
3. O₂
4. H₂

Correct Answer: 2) NO_x

Solution: Photochemical smog

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

99. Which increases water pollution?

1. Treatment
2. Filtration
3. Industrial waste
4. Recycling

Correct Answer: 3) Industrial waste

Solution: Adds contaminants

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

100. Which statement is correct?

1. Good fuel has low CV
2. Good fuel has high ash
3. Good fuel has high CV
4. Good fuel has high moisture

Correct Answer: 3) Good fuel has high CV

Solution: Efficient energy output

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

 GRAND TEST – 3 (AP ECET CHEMISTRY)

75. pH of 0.001 M HCl is:

1. 1
2. 2
3. 3
4. 4

Correct Answer: 3) 3

Solution: $\text{pH} = -\log(10^{-3}) = 3$

Ref: Physical Chemistry – O.P. Tandon

76. If pOH = 4, pH =

1. 4
2. 6
3. 10
4. 14

Correct Answer: 3) 10

Solution: $\text{pH} = 14 - 4$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

77. Which has highest pH?

1. 0.1 M HCl
2. 0.01 M HCl
3. 0.001 M HCl
4. 1 M HCl

Correct Answer: 3) 0.001 M HCl

Solution: Least acidic

Ref: Physical Chemistry – O.P. Tandon

78. Which is strong base?

1. NH_4OH
2. NaOH
3. CH_3COOH
4. HCl

Correct Answer: 2) NaOH

Solution: Strong base

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

79. Which polymer is condensation polymer?

1. PVC
2. Teflon
3. Nylon
4. Polythene

Correct Answer: 3) Nylon

Solution: Eliminates water

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

80. Which polymer is thermosetting?

1. PVC
2. Nylon
3. Bakelite
4. Rubber

Correct Answer: 3) Bakelite

Solution: Cannot be remelted

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

81. Which polymer is elastomer?

1. PVC
2. Nylon

3. Rubber
4. Bakelite

Correct Answer: 3) Rubber

Solution: Elastic

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

82. Rusting requires:

1. Oxygen
2. Water
3. Both
4. None

Correct Answer: 3) Both

Solution: Essential conditions

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. In corrosion, oxidation occurs at:

1. Cathode
2. Anode
3. Electrolyte
4. Salt

Correct Answer: 2) Anode

Solution: Metal loses electrons

Ref: Physical Chemistry – O.P. Tandon

84. Which metal is most resistant to corrosion?

1. Iron
2. Zinc
3. Gold
4. Copper

Correct Answer: 3) Gold

Solution: Noble metal

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. Which fuel has highest calorific value?

1. Coal
2. Wood
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Efficient combustion

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

86. LPG mainly contains:

1. Methane
2. Propane + Butane
3. CO₂
4. Hydrogen

Correct Answer: 2) Propane + Butane

Solution: Hydrocarbon gases

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

87. Which fuel is renewable?

1. Coal
2. Petrol
3. Biogas
4. Diesel

Correct Answer: 3) Biogas

Solution: Renewable

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

88. Which gas causes ozone depletion?

1. CO₂
2. CFC
3. O₂
4. N₂

Correct Answer: 2) CFC

Solution: Breaks ozone layer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

89. Which gas causes acid rain?

1. CO₂
2. SO₂
3. O₂
4. H₂

Correct Answer: 2) SO₂

Solution: Forms H₂SO₄

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

90. Which gas is greenhouse gas?

1. O₂
2. N₂
3. CO₂
4. H₂

Correct Answer: 3) CO₂

Solution: Heat trapping

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

91. If $[H^+] = 10^{-5}$, pH =

1. 3
2. 4
3. 5
4. 6

Correct Answer: 3) 5

Solution: $\text{pH} = -\log(10^{-5})$

Ref: Physical Chemistry – O.P. Tandon

92. Which solution is buffer?

1. $\text{HCl} + \text{NaCl}$
2. $\text{NaOH} + \text{NaCl}$
3. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$
4. $\text{HCl} + \text{H}_2\text{SO}_4$

Correct Answer: 3) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$

Solution: Weak acid + salt

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

93. Which polymer is chemically inert?

1. PVC
2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Stable

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

94. Which metal is used for galvanization?

1. Cu
2. Zn

3. Ag

4. Au

Correct Answer: 2) Zn

Solution: Protects iron

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

95. Which decreases corrosion?

1. Moisture

2. Salt

3. Coating

4. Acid

Correct Answer: 3) Coating

Solution: Prevents contact

Ref: Physical Chemistry – O.P. Tandon

96. BOD measures:

1. Oxygen produced

2. Oxygen consumed

3. Oxygen dissolved

4. Oxygen in air

Correct Answer: 2) Oxygen consumed

Solution: Indicates pollution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

97. Which reduces air pollution?

1. Vehicles

2. Trees

3. Burning

4. Factories

Correct Answer: 2) Trees

Solution: Absorb CO₂

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

98. Which polymer is thermoplastic?

1. Bakelite
2. PVC
3. Rubber
4. Glass

Correct Answer: 2) PVC

Solution: Reusable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

99. Which increases water pollution?

1. Treatment
2. Filtration
3. Industrial waste
4. Recycling

Correct Answer: 3) Industrial waste

Solution: Adds contaminants

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

100. Which statement is correct?

1. Good fuel has low calorific value
2. Good fuel has high ash
3. Good fuel has high calorific value
4. Good fuel has high moisture

Correct Answer: 3) Good fuel has high calorific value

Solution: Efficient fuel

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

 GRAND TEST – 4 (AP ECET CHEMISTRY)

75. pH of 0.1 M HCl is:

1. 1
2. 2
3. 3
4. 4

Correct Answer: 1) 1

Solution: $\text{pH} = -\log(10^{-1}) = 1$

Ref: Physical Chemistry – O.P. Tandon

76. If $[\text{OH}^-] = 10^{-3}$, $\text{pOH} =$

1. 1
2. 2
3. 3
4. 4

Correct Answer: 3) 3

Solution: $\text{pOH} = -\log(10^{-3})$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

77. If $\text{pOH} = 3$, $\text{pH} =$

1. 3
2. 7
3. 11
4. 14

Correct Answer: 3) 11

Solution: $\text{pH} = 14 - 3$

Ref: Physical Chemistry – O.P. Tandon

78. Which is weak acid?

1. HCl
2. H₂SO₄
3. CH₃COOH
4. HNO₃

Correct Answer: 3) CH₃COOH

Solution: Weak acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

79. Which is strong base?

1. NH₄OH
2. NaOH
3. CH₃COOH
4. HCl

Correct Answer: 2) NaOH

Solution: Strong base

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

80. Which polymer is addition polymer?

1. Nylon
2. Bakelite
3. PVC
4. Polyester

Correct Answer: 3) PVC

Solution: No by-product

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

81. Which polymer is condensation polymer?

1. PVC

2. Teflon
3. Nylon
4. Polythene

Correct Answer: 3) Nylon

Solution: Eliminates water

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

82. Which polymer is elastomer?

1. PVC
2. Nylon
3. Rubber
4. Bakelite

Correct Answer: 3) Rubber

Solution: Elastic

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. Rust is:

1. FeO
2. $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
3. FeCl₂
4. FeSO₄

Correct Answer: 2) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

Solution: Hydrated ferric oxide

Ref: Physical Chemistry – O.P. Tandon

84. In corrosion, reduction occurs at:

1. Anode
2. Cathode
3. Electrolyte

4. Salt

Correct Answer: 2) Cathode

Solution: Gain of electrons

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. Which metal is protected by galvanization?

1. Copper
2. Iron
3. Silver
4. Gold

Correct Answer: 2) Iron

Solution: Zinc coating

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

86. Which fuel has highest calorific value?

1. Coal
2. Wood
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Efficient combustion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

87. LPG contains mainly:

1. Methane
2. Propane + Butane
3. CO₂
4. Hydrogen

Correct Answer: 2) Propane + Butane

Solution: Hydrocarbon gases

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

88. Which fuel is renewable?

1. Petrol
2. Diesel
3. Biogas
4. Coal

Correct Answer: 3) Biogas

Solution: Renewable source

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

89. Which gas causes acid rain?

1. CO₂
2. SO₂
3. O₂
4. H₂

Correct Answer: 2) SO₂

Solution: Forms sulphuric acid

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

90. Which gas causes ozone depletion?

1. CO₂
2. CFC
3. O₂
4. N₂

Correct Answer: 2) CFC

Solution: Breaks ozone layer

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

91. If $[H^+] = 10^{-4}$, pH =

1. 2
2. 3
3. 4
4. 5

Correct Answer: 3) 4

Solution: $pH = -\log(10^{-4})$

Ref: Physical Chemistry – O.P. Tandon

92. Which solution is acidic?

1. NaOH
2. NH_4OH
3. HCl
4. NaCl

Correct Answer: 3) HCl

Solution: Strong acid

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

93. Which polymer is chemically inert?

1. PVC
2. Nylon
3. Teflon
4. Rubber

Correct Answer: 3) Teflon

Solution: Stable

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

94. Which method prevents corrosion?

1. Coating
2. Alloying
3. Cathodic protection
4. All

Correct Answer: 4) All

Solution: Multiple methods

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

95. BOD indicates:

1. Oxygen produced
2. Oxygen consumed
3. Oxygen dissolved
4. Oxygen in air

Correct Answer: 2) Oxygen consumed

Solution: Pollution level

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

96. Which reduces pollution?

1. Burning
2. Recycling
3. Dumping
4. Deforestation

Correct Answer: 2) Recycling

Solution: Reduces waste

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

97. Which gas is greenhouse gas?

1. O₂
2. CO₂

3. N₂

4. H₂

Correct Answer: 2) CO₂

Solution: Heat trapping

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

98. Which polymer is thermoplastic?

1. Bakelite

2. PVC

3. Rubber

4. Glass

Correct Answer: 2) PVC

Solution: Reusable

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

99. Which increases water pollution?

1. Treatment

2. Filtration

3. Industrial waste

4. Recycling

Correct Answer: 3) Industrial waste

Solution: Adds contaminants

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

100. Which statement is correct?

1. Good fuel has low calorific value

2. Good fuel has high ash

3. Good fuel has high calorific value

4. Good fuel has high moisture

Correct Answer: 3) Good fuel has high calorific value

Solution: Efficient fuel

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

 GRAND TEST – 5 (AP ECET CHEMISTRY)

76. pH of 0.005 M HCl $\approx$

1. 2
2. 2.3
3. 3
4. 1

Correct Answer: 2) 2.3

Solution: $\text{pH} = -\log(5 \times 10^{-3}) \approx 2.3$

Ref: Physical Chemistry – O.P. Tandon

77. If $\text{pOH} = 4$, $\text{pH} =$

1. 4
2. 10
3. 14
4. 7

Correct Answer: 2) 10

Solution: $\text{pH} = 14 - 4$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

78. Which solution is most basic?

1. pH 8
2. pH 10
3. pH 12
4. pH 6

Correct Answer: 3) pH 12

Solution: Higher pH = more basic

Ref: Physical Chemistry – O.P. Tandon

79. Which electrolyte shows partial ionization?

1. NaCl
2. HCl
3. CH₃COOH
4. KOH

Correct Answer: 3) CH₃COOH

Solution: Weak electrolyte

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

80. Which has highest conductivity?

1. Weak electrolyte
2. Strong electrolyte
3. Non-electrolyte
4. Solid

Correct Answer: 2) Strong electrolyte

Solution: More ions

Ref: Physical Chemistry – O.P. Tandon

81. Which polymer is addition polymer?

1. Nylon
2. Bakelite
3. PVC
4. Polyester

Correct Answer: 3) PVC

Solution: No by-product

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

82. Which polymer is thermosetting?

1. PVC

2. Nylon
3. Bakelite
4. Rubber

Correct Answer: 3) Bakelite

Solution: Cannot be remelted

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

83. Which polymer is elastomer?

1. Nylon
2. PVC
3. Rubber
4. Teflon

Correct Answer: 3) Rubber

Solution: Elastic nature

Ref: Physical Chemistry – O.P. Tandon

84. Which metal is protected by galvanization?

1. Copper
2. Iron
3. Silver
4. Gold

Correct Answer: 2) Iron

Solution: Zinc coating protects iron

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

85. Which metal acts as sacrificial anode?

1. Cu
2. Ag
3. Zn

4. Au

Correct Answer: 3) Zn

Solution: More reactive

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

86. Which fuel is gaseous?

1. Coal
2. Petrol
3. LPG
4. Coke

Correct Answer: 3) LPG

Solution: Stored as liquid, used as gas

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

87. Which fuel is liquid?

1. Coal
2. Petrol
3. Coke
4. Wood

Correct Answer: 2) Petrol

Solution: Liquid fuel

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

88. Which fuel produces least ash?

1. Coal
2. Wood
3. Gas
4. Coke

Correct Answer: 3) Gas

Solution: Clean combustion

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

89. Which gas causes acid rain?

1. CO_2
2. SO_2
3. O_2
4. H_2

Correct Answer: 2) SO_2

Solution: Forms H_2SO_4

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

90. Which gas causes greenhouse effect?

1. O_2
2. CO_2
3. N_2
4. H_2

Correct Answer: 2) CO_2

Solution: Traps heat

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

91. Which gas causes ozone depletion?

1. CO_2
2. CFC
3. O_2
4. N_2

Correct Answer: 2) CFC

Solution: Destroys ozone

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

92. Which pollutant causes smog?

1. CO₂
2. NO_x
3. O₂
4. H₂

Correct Answer: 2) NO_x

Solution: Photochemical smog

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

93. Which pollutant is toxic?

1. O₂
2. CO
3. N₂
4. H₂

Correct Answer: 2) CO

Solution: Poisonous gas

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

94. Which reduces pollution?

1. Recycling
2. Burning
3. Dumping
4. Deforestation

Correct Answer: 1) Recycling

Solution: Waste reduction

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

95. Which increases water pollution?

1. Treatment
2. Filtration
3. Industrial waste
4. Recycling

Correct Answer: 3) Industrial waste

Solution: Adds contaminants

Ref: Textbook of Engineering Chemistry – S.S. Dara & S.S. Umare

96. Which decreases air pollution?

1. Vehicles
2. Industries
3. Trees
4. Burning

Correct Answer: 3) Trees

Solution: Absorb CO₂

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

97. Which fuel is renewable?

1. Coal
2. Petrol
3. Biogas
4. Diesel

Correct Answer: 3) Biogas

Solution: Renewable

Ref: A Textbook of Engineering Chemistry – Shashi Chawla

98. Which solution is neutral?

1. pH 3
2. pH 7

3. pH 10

4. pH 12

Correct Answer: 2) pH 7

Solution: Neutral solution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

99. Which electrolyte is non-electrolyte?

1. NaCl

2. HCl

3. Sugar

4. KOH

Correct Answer: 3) Sugar

Solution: Does not ionize

Ref: Physical Chemistry – O.P. Tandon

100. Which statement is correct?

1. Strong acids partially ionize

2. Weak acids completely ionize

3. Strong acids completely ionize

4. Weak acids do not ionize

Correct Answer: 3) Strong acids completely ionize

Solution: Full dissociation

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

 UNIT 1 — ATOMIC STRUCTURE TOP 30 MOST REPEATED PYQs (AP ECET)

1. The value of Planck's constant is

- 1). $6.626 \times 10^{-34} Js$
- 2). $3 \times 10^8 m/s$
- 3). $1.6 \times 10^{-19} C$
- 4). $9.1 \times 10^{-31} kg$

Correct Answer: 1) $6.626 \times 10^{-34} Js$

Solution:

Planck's constant (h) is a fundamental constant used in quantum theory:

$$E = h\nu$$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The energy of a photon is given by

- 1). $E = mc^2$
- 2). $E = h\nu$
- 3). $E = \frac{1}{2}mv^2$
- 4). $E = PV$

Correct Answer: 2) $E = h\nu$

Solution:

Photon energy depends on frequency:

$$E = h\nu, \text{ where } h = \text{Planck's constant}$$

Ref: Textbook of Engineering Chemistry – S.S. Dara

3. The wavelength of visible light lies between

- 1). 10–100 nm
- 2). 400–700 nm
- 3). 1–10 nm
- 4). 700–1000 nm

Correct Answer: 2) 400–700 nm

Solution:

Visible spectrum range: 400 nm (violet) to 700 nm (red)

Ref: O.P. Tandon

4. One electron volt (eV) is equal to

- 1). $1.6 \times 10^{-19} J$
- 2). $6.626 \times 10^{-34} J$
- 3). $9.1 \times 10^{-31} J$
- 4). $3 \times 10^8 J$

Correct Answer: 1) $1.6 \times 10^{-19} J$

Solution:

1 eV = energy gained by electron when potential difference = 1 V

Ref: S.S. Umare

5. The charge of an electron is

- 1). $+1.6 \times 10^{-19} C$
- 2). $-1.6 \times 10^{-19} C$
- 3). 0
- 4). $1.6 \times 10^{-31} C$

Correct Answer: 2) $-1.6 \times 10^{-19} C$

Solution:

Electron carries a negative charge

Ref: P.C. Jain

6. The mass of an electron is

- 1). $9.1 \times 10^{-31} kg$
- 2). $1.6 \times 10^{-19} kg$
- 3). $6.626 \times 10^{-34} kg$
- 4). $1.67 \times 10^{-27} kg$

Correct Answer: 1) $9.1 \times 10^{-31} kg$

Solution:

Standard electron mass value

Ref: Dara & Umare

7. The atomic number represents

- 1). Number of neutrons
- 2). Number of protons
- 3). Number of electrons + neutrons
- 4). Atomic mass

Correct Answer: 2) Number of protons

Solution:

Atomic number = number of protons in nucleus

Ref: J.D. Lee

8. The maximum number of electrons in K-shell is

- 1). 2
- 2). 8
- 3). 18
- 4). 32

Correct Answer: 1) 2

Solution:

Formula: $2n^2$, for $n=1 \rightarrow 2$

Ref: P.C. Jain

9. The maximum number of electrons in L-shell is

- 1). 2
- 2). 8
- 3). 18
- 4). 32

Correct Answer: 2) 8

Solution:

$$2n^2, n=2 \rightarrow 8$$

Ref: Dara

10. The maximum number of orbitals in a shell is

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

Correct Answer: 2) n^2

Solution:

Number of orbitals = n^2

Ref: O.P. Tandon

11. The angular momentum of electron in Bohr's model is given by

- 1). $mvr = \frac{nh}{2\pi}$
- 2). $E = h\nu$
- 3). $PV = nRT$
- 4). $E = mc^2$

Correct Answer: 1) $mvr = \frac{nh}{2\pi}$

Solution:

Bohr quantization condition: angular momentum is quantized

Ref: Engineering Chemistry – P.C. Jain

12. The principal quantum number (n) determines

- 1). Shape of orbital
- 2). Orientation of orbital
- 3). Energy level and size
- 4). Spin

Correct Answer: 3) Energy level and size

Solution:

Higher $n \rightarrow$ larger size and higher energy

Ref: S.S. Dara

13. The azimuthal quantum number (l) determines

- 1). Size
- 2). Shape
- 3). Spin
- 4). Energy only

Correct Answer: 2) Shape

Solution:

l defines subshell (s, p, d, f) $\rightarrow$ shape

Ref: J.D. Lee

14. The magnetic quantum number (m) determines

- 1). Size
- 2). Shape
- 3). Orientation
- 4). Spin

Correct Answer: 3) Orientation

Solution:

m gives orientation of orbital in space

Ref: O.P. Tandon

15. Spin quantum number (s) has values

- 1). 0, 1
- 2). +1, -1
- 3). +1/2, -1/2
- 4). 1/2 only

Correct Answer: 3) +1/2, -1/2

Solution:

Electron spin is always $\pm 1/2$

Ref: Dara & Umare

16. Total number of orbitals in p-subshell is

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

Correct Answer: 2) 3

Solution:

p-subshell $\rightarrow$ p_x, p_y, p_z

Ref: P.C. Jain

17. Total number of orbitals in d-subshell is

- 1). 3
- 2). 5
- 3). 7
- 4). 9

Correct Answer: 2) 5

Solution:

d-subshell has 5 orbitals

Ref: S.S. Dara

18. The Pauli Exclusion Principle states that

- 1). Electrons fill lowest energy first
- 2). No two electrons have same set of quantum numbers
- 3). Orbitals are filled singly first
- 4). Energy is quantized

Correct Answer: 2) No two electrons have same set of quantum numbers

Solution:

Each electron must differ in at least one quantum number

Ref: J.D. Lee

19. Hund's rule states that

- 1). Pairing occurs first
- 2). Orbitals fill randomly
- 3). Maximum number of unpaired electrons
- 4). Lowest energy is highest priority

Correct Answer: 3) Maximum number of unpaired electrons

Solution:

Electrons occupy orbitals singly before pairing

Ref: O.P. Tandon

20. Aufbau principle states that

- 1). Highest energy filled first
- 2). Lowest energy filled first
- 3). Random filling
- 4). Pairing first

Correct Answer: 2) Lowest energy filled first

Solution:

Electrons fill orbitals in increasing energy order

Ref: P.C. Jain

21. The shape of s-orbital is

- 1). Dumbbell
- 2). Spherical
- 3). Double dumbbell
- 4). Linear

Correct Answer: 2) Spherical

Solution:

s-orbital has no directional character

Ref: Dara

22. The shape of p-orbital is

- 1). Spherical
- 2). Dumbbell
- 3). Circular
- 4). Square

Correct Answer: 2) Dumbbell

Solution:

p-orbitals have two lobes

Ref: J.D. Lee

23. The de Broglie equation is

- 1). $E = h\nu$
- 2). $\lambda = \frac{h}{mv}$
- 3). $PV = nRT$
- 4). $E = mc^2$

Correct Answer: 2) $\lambda = \frac{h}{mv}$

Solution:

Wave nature of particles

Ref: O.P. Tandon

24. The unit of wavelength is

- 1). Joule
- 2). Meter
- 3). Coulomb
- 4). Volt

Correct Answer: 2) Meter

Solution:

Wavelength is a length quantity

Ref: P.C. Jain

25. The photoelectric effect was explained by

- 1). Bohr
- 2). Einstein
- 3). Rutherford
- 4). Dalton

Correct Answer: 2) Einstein

Solution:

Einstein used photon theory

Ref: S.S. Dara

26. The threshold frequency is

- 1). Maximum frequency
- 2). Minimum frequency to eject electron
- 3). Average frequency
- 4). Zero frequency

Correct Answer: 2) Minimum frequency to eject electron

Solution:

Below this, no emission occurs

Ref: O.P. Tandon

27. The number of electrons in a d-subshell is

- 1). 6
- 2). 8
- 3). 10
- 4). 14

Correct Answer: 3) 10

Solution:

$$5 \text{ orbitals} \times 2 \text{ electrons} = 10$$

Ref: P.C. Jain

28. The number of electrons in f-subshell is

- 1). 10
- 2). 12
- 3). 14
- 4). 16

Correct Answer: 3) 14**Solution:**

$$7 \text{ orbitals} \times 2 = 14$$

Ref: Dara

29. The energy of electron in Bohr's orbit is proportional to

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

Correct Answer: 3) $1/n^2$ **Solution:**Energy decreases with increase in n **Ref:** O.P. Tandon

30. The atomic model proposed by Rutherford is based on

- 1). Cathode rays
- 2). Alpha particle scattering
- 3). Photoelectric effect
- 4). X-rays

Correct Answer: 2) Alpha particle scattering

Solution:

Gold foil experiment

Ref: Engineering Chemistry – P.C. Jain

 UNIT 2 — CHEMICAL BONDING **TOP 20 MOST REPEATED PYQs (AP ECET)**

1. The bond formed by transfer of electrons is called

- 1). Covalent bond
- 2). Ionic bond
- 3). Coordinate bond
- 4). Hydrogen bond

Correct Answer: 2) Ionic bond

Solution:

Ionic bond forms by complete transfer of electrons (metal → non-metal)

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The bond formed by sharing of electrons is called

- 1). Ionic bond
- 2). Covalent bond
- 3). Metallic bond
- 4). Hydrogen bond

Correct Answer: 2) Covalent bond

Solution:

Covalent bond involves mutual sharing of electron pairs

Ref: S.S. Dara & Umare

3. Electrovalency is defined as

- 1). Number of shared electrons
- 2). Number of electrons transferred
- 3). Number of protons
- 4). Atomic mass

Correct Answer: 2) Number of electrons transferred

Solution:

Electrovalency = electrons lost or gained

Ref: J.D. Lee

4. Covalency is defined as

- 1). Number of electrons transferred
- 2). Number of shared electrons
- 3). Number of neutrons
- 4). Atomic number

Correct Answer: 2) Number of shared electrons

Solution:

Covalency = number of electron pairs shared

Ref: O.P. Tandon

5. Which of the following is an ionic compound?

- 1). CH₄
- 2). NaCl
- 3). CO₂
- 4). H₂

Correct Answer: 2) NaCl

Solution:

Na (metal) + Cl (non-metal) → ionic bond

Ref: P.C. Jain

6. Which of the following is a covalent compound?

- 1). NaCl
- 2). KBr
- 3). H₂O
- 4). CaO

Correct Answer: 3) H₂O

Solution:

Non-metal + non-metal → covalent bond

Ref: Dara

7. A coordinate bond is formed by

- 1). Mutual sharing
- 2). Transfer of electrons
- 3). Donation of electron pair by one atom
- 4). Hydrogen attraction

Correct Answer: 3) Donation of electron pair by one atom

Solution:

One atom donates both electrons

Ref: J.D. Lee

8. Which of the following has coordinate bond?

- 1). NH₃
- 2). NH₄⁺
- 3). CH₄
- 4). H₂

Correct Answer: 2) NH₄⁺

Solution:

NH₃ donates lone pair to H⁺

Ref: P.C. Jain

9. Hydrogen bond is strongest in

- 1). HCl
- 2). H₂O
- 3). H₂S
- 4). NH₃

Correct Answer: 2) H₂O

Solution:

Oxygen is highly electronegative → strong H-bond

Ref: O.P. Tandon

10. The shape of methane (CH₄) is

- 1). Linear
- 2). Trigonal planar
- 3). Tetrahedral
- 4). Bent

Correct Answer: 3) Tetrahedral

Solution:

sp³ hybridization → tetrahedral

Ref: S.S. Dara

11. The hybridization of carbon in ethene (C₂H₄) is

- 1). sp
- 2). sp²
- 3). sp³
- 4). dsp²

Correct Answer: 2) sp²

Solution:

Double bond → sp² hybridization

Ref: Shashi Chawla

12. The hybridization of carbon in ethyne (C_2H_2) is

- 1). sp^3
- 2). sp^2
- 3). sp
- 4). dsp^3

Correct Answer: 3) sp

Solution:

Triple bond $\rightarrow$ sp hybridization

Ref: O.P. Tandon

13. The geometry of CO_2 molecule is

- 1). Bent
- 2). Linear
- 3). Trigonal planar
- 4). Tetrahedral

Correct Answer: 2) Linear

Solution:

No lone pairs $\rightarrow$ linear (180°)

Ref: P.C. Jain

14. The geometry of NH_3 is

- 1). Linear
- 2). Trigonal planar
- 3). Trigonal pyramidal
- 4). Tetrahedral

Correct Answer: 3) Trigonal pyramidal

Solution:

One lone pair $\rightarrow$ pyramidal shape

Ref: Dara

15. VSEPR theory is used to predict

- 1). Energy
- 2). Shape of molecules
- 3). Atomic number
- 4). Mass

Correct Answer: 2) Shape of molecules

Solution:

Based on electron pair repulsion

Ref: J.D. Lee

16. Bond angle in methane is

- 1). 90°
- 2). 120°
- 3). 109.5°
- 4). 180°

Correct Answer: 3) 109.5°

Solution:

Tetrahedral geometry

Ref: O.P. Tandon

17. Which bond is strongest?

- 1). Single bond
- 2). Double bond
- 3). Triple bond
- 4). Hydrogen bond

Correct Answer: 3) Triple bond

Solution:

More shared electrons $\rightarrow$ stronger bond

Ref: P.C. Jain

18. Which compound has polar covalent bond?

- 1). H_2
- 2). O_2
- 3). HCl
- 4). N_2

Correct Answer: 3) HCl

Solution:

Electronegativity difference $\rightarrow$ polar bond

Ref: Dara

19. Electronegativity is defined as

- 1). Ability to donate electrons
- 2). Ability to attract electrons
- 3). Number of electrons
- 4). Atomic size

Correct Answer: 2) Ability to attract electrons

Solution:

Higher electronegativity $\rightarrow$ stronger attraction

Ref: J.D. Lee

20. Which of the following has metallic bonding?

- 1). Na
- 2). H_2O
- 3). CO_2
- 4). NH_3

Correct Answer: 1) Na

Solution:

Metals have free electron cloud $\rightarrow$ metallic bond

Ref: Engineering Chemistry – P.C. Jain

UNIT 3 — SOLUTIONS** TOP 30 MOST REPEATED PYQs (AP ECET)**

1. Molarity is defined as

- 1). Moles of solute per kg of solvent
- 2). Moles of solute per liter of solution
- 3). Grams of solute per liter
- 4). Equivalent per liter

Correct Answer: 2) Moles of solute per liter of solution

Solution:

$$M = \frac{\text{moles of solute}}{\text{volume in liters}}$$

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Molality is defined as

- 1). Moles of solute per liter of solution
- 2). Moles of solute per kg of solvent
- 3). Grams per liter
- 4). Equivalent per liter

Correct Answer: 2) Moles of solute per kg of solvent

Solution:

Molality depends on mass, so independent of temperature

Ref: S.S. Dara

3. Normality is defined as

- 1). Moles per liter
- 2). Equivalents per liter
- 3). Grams per liter
- 4). Moles per kg

Correct Answer: 2) Equivalents per liter

Solution:

$$N = \frac{\text{gram equivalents}}{\text{volume in liters}}$$

Ref: O.P. Tandon

4. Mole fraction is defined as

- 1). Moles of solute / total moles
- 2). Mass of solute / mass of solution
- 3). Volume ratio
- 4). Equivalent ratio

Correct Answer: 1) Moles of solute / total moles

Solution:

$$X = \frac{n_i}{n_{total}}$$

Ref: J.D. Lee

5. The unit of molarity is

- 1). mol/kg
- 2). mol/L
- 3). g/L
- 4). eq/kg

Correct Answer: 2) mol/L

Solution:

Molarity is expressed in moles per liter

Ref: P.C. Jain

6. Which concentration is temperature independent?

- 1). Molarity
- 2). Normality
- 3). Molality
- 4). ppm

Correct Answer: 3) Molality

Solution:

Molality depends on mass, not volume

Ref: Dara

7. 1 mole of any substance contains

- 1). 6.022×10^{23} particles
- 2). 3×10^8 particles
- 3). 1.6×10^{-19} particles
- 4). 9.1×10^{-31} particles

Correct Answer: 1) 6.022×10^{23} particles

Solution:

Avogadro number

Ref: O.P. Tandon

8. ppm stands for

- 1). Parts per mole
- 2). Parts per million
- 3). Percentage per mass
- 4). Pressure per mole

Correct Answer: 2) Parts per million

Solution:

Used for very dilute solutions

Ref: P.C. Jain

9. A 1M solution contains

- 1). 1 mole in 100 mL
- 2). 1 mole in 1 liter
- 3). 1 mole in 1 kg
- 4). 1 gram in 1 liter

Correct Answer: 2) 1 mole in 1 liter

Solution:

Definition of molarity

Ref: Dara

10. The equivalent weight of an acid is

- 1). Molecular weight $\times$ basicity
- 2). Molecular weight / basicity
- 3). Basicity / molecular weight
- 4). Same as molecular weight

Correct Answer: 2) Molecular weight / basicity

Solution:

Equivalent weight depends on replaceable H^+

Ref: O.P. Tandon

11. The equivalent weight of a base is

- 1). Molecular weight $\times$ acidity
- 2). Molecular weight / acidity
- 3). Same as molar mass
- 4). Zero

Correct Answer: 2) Molecular weight / acidity

Solution:

Acidity = number of OH^- ions

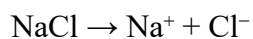
Ref: P.C. Jain

12. If 1 mole of NaCl is dissolved in water, number of particles becomes

- 1). 1 mole
- 2). 2 moles
- 3). 0.5 mole
- 4). 3 moles

Correct Answer: 2) 2 moles

Solution:



Ref: Dara

13. Colligative properties depend on

- 1). Nature of solute
- 2). Number of particles
- 3). Temperature only
- 4). Pressure only

Correct Answer: 2) Number of particles

Solution:

Independent of chemical nature

Ref: O.P. Tandon

14. Boiling point elevation depends on

- 1). Volume
- 2). Number of particles
- 3). Pressure only
- 4). Color

Correct Answer: 2) Number of particles

Solution:

More particles $\rightarrow$ higher boiling point

Ref: P.C. Jain

15. Freezing point depression occurs when

- 1). Solute is added
- 2). Solvent is removed
- 3). Temperature increases
- 4). Pressure decreases

Correct Answer: 1) Solute is added

Solution:

Solute lowers freezing point

Ref: Dara

16. Osmosis is the flow of

- 1). Solute
- 2). Solvent
- 3). Gas
- 4). Electrons

Correct Answer: 2) Solvent

Solution:

From dilute → concentrated solution

Ref: J.D. Lee

17. Osmotic pressure is given by

- 1). $PV = nRT$
- 2). $\pi = CRT$
- 3). $E = mc^2$
- 4). $E = h\nu$

Correct Answer: 2) $\pi = CRT$

Solution:

C = molar concentration

Ref: O.P. Tandon

18. The unit of molality is

- 1). mol/L
- 2). mol/kg
- 3). g/L
- 4). eq/L

Correct Answer: 2) mol/kg

Solution:

Molality uses mass of solvent

Ref: P.C. Jain

19. If dilution increases, molarity

- 1). Increases
- 2). Decreases
- 3). Remains constant
- 4). Becomes zero

Correct Answer: 2) Decreases

Solution:

Volume increases → concentration decreases

Ref: Dara

20. The relation between molarity and normality is

- 1). $N = M \times n\text{-factor}$
- 2). $M = N \times n\text{-factor}$
- 3). $N = M / n\text{-factor}$
- 4). No relation

Correct Answer: 1) $N = M \times n\text{-factor}$

Solution:

n-factor depends on reaction

Ref: O.P. Tandon

21. A 0.5 M solution means

- 1). 0.5 mole in 500 mL
- 2). 0.5 mole in 1 liter
- 3). 1 mole in 0.5 liter
- 4). 0.5 gram in 1 liter

Correct Answer: 2) 0.5 mole in 1 liter

Solution:

Definition of molarity

Ref: P.C. Jain

22. Dilution formula is

- 1). $M_1V_1 = M_2V_2$
- 2). $PV = nRT$
- 3). $E = h\nu$
- 4). $E = mc^2$

Correct Answer: 1) $M_1V_1 = M_2V_2$

Solution:

Used in dilution problems

Ref: Dara

23. The molar mass of NaCl is

- 1). 58.5 g/mol
- 2). 23 g/mol
- 3). 35.5 g/mol
- 4). 40 g/mol

Correct Answer: 1) 58.5 g/mol

Solution:

Na (23) + Cl (35.5)

Ref: O.P. Tandon

24. The concentration of very dilute solution is expressed in

- 1). Molarity
- 2). Molality
- 3). ppm
- 4). Normality

Correct Answer: 3) ppm

Solution:

Used for trace amounts

Ref: P.C. Jain

25. Raoult's law is applicable to

- 1). Ideal solutions
- 2). Non-ideal solutions
- 3). Strong electrolytes
- 4). Solids

Correct Answer: 1) Ideal solutions

Solution:

Applies when intermolecular forces are similar

Ref: Dara

26. Vapor pressure decreases when

- 1). Solute is added
- 2). Temperature increases
- 3). Pressure decreases
- 4). Volume decreases

Correct Answer: 1) Solute is added

Solution:

Non-volatile solute lowers vapor pressure

Ref: O.P. Tandon

27. Ideal solutions obey

- 1). Dalton's law
- 2). Raoult's law
- 3). Boyle's law
- 4). Charles law

Correct Answer: 2) Raoult's law

Solution:

Vapor pressure proportional to mole fraction

Ref: P.C. Jain

28. The unit of normality is

- 1). mol/L
- 2). eq/L
- 3). g/L
- 4). mol/kg

Correct Answer: 2) eq/L

Solution:

Based on equivalents

Ref: Dara

29. Colligative properties include

- 1). Boiling point
- 2). Freezing point
- 3). Osmotic pressure
- 4). All of these

Correct Answer: 4) All of these

Solution:

All depend on number of particles

Ref: O.P. Tandon

30. Strong electrolytes show

- 1). Partial dissociation
- 2). Complete dissociation
- 3). No dissociation
- 4). Slow reaction

Correct Answer: 2) Complete dissociation

Solution:

Example: NaCl, HCl

Ref: P.C. Jain

 UNIT 4 — ACIDS & BASES

 TOP 20 MOST REPEATED MCQs (AP ECET)

1. According to Arrhenius theory, an acid is a substance that

- 1). Donates OH^- ions
- 2). Gives H^+ ions in solution
- 3). Accepts protons
- 4). Donates electrons

Correct Answer: 2) Gives H^+ ions in solution

Solution:

Arrhenius acid $\rightarrow$ produces H^+ in aqueous solution

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. According to Arrhenius theory, a base is a substance that

- 1). Gives H^+ ions
- 2). Accepts electrons
- 3). Produces OH^- ions
- 4). Donates protons

Correct Answer: 3) Produces OH^- ions

Solution:

Arrhenius base $\rightarrow$ produces OH^- ions

Ref: S.S. Dara

3. According to Bronsted-Lowry theory, an acid is

- 1). Electron donor
- 2). Proton donor
- 3). Proton acceptor
- 4). Electron acceptor

Correct Answer: 2) Proton donor

Solution:

Acid $\rightarrow$ donates H^+

Ref: J.D. Lee

4. According to Bronsted-Lowry theory, a base is

- 1). Proton donor
- 2). Proton acceptor
- 3). Electron donor
- 4). Neutral

Correct Answer: 2) Proton acceptor

Solution:

Base $\rightarrow$ accepts H^+

Ref: O.P. Tandon

5. A conjugate base is formed when

- 1). Acid gains H^+
- 2). Acid loses H^+
- 3). Base loses OH^-
- 4). Salt forms

Correct Answer: 2) Acid loses H^+

Solution:

Acid $\rightarrow$ conjugate base after donating proton

Ref: P.C. Jain

6. The pH of a neutral solution at 25°C is

- 1). 0
- 2). 7
- 3). 14
- 4). 1

Correct Answer: 2) 7

Solution:

Neutral $\rightarrow [H^+] = [OH^-]$

Ref: Dara

7. The pH of an acidic solution is

- 1). >7
- 2). $=7$
- 3). <7
- 4). 14

Correct Answer: 3) <7

Solution:

Higher H^+ concentration $\rightarrow$ lower pH

Ref: O.P. Tandon

8. The pH of a basic solution is

- 1). <7
- 2). $=7$
- 3). >7
- 4). 0

Correct Answer: 3) >7

Solution:

Higher OH^- concentration

Ref: P.C. Jain

9. pH is defined as

- 1). $-\log [OH^-]$
- 2). $\log [H^+]$
- 3). $-\log [H^+]$
- 4). $\log [OH^-]$

Correct Answer: 3) $-\log [H^+]$

Solution:

Standard definition of pH

Ref: Dara

10. The ionic product of water (K_w) at 25°C is

- 1). 10^{-7}
- 2). 10^{-14}
- 3). 10^{-1}
- 4). 10^{14}

Correct Answer: 2) 10^{-14}

Solution:

$$K_w = [H^+][OH^-]$$

Ref: O.P. Tandon

11. If $\text{pH} = 3$, the solution is

- 1). Strongly basic
- 2). Neutral
- 3). Strongly acidic
- 4). Weakly basic

Correct Answer: 3) Strongly acidic

Solution:

Low pH $\rightarrow$ high acidity

Ref: P.C. Jain

12. If pH = 11, the solution is

- 1). Acidic
- 2). Neutral
- 3). Basic
- 4). Strong acid

Correct Answer: 3) Basic

Solution:

High pH $\rightarrow$ basic solution

Ref: Dara

13. The relation between pH and pOH is

- 1). $\text{pH} + \text{pOH} = 7$
- 2). $\text{pH} + \text{pOH} = 14$
- 3). $\text{pH} \times \text{pOH} = 14$
- 4). $\text{pH} - \text{pOH} = 14$

Correct Answer: 2) $\text{pH} + \text{pOH} = 14$

Solution:

Valid at 25°C

Ref: O.P. Tandon

14. A strong acid is one which

- 1). Partially ionizes
- 2). Completely ionizes
- 3). Does not ionize
- 4). Forms precipitate

Correct Answer: 2) Completely ionizes

Solution:

Example: HCl

Ref: P.C. Jain

15. A weak base is one which

- 1). Completely ionizes
- 2). Partially ionizes
- 3). Does not react
- 4). Strongly reacts

Correct Answer: 2) Partially ionizes

Solution:

Example: NH_3

Ref: Dara

16. The strength of acid depends on

- 1). Color
- 2). Concentration only
- 3). Degree of ionization
- 4). Volume

Correct Answer: 3) Degree of ionization

Solution:

More ionization $\rightarrow$ stronger acid

Ref: J.D. Lee

17. The indicator used in acid-base titration is

- 1). NaCl
- 2). Phenolphthalein
- 3). H_2O
- 4). CO_2

Correct Answer: 2) Phenolphthalein

Solution:

Changes color at endpoint

Ref: O.P. Tandon

18. In acidic medium, phenolphthalein is

- 1). Pink
- 2). Colorless
- 3). Yellow
- 4). Blue

Correct Answer: 2) Colorless

Solution:

Becomes pink in basic medium

Ref: P.C. Jain

19. The pH scale ranges from

- 1). 0–7
- 2). 7–14
- 3). 0–14
- 4). 1–10

Correct Answer: 3) 0–14

Solution:

Standard pH range

Ref: Dara

20. Which of the following is a strong acid?

- 1). CH_3COOH
- 2). HCl
- 3). NH_3
- 4). H_2O

Correct Answer: 2) HCl

Solution:

HCl completely ionizes

Ref: Engineering Chemistry – P.C. Jain

UNIT 5 — ELECTROCHEMISTRY

TOP 30 MOST REPEATED PYQs (AP ECET)

1. Electrochemistry deals with

- 1). Heat changes
- 2). Electrical energy and chemical reactions
- 3). Light energy
- 4). Nuclear energy

Correct Answer: 2) Electrical energy and chemical reactions

Solution:

Electrochemistry studies interconversion of chemical and electrical energy

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. A galvanic cell converts

- 1). Electrical → chemical energy
- 2). Chemical → electrical energy
- 3). Heat → electrical energy
- 4). Light → chemical energy

Correct Answer: 2) Chemical → electrical energy

Solution:

Spontaneous reaction produces electricity

Ref: S.S. Dara

3. An electrolytic cell converts

- 1). Chemical → electrical
- 2). Electrical → chemical
- 3). Heat → chemical
- 4). Light → electrical

Correct Answer: 2) Electrical → chemical

Solution:

Non-spontaneous reaction driven by electricity

Ref: O.P. Tandon

4. Oxidation is defined as

- 1). Gain of electrons
- 2). Loss of electrons
- 3). Gain of protons
- 4). Loss of neutrons

Correct Answer: 2) Loss of electrons

Solution:

Oxidation = electron loss

Ref: J.D. Lee

5. Reduction is defined as

- 1). Loss of electrons
- 2). Gain of electrons
- 3). Loss of protons
- 4). Gain of neutrons

Correct Answer: 2) Gain of electrons

Solution:

Reduction = electron gain

Ref: P.C. Jain

6. The electrode where oxidation occurs is

- 1). Cathode
- 2). Anode
- 3). Salt bridge
- 4). Electrolyte

Correct Answer: 2) Anode

Solution:

Oxidation always at anode

Ref: Dara

7. The electrode where reduction occurs is

- 1). Anode
- 2). Cathode
- 3). Salt bridge
- 4). Wire

Correct Answer: 2) Cathode

Solution:

Reduction always at cathode

Ref: O.P. Tandon

8. The flow of electrons in a circuit is from

- 1). Cathode $\rightarrow$ anode
- 2). Anode $\rightarrow$ cathode
- 3). Salt bridge $\rightarrow$ electrode
- 4). Electrolyte $\rightarrow$ electrode

Correct Answer: 2) Anode $\rightarrow$ cathode

Solution:

Electrons flow from oxidation to reduction

Ref: P.C. Jain

9. The unit of EMF is

- 1). Ampere
- 2). Volt
- 3). Ohm
- 4). Coulomb

Correct Answer: 2) Volt

Solution:

EMF is potential difference

Ref: Dara

10. Standard electrode potential is measured at

- 1). 0°C
- 2). 25°C
- 3). 100°C
- 4). 50°C

Correct Answer: 2) 25°C

Solution:

Standard conditions → 25°C

Ref: O.P. Tandon

11. The standard hydrogen electrode (SHE) has potential

- 1). 1 V
- 2). 0 V
- 3). -1 V
- 4). 0.5 V

Correct Answer: 2) 0 V

Solution:

Reference electrode

Ref: P.C. Jain

12. EMF of a cell is given by

- 1). $E_{cell} = E_{anode} + E_{cathode}$
- 2). $E_{cell} = E_{cathode} - E_{anode}$
- 3). $E_{cell} = IR$
- 4). $E = mc^2$

Correct Answer: 2) $E_{cell} = E_{cathode} - E_{anode}$

Solution:

Key formula for numericals

Ref: Dara

13. The unit of conductance is

- 1). Ohm
- 2). Ohm^{-1}
- 3). Volt
- 4). Ampere

Correct Answer: 2) Ohm^{-1}

Solution:

Conductance = reciprocal of resistance

Ref: O.P. Tandon

14. Specific conductance is also called

- 1). Resistivity
- 2). Conductivity
- 3). Voltage
- 4). Current

Correct Answer: 2) Conductivity

Solution:

k = conductivity

Ref: P.C. Jain

15. The unit of conductivity is

- 1). S cm^{-1}
- 2). Ohm
- 3). Volt
- 4). Ampere

Correct Answer: 1) S cm^{-1}

Solution:

S = Siemens

Ref: Dara

16. Faraday's constant is

- 1). 96500 C/mol
- 2). 6.022×10^{23}
- 3). 1.6×10^{-19}
- 4). 9.1×10^{-31}

Correct Answer: 1) 96500 C/mol

Solution:

Charge of 1 mole electrons

Ref: O.P. Tandon

17. According to Faraday's first law

- 1). Mass $\propto$ time
- 2). Mass $\propto$ current
- 3). Mass $\propto$ charge passed
- 4). Mass $\propto$ voltage

Correct Answer: 3) Mass $\propto$ charge passed

Solution:

$m \propto It$

Ref: P.C. Jain

18. Faraday's second law states

- 1). Mass $\propto$ time
- 2). Mass $\propto$ equivalent weight
- 3). Mass $\propto$ voltage
- 4). Mass $\propto$ resistance

Correct Answer: 2) Mass $\propto$ equivalent weight

Solution:

$$m_1/m_2 = E_1/E_2$$

Ref: Dara

19. The product of current and time gives

- 1). Voltage
- 2). Charge
- 3). Resistance
- 4). Power

Correct Answer: 2) Charge**Solution:**

$$Q = It$$

Ref: O.P. Tandon

20. The unit of charge is

- 1). Volt
- 2). Coulomb
- 3). Ohm
- 4). Ampere

Correct Answer: 2) Coulomb**Solution:**

SI unit of charge

Ref: P.C. Jain

21. If current = 2 A and time = 10 s, charge is

- 1). 5 C
- 2). 10 C
- 3). 20 C
- 4). 2 C

Correct Answer: 3) 20 C

Solution:

$$Q = It = 2 \times 10 = 20 \text{ C}$$

Ref: Dara

22. Equivalent weight is given by

- 1). Molecular weight $\times$ valency
- 2). Molecular weight / valency
- 3). Valency / molecular weight
- 4). Same as atomic weight

Correct Answer: 2) Molecular weight / valency**Solution:**

Used in electrolysis calculations

Ref: O.P. Tandon

23. Conductance increases with

- 1). Decrease in ions
- 2). Increase in ions
- 3). No ions
- 4). Solid formation

Correct Answer: 2) Increase in ions**Solution:**More ions $\rightarrow$ more conductivity**Ref:** P.C. Jain

24. Strong electrolytes show

- 1). Partial dissociation
- 2). Complete dissociation
- 3). No dissociation
- 4). Slow dissociation

Correct Answer: 2) Complete dissociation

Solution:

Example: HCl, NaCl

Ref: Dara

25. Weak electrolytes show

- 1). Complete dissociation
- 2). Partial dissociation
- 3). No dissociation
- 4). Strong reaction

Correct Answer: 2) Partial dissociation

Solution:

Example: CH₃COOH

Ref: O.P. Tandon

26. The salt bridge in a galvanic cell

- 1). Produces electrons
- 2). Maintains electrical neutrality
- 3). Stops reaction
- 4). Increases voltage

Correct Answer: 2) Maintains electrical neutrality

Solution:

Allows ion flow

Ref: P.C. Jain

27. Oxidizing agent is

- 1). Electron donor
- 2). Electron acceptor
- 3). Neutral
- 4). Catalyst

Correct Answer: 2) Electron acceptor

Solution:

Gets reduced

Ref: Dara

28. Reducing agent is

- 1). Electron donor
- 2). Electron acceptor
- 3). Neutral
- 4). Inert

Correct Answer: 1) Electron donor

Solution:

Gets oxidized

Ref: O.P. Tandon

29. EMF of a cell increases when

- 1). Temperature decreases
- 2). Reactivity difference increases
- 3). Pressure increases
- 4). Volume decreases

Correct Answer: 2) Reactivity difference increases

Solution:

Greater potential difference

Ref: P.C. Jain

30. Electrolysis is used in

- 1). Corrosion
- 2). Electroplating
- 3). Combustion
- 4). Neutralization

Correct Answer: 2) Electroplating

Solution:

Metal coating using electricity

Ref: Engineering Chemistry – P.C. Jain

 UNIT 6 — WATER TECHNOLOGY **TOP 30 MOST REPEATED MCQs (AP ECET)**

1. Hardness of water is due to presence of

- 1). Na^+ and K^+
- 2). Ca^{2+} and Mg^{2+}
- 3). Cl^- and SO_4^{2-}
- 4). H^+ ions

Correct Answer: 2) Ca^{2+} and Mg^{2+}

Solution:

Hardness is mainly caused by calcium and magnesium salts

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Temporary hardness is due to

- 1). Chlorides
- 2). Sulphates
- 3). Bicarbonates
- 4). Nitrates

Correct Answer: 3) Bicarbonates

Solution:

$\text{Ca}(\text{HCO}_3)_2$ and $\text{Mg}(\text{HCO}_3)_2$ cause temporary hardness

Ref: S.S. Dara

3. Permanent hardness is due to

- 1). Bicarbonates
- 2). Carbonates
- 3). Sulphates and chlorides
- 4). Hydroxides

Correct Answer: 3) Sulphates and chlorides

Solution:

CaSO_4 , MgCl_2 cause permanent hardness

Ref: O.P. Tandon

4. Temporary hardness can be removed by

- 1). Filtration
- 2). Boiling
- 3). Distillation
- 4). Chlorination

Correct Answer: 2) Boiling

Solution:

Bicarbonates decompose on heating

Ref: P.C. Jain

5. Permanent hardness is removed by

- 1). Boiling
- 2). Clark's method
- 3). Ion exchange
- 4). Cooling

Correct Answer: 3) Ion exchange

Solution:

Zeolite/ion exchange removes permanent hardness

Ref: Dara

6. The process of removing hardness is called

- 1). Filtration
- 2). Softening
- 3). Sedimentation
- 4). Distillation

Correct Answer: 2) Softening

Solution:

Hard water → soft water

Ref: O.P. Tandon

7. EDTA method is used to determine

- 1). pH
- 2). Hardness
- 3). Conductivity
- 4). Temperature

Correct Answer: 2) Hardness

Solution:

Complexometric titration

Ref: P.C. Jain

8. Unit of hardness is

- 1). ppm
- 2). mol/L
- 3). kg
- 4). atm

Correct Answer: 1) ppm

Solution:

Expressed as CaCO_3 equivalent

Ref: Dara

9. Zeolite process removes

- 1). Temporary hardness
- 2). Permanent hardness
- 3). Both
- 4). None

Correct Answer: 3) Both

Solution:

Ion exchange replaces Ca^{2+} , Mg^{2+}

Ref: O.P. Tandon

10. Lime-soda process is used for

- 1). Filtration
- 2). Softening
- 3). Chlorination
- 4). Distillation

Correct Answer: 2) Softening

Solution:

Removes both types of hardness

Ref: P.C. Jain

11. The chemical used in Clark's method is

- 1). NaCl
- 2). $\text{Ca}(\text{OH})_2$
- 3). HCl
- 4). NaOH

Correct Answer: 2) $\text{Ca}(\text{OH})_2$

Solution:

Lime removes temporary hardness

Ref: Dara

12. Reverse osmosis is used for

- 1). Softening
- 2). Purification
- 3). Distillation
- 4). Sedimentation

Correct Answer: 2) Purification

Solution:

Removes dissolved salts

Ref: O.P. Tandon

13. Boiler scale is formed due to

- 1). Soft water
- 2). Hard water
- 3). Distilled water
- 4). Rain water

Correct Answer: 2) Hard water

Solution:

Salts deposit inside boiler

Ref: P.C. Jain

14. Sludge in boilers is

- 1). Hard deposit
- 2). Soft deposit
- 3). Gas
- 4). Liquid

Correct Answer: 2) Soft deposit

Solution:

Loosely adhering impurities

Ref: Dara

15. Scale formation leads to

- 1). Increased efficiency
- 2). Reduced efficiency
- 3). No change
- 4). Cooling

Correct Answer: 2) Reduced efficiency

Solution:

Blocks heat transfer

Ref: O.P. Tandon

16. Priming in boilers is

- 1). Carrying water with steam
- 2). Heating
- 3). Cooling
- 4). Filtration

Correct Answer: 1) Carrying water with steam

Solution:

Leads to wet steam

Ref: P.C. Jain

17. Foaming is caused by

- 1). Oil
- 2). Salt
- 3). Water
- 4). Air

Correct Answer: 1) Oil

Solution:

Oil reduces surface tension

Ref: Dara

18. Internal treatment of water is done by

- 1). Filtration
- 2). Chemical addition inside boiler
- 3). Distillation
- 4). Cooling

Correct Answer: 2) Chemical addition inside boiler

Solution:

Prevents scale formation

Ref: O.P. Tandon

19. External treatment of water includes

- 1). Filtration
- 2). Ion exchange
- 3). Both
- 4). None

Correct Answer: 3) Both

Solution:

Done before entering boiler

Ref: P.C. Jain

20. Desalination removes

- 1). Hardness
- 2). Salts
- 3). Gases
- 4). Oil

Correct Answer: 2) Salts

Solution:

Used for seawater

Ref: Dara

21. Potable water means

- 1). Hard water
- 2). Drinking water
- 3). Waste water
- 4). Sea water

Correct Answer: 2) Drinking water

Solution:

Safe for consumption

Ref: O.P. Tandon

22. Chlorination is used for

- 1). Softening
- 2). Disinfection
- 3). Filtration
- 4). Cooling

Correct Answer: 2) Disinfection

Solution:

Kills bacteria

Ref: P.C. Jain

23. Breakpoint chlorination ensures

- 1). Removal of hardness
- 2). Complete disinfection
- 3). Color removal
- 4). Temperature control

Correct Answer: 2) Complete disinfection

Solution:

Excess chlorine ensures safety

Ref: Dara

24. pH of pure water is

- 1). 0
- 2). 7
- 3). 14
- 4). 1

Correct Answer: 2) 7

Solution:

Neutral water

Ref: O.P. Tandon

25. Hard water does not lather with

- 1). Soap
- 2). Detergent
- 3). Acid
- 4). Base

Correct Answer: 1) Soap

Solution:

Forms scum with Ca^{2+}

Ref: P.C. Jain

26. Soft water lathers easily with

- 1). Oil
- 2). Soap
- 3). Salt
- 4). Acid

Correct Answer: 2) Soap

Solution:

No $\text{Ca}^{2+}/\text{Mg}^{2+}$ ions

Ref: Dara

27. Scale is mainly composed of

- 1). CaCO_3
- 2). NaCl
- 3). HCl
- 4). CO_2

Correct Answer: 1) CaCO_3

Solution:

Common scale-forming compound

Ref: O.P. Tandon

28. Ion exchange resin replaces Ca^{2+} with

- 1). Na^+
- 2). Cl^-
- 3). OH^-
- 4). H^+

Correct Answer: 1) Na^+

Solution:

Softening process

Ref: P.C. Jain

29. Demineralization removes

- 1). Only hardness
- 2). All ions
- 3). Only Ca^{2+}
- 4). Only Mg^{2+}

Correct Answer: 2) All ions

Solution:

Produces pure water

Ref: Dara

30. The main purpose of water treatment is

- 1). Color change
- 2). Purification
- 3). Heating
- 4). Cooling

Correct Answer: 2) Purification

Solution:

Removes impurities

Ref: Engineering Chemistry – P.C. Jain

 UNIT 7 — CORROSION **TOP 20 MOST REPEATED MCQs (AP ECET)**

1. Corrosion is defined as

- 1). Formation of alloys
- 2). Deterioration of metal due to environment
- 3). Heating of metal
- 4). Cooling of metal

Correct Answer: 2) Deterioration of metal due to environment

Solution:

Metal reacts with surroundings → gets damaged

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Rusting of iron is an example of

- 1). Chemical corrosion
- 2). Electrochemical corrosion
- 3). Thermal corrosion
- 4). Mechanical corrosion

Correct Answer: 2) Electrochemical corrosion

Solution:

Occurs via anodic and cathodic reactions

Ref: S.S. Dara

3. Rust is chemically

- 1). Fe_2O_3
- 2). $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
- 3). FeO
- 4). Fe_3O_4

Correct Answer: 2) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

Solution:

Hydrated ferric oxide

Ref: O.P. Tandon

4. Corrosion involves

- 1). Only oxidation
- 2). Only reduction
- 3). Both oxidation and reduction
- 4). No reaction

Correct Answer: 3) Both oxidation and reduction

Solution:

Redox process

Ref: J.D. Lee

5. The anodic reaction in corrosion is

- 1). Gain of electrons
- 2). Loss of electrons
- 3). No change
- 4). Neutralization

Correct Answer: 2) Loss of electrons

Solution:

Metal $\rightarrow$ metal ions + electrons

Ref: P.C. Jain

6. The cathodic reaction involves

- 1). Oxidation
- 2). Reduction
- 3). Neutralization
- 4). Dissolution

Correct Answer: 2) Reduction

Solution:



Ref: Dara

7. Presence of moisture

- 1). Prevents corrosion
- 2). Accelerates corrosion
- 3). Has no effect
- 4). Stops reaction

Correct Answer: 2) Accelerates corrosion

Solution:

Acts as electrolyte

Ref: O.P. Tandon

8. Corrosion is faster in

- 1). Dry air
- 2). Moist air
- 3). Vacuum
- 4). Pure metal

Correct Answer: 2) Moist air

Solution:

Water + oxygen $\rightarrow$ corrosion

Ref: P.C. Jain

9. Galvanization involves coating of iron with

- 1). Copper
- 2). Zinc
- 3). Aluminium
- 4). Nickel

Correct Answer: 2) Zinc

Solution:

Zinc protects iron (sacrificial protection)

Ref: Dara

10. Tinning involves coating of iron with

- 1). Zinc
- 2). Tin
- 3). Copper
- 4). Aluminium

Correct Answer: 2) Tin

Solution:

Used in food containers

Ref: O.P. Tandon

11. Cathodic protection prevents corrosion by

- 1). Heating
- 2). Making metal cathode
- 3). Cooling
- 4). Removing oxygen

Correct Answer: 2) Making metal cathode

Solution:

Prevents oxidation

Ref: P.C. Jain

12. Sacrificial protection uses

- 1). Less reactive metal
- 2). More reactive metal
- 3). Non-metal
- 4). Inert gas

Correct Answer: 2) More reactive metal

Solution:

Example: Zn protects Fe

Ref: Dara

13. Painting prevents corrosion by

- 1). Chemical reaction
- 2). Physical barrier
- 3). Heating
- 4). Cooling

Correct Answer: 2) Physical barrier

Solution:

Blocks air and moisture

Ref: O.P. Tandon

14. Alloying reduces corrosion by

- 1). Increasing reactivity
- 2). Decreasing reactivity
- 3). No effect
- 4). Increasing weight

Correct Answer: 2) Decreasing reactivity

Solution:

Example: stainless steel

Ref: P.C. Jain

15. Stainless steel contains

- 1). Fe + Cu
- 2). Fe + Cr + Ni
- 3). Fe + Zn
- 4). Fe + Al

Correct Answer: 2) Fe + Cr + Ni

Solution:

Chromium forms protective layer

Ref: Dara

16. Corrosion rate increases with

- 1). Decrease in temperature
- 2). Increase in temperature
- 3). No change
- 4). Low pressure

Correct Answer: 2) Increase in temperature

Solution:

Higher temperature → faster reaction

Ref: O.P. Tandon

17. Impurities in metal

- 1). Reduce corrosion
- 2). Increase corrosion
- 3). No effect
- 4). Stop corrosion

Correct Answer: 2) Increase corrosion

Solution:

Creates galvanic cells

Ref: P.C. Jain

18. Passivation means

- 1). Increase corrosion
- 2). Formation of protective layer
- 3). Removal of metal
- 4). Heating

Correct Answer: 2) Formation of protective layer

Solution:

Prevents further corrosion

Ref: Dara

19. The electrolyte in corrosion is

- 1). Air
- 2). Water with dissolved salts
- 3). Metal
- 4). Oil

Correct Answer: 2) Water with dissolved salts

Solution:

Conducts ions

Ref: O.P. Tandon

20. Corrosion can be prevented by

- 1). Painting
- 2). Galvanizing
- 3). Cathodic protection
- 4). All of these

Correct Answer: 4) All of these

Solution:

All methods reduce corrosion

Ref: Engineering Chemistry – P.C. Jain

 UNIT 8 — POLYMERS **TOP 40 MOST REPEATED MCQs (AP ECET)**

1. A polymer is a substance of

- 1). Small molecules
- 2). Large molecules
- 3). Gases
- 4). Liquids

Correct Answer: 2) Large molecules

Solution:

Polymers are macromolecules made of repeating units

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The small units that form polymers are called

- 1). Isomers
- 2). Monomers
- 3). Polymers
- 4). Radicals

Correct Answer: 2) Monomers

Solution:

Monomers join to form polymers

Ref: S.S. Dara

3. Polymerization is the process of

- 1). Breaking molecules
- 2). Forming polymers
- 3). Cooling
- 4). Heating

Correct Answer: 2) Forming polymers

Solution:

Monomers combine to form polymer

Ref: O.P. Tandon

4. Addition polymerization involves

- 1). Elimination of small molecules
- 2). No elimination
- 3). Decomposition
- 4). Oxidation

Correct Answer: 2) No elimination

Solution:

Example: polyethylene

Ref: P.C. Jain

5. Condensation polymerization involves

- 1). No by-product
- 2). Elimination of small molecules
- 3). Only heat
- 4). Only pressure

Correct Answer: 2) Elimination of small molecules

Solution:

Example: nylon

Ref: Dara

6. Polyethylene is formed from

- 1). Ethane
- 2). Ethene
- 3). Methane
- 4). Propane

Correct Answer: 2) Ethene

Solution:

$\text{CH}_2=\text{CH}_2 \rightarrow \text{polyethylene}$

Ref: O.P. Tandon

7. PVC is formed from

- 1). Ethene
- 2). Vinyl chloride
- 3). Benzene
- 4). Methane

Correct Answer: 2) Vinyl chloride

Solution:

$\text{CH}_2=\text{CHCl}$

Ref: P.C. Jain

8. Teflon is polymer of

- 1). Ethene
- 2). Tetrafluoroethylene
- 3). Propene
- 4). Styrene

Correct Answer: 2) Tetrafluoroethylene

Solution:

Highly inert polymer

Ref: Dara

9. Bakelite is a

- 1). Thermoplastic
- 2). Thermosetting polymer
- 3). Elastomer
- 4). Fibre

Correct Answer: 2) Thermosetting polymer

Solution:

Hard, heat-resistant

Ref: O.P. Tandon

10. Nylon-6,6 is formed from

- 1). Hexamethylene diamine + adipic acid
- 2). Ethene
- 3). Benzene
- 4). Methane

Correct Answer: 1) Hexamethylene diamine + adipic acid

Solution:

Condensation polymer

Ref: P.C. Jain

11. Natural polymer is

- 1). PVC
- 2). Nylon
- 3). Rubber
- 4). Bakelite

Correct Answer: 3) Rubber

Solution:

Occurs naturally

Ref: Dara

12. Synthetic polymer is

- 1). Protein
- 2). Cellulose
- 3). Nylon
- 4). Starch

Correct Answer: 3) Nylon

Solution:

Man-made polymer

Ref: O.P. Tandon

13. Thermoplastics can be

- 1). Melted repeatedly
- 2). Used once
- 3). Broken easily
- 4). Not shaped

Correct Answer: 1) Melted repeatedly

Solution:

Example: polyethylene

Ref: P.C. Jain

14. Thermosetting plastics

- 1). Melt again
- 2). Cannot be remolded
- 3). Soft
- 4). Flexible

Correct Answer: 2) Cannot be remolded

Solution:

Cross-linked structure

Ref: Dara

15. Elastomers are

- 1). Rigid
- 2). Elastic
- 3). Hard
- 4). Brittle

Correct Answer: 2) Elastic

Solution:

Example: rubber

Ref: O.P. Tandon

16. Fibre polymers are

- 1). Soft
- 2). Strong and thread-like
- 3). Liquid
- 4). Gas

Correct Answer: 2) Strong and thread-like

Solution:

Example: nylon

Ref: P.C. Jain

17. Polymer with cross-linking is

- 1). Thermoplastic
- 2). Thermosetting
- 3). Elastomer
- 4). Fibre

Correct Answer: 2) Thermosetting

Solution:

Network structure

Ref: Dara

18. Polystyrene is formed from

- 1). Ethene
- 2). Styrene
- 3). Benzene
- 4). Methane

Correct Answer: 2) Styrene

Solution:

Addition polymer

Ref: O.P. Tandon

19. Rubber is polymer of

- 1). Isoprene
- 2). Ethene
- 3). Propene
- 4). Benzene

Correct Answer: 1) Isoprene

Solution:

Natural rubber

Ref: P.C. Jain

20. Vulcanization improves

- 1). Softness
- 2). Elasticity and strength
- 3). Melting
- 4). Color

Correct Answer: 2) Elasticity and strength

Solution:

Sulfur cross-links

Ref: Dara

21. Buna-S rubber is made from

- 1). Styrene + butadiene
- 2). Ethene
- 3). Methane
- 4). Benzene

Correct Answer: 1) Styrene + butadiene

Solution:

Synthetic rubber

Ref: O.P. Tandon

22. Neoprene is polymer of

- 1). Chloroprene
- 2). Ethene
- 3). Benzene
- 4). Propene

Correct Answer: 1) Chloroprene

Solution:

Synthetic rubber

Ref: P.C. Jain

23. Degree of polymerization means

- 1). Number of atoms
- 2). Number of repeating units
- 3). Weight
- 4). Volume

Correct Answer: 2) Number of repeating units

Solution:

Higher DP → larger polymer

Ref: Dara

24. Biodegradable polymer is

- 1). PVC
- 2). Nylon
- 3). PHBV
- 4). Teflon

Correct Answer: 3) PHBV

Solution:

Eco-friendly polymer

Ref: O.P. Tandon

25. Polyester is formed by

- 1). Addition reaction
- 2). Condensation reaction
- 3). Oxidation
- 4). Reduction

Correct Answer: 2) Condensation reaction

Solution:

Eliminates water

Ref: P.C. Jain

26. Kevlar is used for

- 1). Toys
- 2). Bulletproof jackets
- 3). Pipes
- 4). Bottles

Correct Answer: 2) Bulletproof jackets

Solution:

Very strong fibre

Ref: Dara

27. Which is thermoplastic?

- 1). Bakelite
- 2). PVC
- 3). Rubber
- 4). Nylon-66

Correct Answer: 2) PVC

Solution:

Can be remolded

Ref: O.P. Tandon

28. Which is thermosetting?

- 1). PVC
- 2). Bakelite
- 3). Polythene
- 4). Nylon

Correct Answer: 2) Bakelite

Solution:

Permanent shape

Ref: P.C. Jain

29. Polymer used in non-stick cookware

- 1). Nylon
- 2). PVC
- 3). Teflon
- 4). Rubber

Correct Answer: 3) Teflon

Solution:

Heat-resistant

Ref: Dara

30. Polymer used in bottles

- 1). PET
- 2). Bakelite
- 3). Rubber
- 4). Nylon

Correct Answer: 1) PET

Solution:

Polyethylene terephthalate

Ref: O.P. Tandon

31. PET is used for

- 1). Pipes
- 2). Bottles
- 3). Rubber
- 4). Coating

Correct Answer: 2) Bottles

Solution:

Common plastic

Ref: P.C. Jain

32. Nylon is a

- 1). Thermosetting
- 2). Fibre
- 3). Elastomer
- 4). Liquid

Correct Answer: 2) Fibre

Solution:

Strong synthetic fibre

Ref: Dara

33. Polymers are generally

- 1). Low molecular weight
- 2). High molecular weight
- 3). Medium
- 4). Fixed

Correct Answer: 2) High molecular weight

Solution:

Macromolecules

Ref: O.P. Tandon

34. Which polymer is biodegradable?

- 1). PVC
- 2). Nylon
- 3). PHBV
- 4). Teflon

Correct Answer: 3) PHBV

Solution:

Breaks naturally

Ref: P.C. Jain

35. The repeating unit in polyethylene is

- 1). CH_4
- 2). CH_2
- 3). $\text{CH}_2\text{—CH}_2$
- 4). C_2H_6

Correct Answer: 3) $\text{CH}_2\text{—CH}_2$

Solution:

From ethene

Ref: Dara

36. Polymerization of ethene is

- 1). Condensation
- 2). Addition
- 3). Oxidation
- 4). Reduction

Correct Answer: 2) Addition

Solution:

No by-product

Ref: O.P. Tandon

37. Rubber becomes hard on vulcanization due to

- 1). Oxygen
- 2). Sulfur
- 3). Nitrogen
- 4). Hydrogen

Correct Answer: 2) Sulfur

Solution:

Cross-linking

Ref: P.C. Jain

38. Synthetic rubber is

- 1). Natural
- 2). Man-made
- 3). Mineral
- 4). Gas

Correct Answer: 2) Man-made

Solution:

Prepared artificially

Ref: Dara

39. Polymers used in fibres are

- 1). Weak
- 2). Strong
- 3). Liquid
- 4). Gas

Correct Answer: 2) Strong

Solution:

High tensile strength

Ref: O.P. Tandon

40. The main advantage of polymers is

- 1). High cost
- 2). Light weight and durability
- 3). Heavy weight
- 4). Low strength

Correct Answer: 2) Light weight and durability

Solution:

Widely used materials

Ref: Engineering Chemistry – P.C. Jain

 UNIT 9 — FUELS **TOP 10 MOST REPEATED MCQs (AP ECET)**

1. A fuel is a substance which

- 1). Produces light
- 2). Produces heat on combustion
- 3). Produces sound
- 4). Produces electricity

Correct Answer: 2) Produces heat on combustion

Solution:

Fuel releases energy (heat) when burned

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. The calorific value of a fuel is

- 1). Temperature
- 2). Heat produced by complete combustion

- 3). Pressure
- 4). Volume

Correct Answer: 2) Heat produced by complete combustion

Solution:

Measured in kJ/kg

Ref: S.S. Dara

3. The unit of calorific value is

- 1). kJ/kg
- 2). kg
- 3). °C
- 4). atm

Correct Answer: 1) kJ/kg

Solution:

Energy per unit mass

Ref: O.P. Tandon

4. A good fuel should have

- 1). Low calorific value
- 2). High calorific value
- 3). High moisture
- 4). Low ignition temperature

Correct Answer: 2) High calorific value

Solution:

More energy output

Ref: P.C. Jain

5. The ignition temperature is

- 1). Maximum temperature
- 2). Minimum temperature to start combustion

- 3). Average temperature
- 4). Boiling point

Correct Answer: 2) Minimum temperature to start combustion

Solution:

Fuel must reach this temperature to burn

Ref: Dara

6. Which of the following is a gaseous fuel?

- 1). Coal
- 2). Petrol
- 3). LPG
- 4). Wood

Correct Answer: 3) LPG

Solution:

Liquefied petroleum gas

Ref: O.P. Tandon

7. The main component of LPG is

- 1). Methane
- 2). Butane and propane
- 3). Ethane
- 4). Hydrogen

Correct Answer: 2) Butane and propane

Solution:

Mixture of hydrocarbons

Ref: P.C. Jain

8. The main component of CNG is

- 1). Methane
- 2). Ethane

- 3). Propane
- 4). Butane

Correct Answer: 1) Methane

Solution:

Compressed natural gas

Ref: Dara

9. Solid fuel is

- 1). LPG
- 2). Petrol
- 3). Coal
- 4). Diesel

Correct Answer: 3) Coal

Solution:

Example of solid fuel

Ref: O.P. Tandon

10. Liquid fuel is

- 1). Coal
- 2). LPG
- 3). Petrol
- 4). Wood

Correct Answer: 3) Petrol

Solution:

Common liquid fuel

Ref: Engineering Chemistry – P.C. Jain

UNIT 10 — ENVIRONMENTAL CHEMISTRY**TOP 20 MOST REPEATED MCQs (AP ECET)**

1. Environment means

- 1). Only air
- 2). Surroundings of living organisms
- 3). Only water
- 4). Only land

Correct Answer: 2) Surroundings of living organisms

Solution:

Includes air, water, land, and living beings

Ref: Engineering Chemistry – P.C. Jain & Monica Jain

2. Air pollution is caused by

- 1). Oxygen
- 2). Pollutants in air
- 3). Nitrogen
- 4). Water vapor

Correct Answer: 2) Pollutants in air

Solution:

Harmful substances in atmosphere

Ref: S.S. Dara

3. The main air pollutant is

- 1). Oxygen
- 2). Nitrogen
- 3). Carbon monoxide
- 4). Hydrogen

Correct Answer: 3) Carbon monoxide

Solution:

CO is toxic gas

Ref: O.P. Tandon

4. Water pollution is caused by

- 1). Pure water
- 2). Contaminants
- 3). Oxygen
- 4). Sunlight

Correct Answer: 2) Contaminants

Solution:

Industrial and domestic waste

Ref: P.C. Jain

5. Soil pollution is due to

- 1). Clean water
- 2). Fertilizers and pesticides
- 3). Oxygen
- 4). Air

Correct Answer: 2) Fertilizers and pesticides

Solution:

Chemicals degrade soil

Ref: Dara

6. Greenhouse gas is

- 1). O₂
- 2). CO₂
- 3). N₂
- 4). He

Correct Answer: 2) CO₂

Solution:

Traps heat

Ref: O.P. Tandon

7. Global warming is caused by

- 1). Oxygen
- 2). Greenhouse gases
- 3). Nitrogen
- 4). Water

Correct Answer: 2) Greenhouse gases

Solution:

CO₂, CH₄ increase temperature

Ref: P.C. Jain

8. Ozone layer protects from

- 1). Infrared rays
- 2). UV rays
- 3). Visible light
- 4). Heat

Correct Answer: 2) UV rays

Solution:

Absorbs harmful radiation

Ref: Dara

9. Ozone depletion is caused by

- 1). CO₂
- 2). CFCs
- 3). O₂
- 4). N₂

Correct Answer: 2) CFCs

Solution:

Chlorofluorocarbons destroy ozone

Ref: O.P. Tandon

10. Acid rain is caused by

- 1). CO_2
- 2). SO_2 and NO_2
- 3). O_2
- 4). H_2

Correct Answer: 2) SO_2 and NO_2

Solution:

Forms H_2SO_4 and HNO_3

Ref: P.C. Jain

11. pH of acid rain is

- 1). >7
- 2). $=7$
- 3). <7
- 4). 14

Correct Answer: 3) <7

Solution:

Acidic nature

Ref: Dara

12. BOD stands for

- 1). Biological Oxygen Demand
- 2). Basic Oxygen Demand
- 3). Binary Oxygen Demand
- 4). Balanced Oxygen Demand

Correct Answer: 1) Biological Oxygen Demand

Solution:

Indicates organic pollution

Ref: O.P. Tandon

13. High BOD indicates

- 1). Clean water
- 2). Polluted water
- 3). Pure oxygen
- 4). No pollution

Correct Answer: 2) Polluted water

Solution:

More oxygen consumed by microbes

Ref: P.C. Jain

14. Eutrophication is caused by

- 1). Oxygen
- 2). Nutrients
- 3). Nitrogen gas
- 4). Sunlight

Correct Answer: 2) Nutrients

Solution:

Excess nutrients → algal growth

Ref: Dara

15. Noise pollution is measured in

- 1). Pascal
- 2). Decibel
- 3). Joule
- 4). Watt

Correct Answer: 2) Decibel

Solution:

dB is unit of sound

Ref: O.P. Tandon

16. Smog is a mixture of

- 1). Smoke + fog
- 2). Water + air
- 3). Dust + gas
- 4). Oxygen + nitrogen

Correct Answer: 1) Smoke + fog

Solution:

Air pollution phenomenon

Ref: P.C. Jain

17. Photochemical smog involves

- 1). CO₂
- 2). NO₂ and hydrocarbons
- 3). O₂
- 4). H₂

Correct Answer: 2) NO₂ and hydrocarbons

Solution:

Sunlight-driven reactions

Ref: Dara

18. The main source of water pollution is

- 1). Rain
- 2). Industrial waste
- 3). Sunlight
- 4). Air

Correct Answer: 2) Industrial waste

Solution:

Major pollutant source

Ref: O.P. Tandon

19. Recycling helps to

- 1). Increase pollution
- 2). Reduce waste
- 3). Increase cost
- 4). Increase energy use

Correct Answer: 2) Reduce waste

Solution:

Environmental protection

Ref: P.C. Jain

20. The best method to control pollution is

- 1). Increase waste
- 2). Reduce, reuse, recycle
- 3). Burn waste
- 4). Dump waste

Correct Answer: 2) Reduce, reuse, recycle

Solution:

3R principle

Ref: Engineering Chemistry – P.C. Jain

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 — not just of reading, but of understanding, practicing, and improving.

- You have mastered the fundamentals of Atomic Structure and Chemical Bonding.
- You have solved numericals from Solutions, Acids & Bases, and Electrochemistry.
- You have understood real-world concepts like Water Technology, Corrosion, and Fuels.
- You have learned modern topics like Polymers and Environmental Chemistry.
- You have practiced MCQs, analyzed patterns, and improved your accuracy.

This is exactly how toppers prepare.

Remember one important truth:

ECET is not about studying everything — it is about revising the right things multiple times.

If you revise these questions 2–3 times:

- Your concepts become strong
- Your speed improves
- Your confidence increases

And confidence is what gives rank.

Do not panic before the exam.

Do not compare with others.

Do not try to learn new topics at the last moment.

Instead:

Revise → Practice → Stay Calm → Write Confidently

Believe this —

Even an average student can get a top rank with the right strategy and consistent revision.

Your success is already in your hands.

Now go and prove it in the exam hall.

Wishing you All the Best for AP ECET 2026 🚀

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



Book Description

A complete and structured guide for AP ECET 2026 Chemistry designed to help diploma students achieve top ranks. This book focuses on concept clarity, smart practice strategies, and exam-oriented questions.

Key Features

-  Complete syllabus coverage
-  Concept-based explanations
-  Previous year questions analysis
-  Practice questions with solutions
-  Rank booster model tests
-  Shortcut techniques for quick solving

About the Author

Bandi Dayasagar is a dedicated educator with a strong academic background in Mechanical Engineering and Computer Information Systems. He is committed to helping students achieve top ranks through structured learning.