MY DREAMz ACADEMY

Dilsuknagar,HYD.Contact:7995918905/06.

Test Name : EAPCET MPC GRAND TEST -02

Batch : MPC LONG TERM

No Questions : 160 Time : 180 MIN

IMPORTANT INSTRUCTIONS:

Please read the instructions carefully

- The candidate must immediately fill their details on the **OMR SHEET** before attempting the test booklet.
- Duration of the test is **3hrs (180Min)**,test booklet contains **160 questions**.
- Each question carries **1 Marks** for each correct response .The maximum marks are **160**.
- Use **BLUE/BLACK** Ball point pen only for writing responses on **OMR SHEET**.Use of pencil,sketch pen,gell pens are strictly prohibited.
- No candidate is allowed to carry any textual material,printed or written,bits of papers,pager,mobile phone any electronic gadgets etc.. Except the Identity card and hall ticket into the examination hall.
- **Rough work** is to be done only on the space provided in the test booklet.
- Don't fold or make any stray marks on the **ANSWER SHEET**.
- Use of white fluid for correction is not permissiable on the ANSWER SHEET.
- On the completion of the test the candidate must hand over the answer sheet to the invigilator after completing the time.However the candidate is allowed to take away this test booklet with them.

ALL THE BEST

NAME:.....

BATCH:..... TEST DATE:.....

ROLL NO:.....INVIGILATOR SIGN:.....

SET: A

Test Id: 687823

Part - A Mathematics

Section - I: Single Correct

This section contains a total of 80 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 1 marks.
For every incorrect response 0 marks shall be deducted.

1. The inverse of $y = 5^{\log x}$ is :

(a) $x = 5^{\log y}$
(b) $x = y^{\log 5}$
(c) $x = y^{\frac{1}{\log 5}}$
(d) $x = 5^{\frac{1}{\log y}}$

2. Function $f : (-\infty, -1] \to (0, e^5]$ defined by $f(x) = e^{x^3 - 3x + 2}$ is

(a) many one and onto
(b) Many one and into
(c) one one and onto
(d) one one and into

3. $|x^2 + 1| - x^2 - 1 = 0$, is true for what values of x?

(a) R
(b) ϕ
(c) $(-\infty, 0]$
(d) none of these

4. If $\begin{bmatrix} x & y \\ u & v \end{bmatrix}$ is symmetric matrix, then:

(a) $x + v = 0$
(b) $x - v = 0$
(c) $y + u = 0$
(d) $y - u = 0$

5. Number of real values of λ for which the matrix $A = \begin{bmatrix} \lambda - 1 & \lambda & \lambda + 1 \\ 2 & -1 & 3 \\ \lambda + 3 & \lambda - 2 & \lambda + 7 \end{bmatrix}$ has no inverse

(a) 0
(b) 1
(c) 2
(d) infinite

6. Let $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = I + \text{adj } (A) + (\text{adj A})^2 + \ldots\ldots + (\text{adj A})^{10}$. Then, the sum of all the elements of the matrix B is:

(a) 22
(b) -88
(c) -124
(d) -110

7. If for $AX = B, B = \begin{bmatrix} 9 \\ 52 \\ 0 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 3 & -\frac{1}{2} & -\frac{1}{2} \\ -4 & \frac{3}{4} & \frac{5}{4} \\ 2 & -\frac{1}{4} & -\frac{3}{4} \end{bmatrix}$, then X is equal to

(a) $\begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$
(b) $\begin{bmatrix} -\frac{1}{2} \\ -\frac{1}{2} \\ 2 \end{bmatrix}$
(c) $\begin{bmatrix} -4 \\ 2 \\ 3 \end{bmatrix}$
(d) $\begin{bmatrix} 3 \\ \frac{3}{4} \\ -\frac{3}{4} \end{bmatrix}$

8. Let O be the origin and the position vectors of A and B be $2\hat{i} + 2\hat{j} + \hat{k}$ and $2\hat{i} + 4\hat{j} + 4\hat{k}$ respectively. If the internal bisector of $\angle AOB$ meets the line AB at C, then the length of OC is

(a) $\frac{2}{3}\sqrt{34}$
(b) $\frac{3}{2}\sqrt{34}$
(c) $\frac{3}{2}\sqrt{31}$
(d) $\frac{2}{3}\sqrt{31}$

9. The shortest distance between the lines $\frac{x-3}{1} = \frac{y-8}{4} = \frac{z-3}{22}$ and $\frac{x+3}{1} = \frac{y+7}{1} = \frac{z-6}{7}$ is:

(a) $2\sqrt{30}$
(b) 3

(c) $\frac{7}{2}\sqrt{30}$

(d) $3\sqrt{30}$

10. If $\hat{i}+2\hat{j}+3\hat{k}$ is parallel to sum of the vectors $3\hat{i}+\lambda\hat{j}+2\hat{k}$ and $-2\hat{i}+3\hat{j}+\hat{k}$, then λ equals -

(a) 1

(b) -1

(c) 2

(d) -2

11. A unit vector in the $xy-$ plane which is perpendicular to $4i-3j+k$ is

(a) $\frac{i+j}{\sqrt{2}}$

(b) $\frac{1}{5}(3i+4j)$

(c) $\frac{1}{5}(3i-4j)$

(d) None of these

12. The magnitude of the projection of the vector $2\hat{i}+3\hat{j}+\hat{k}$ on the vector perpendicular to the plane containing the vectors $\hat{i}+\hat{j}+\hat{k}$ and $\hat{i}+2\hat{j}+3\hat{k}$, is

(a) $\sqrt{\frac{3}{2}}$

(b) $3\sqrt{6}$

(c) $\frac{\sqrt{3}}{2}$

(d) $\sqrt{6}$

13. Let $\vec{a}=2\hat{i}-\hat{j}+5\hat{k}$ and $\vec{b}=\alpha\hat{i}+\beta\hat{j}+2\hat{k}$. If $((\vec{a}\times\vec{b})\times\hat{i})\cdot\hat{k}=\frac{23}{2}$, then $|\vec{b}\times 2\hat{j}|$ is equal to

(a) 4

(b) 5

(c) $\sqrt{21}$

(d) $\sqrt{17}$

14. If $K_1=\tan 27\theta-\tan\theta$ and $K_2=\frac{\sin\theta}{\cos 3\theta}+\frac{\sin 3\theta}{\cos 9\theta}+\frac{\sin 9\theta}{\cos 27\theta}$, then

(a) $K_1=2K_2$

(b) $K_1=K_2+2$

(c) $K_1=K_2$

(d) none of these

15. If $\cos A=\frac{3}{4}$, then $32\sin\frac{A}{2}\cos\frac{5A}{2}=$

(a) $\sqrt{7}$

(b) $-\sqrt{7}$

(c) 7

(d) -7

16. If $\cos 5\theta=a\cos^5\theta+b\cos^3\theta+c\cos\theta$ then c is equal to-

(a) -5

(b) 1

(c) 5

(d) None

17. The general solution of the equation $\sin^{50}x-\cos^{50}x=1$ is -

(a) $2n\pi+\frac{\pi}{2}$

(b) $2n\pi+\frac{\pi}{3}$

(c) $n\pi+\frac{\pi}{2}$

(d) $n\pi+\frac{\pi}{3}$

18. The trigonometric equation $\sin^{-1}x=2\sin^{-1}a$ has a solution for :

(a) $\frac{1}{2}<|a|<\frac{1}{\sqrt{2}}$

(b) All real values of a

(c) $|a|\leq\frac{1}{\sqrt{2}}$

(d) $|a|\geq\frac{1}{\sqrt{2}}$

19. $\tan^{-1}\tan\left(\frac{5\pi}{7}\right)$ is equal to -

(a) $\frac{2\pi}{7}$

(b) $\frac{5\pi}{7}$

(c) $-\frac{2\pi}{7}$

(d) $\frac{\pi}{7}$

20. The angle of elevation of the top of a tower at point on the ground is30°. If on walking20 meters toward the tower, the angle of elevation becomes 60°, then the height of the tower is

(a) 10 metre

(b) $\frac{10}{\sqrt{3}}$ metre

(c) $10\sqrt{3}$ metre

(d) None of these

21. The solution of $\frac{dy}{dx}+2y\tan x=\sin x$, is

(a) $y\sec^3 x = \sec^2 x + c$

(b) $y\sec^2 x = \sec x + c$

(c) $y\sin x = \tan x + c$

(d) None of these

22. The angle between the tangents drawn from the point $\left(\sqrt{7}, 1\right)$ to the ellipse $3x^2 + 5y^2 = 15$ is

(a) $\frac{\pi}{6}$

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) $\frac{\pi}{2}$

23. The straight line $y = mx + c(m > 0)$ touches the parabolas $y^2 = 8(x + 2)$ then the minimum value taken by c is

(a) 4

(b) 8

(c) 12

(d) 6

24. The interval of increase of the function $y = x - e^x + \tan\left(\frac{\pi}{4}\right)$ is

(a) $(-\infty, 0)$

(b) $(0, \infty)$

(c) $(-\infty, \infty)$

(d) $(1, \infty)$

25. The sum of all values of x so that $16^{(x^2+3x-1)} = 8^{(x^2+3x+2)}$, is

(a) 0

(b) 3

(c) -3

(d) -5

26. If x is real, then value of the expression $\frac{x^2 + 14x + 9}{x^2 + 2x + 3}$ lies between

(a) 5 and 4

(b) 5 and -4

(c) -5 and 4

(d) None of these

27. The gradient of the tangent line at the point $(a\cos\alpha, a\sin\alpha)$ to the circle $x^2 + y^2 = a^2$, is-

(a) $\tan(\pi - \alpha)$

(b) $\tan\alpha$

(c) $\cot\alpha$

(d) $-\cot\alpha$

28. The value of $I = \int_0^{\frac{\pi}{2}} \frac{(\sin x + \cos x)^2}{\sqrt{1 + \sin 2x}} dx$ is

(a) 3 (b) 1

(c) 2 (d) 0

29. The sum of $\sum_{n=2}^{\infty} {}^nC_2 . \frac{3^{n-2}}{n!}$ equals

(a) $\frac{e}{2}$

(b) e^2

(c) e^3

(d) $\frac{1}{2}e^3$

30. The roots of the equation $x^4 - 2x^2 + 4 = 0$ are the vetices of a

(a) square inscribed in a circle of radius 2

(b) rectangle inscribed in a circle of radius 2

(c) square inscribed in a circle of radius $\sqrt{2}$

(d) rectangle inscribed in a circle of radius $\sqrt{2}$

31. $\sqrt{\frac{1 - \sin A}{1 + \sin A}} =$

(a) $\sec A + \tan A$

(b) $\tan\left(\frac{\pi}{4} - A\right)$

(c) $\tan\left(\frac{\pi}{4} + \frac{A}{2}\right)$

(d) $\tan\left(\frac{\pi}{4} - \frac{A}{2}\right)$

32. The coefficient of x^5 in the expansion of $(1 + x)^3 . (1 - x)^6$ is -

(a) 6

(b) 22

(c) -6

(d) 8

33. A survey shows that 63% of the Americans like cheese whereas 76% like apples. If $x\%$ of the Americans like both cheese and apples, then

(a) $x = 39$

(b) $x = 63$

(c) $39 \leq x \leq 63$

(d) None of these

34. A value of θ for which $\frac{2 + 3i\sin\theta}{1 - 2i\sin\theta}$ is purely imaginary, is :

(a) $\frac{\pi}{6}$

(b) $\sin^{-1}\left(\frac{\sqrt{3}}{4}\right)$

(c) $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

(d) $\frac{\pi}{3}$

35. If $d_1,\ d_2,\ d_3$ are the diameters of the three escribed circles of a triangle, then $d_1d_2 + d_2d_3 + d_3d_1$ is equal to

(a) Δ^2

(b) $4s^2$

(c) $2\Delta^2$

(d) $4\Delta^2$

36. If ${}^nC_r = 84, {}^nC_{r-1} = 36$ and ${}^nC_{r+1} = 126$, then n equals

(a) 8

(b) 9

(c) 10

(d) 5

37. The number of numbers can be formed by taking any 2 digits from digits $6, 7, 8, 9$ and 3 digits from $1, 2, 3, 4, 5$ is -

(a) ${}^5C_3 \times {}^4C_3 \times 3! \times 2!$

(b) ${}^5P_3 \times {}^4P_2 \times 5!$

(c) ${}^5C_3 \times {}^4C_2 \times 5!$

(d) ${}^5C_3 \times {}^4C_2 \times \frac{5!}{2!}$

38. Find the ratio in which the segment joining $(1, 2, -1)$ and $(4, -5, 2)$ is divided by the plane $2x - 3y + z = 4$.

(a) 2 : 1

(b) 3 : 2

(c) 3 : 7

(d) 1 : 2

39. A value of m for which $y = mx + 6$ is a tangent to the hyperbola $\frac{x^2}{100} - \frac{y^2}{49} = 1$ is

(a) $\sqrt{\frac{17}{20}}$

(b) $\sqrt{\frac{20}{17}}$

(c) $\sqrt{\frac{3}{20}}$

(d) $\sqrt{\frac{20}{3}}$

40. A hyperbola whose transverse axis is along the major axis of the conic, $\frac{x^2}{3} + \frac{y^2}{4} = 4$ and has vertices at the foci of this conic. If the eccentricity of the hyperbola is $\frac{3}{2}$, then which of the following points does NOT lie on it ?

(a) $(\sqrt{5}, 2\sqrt{2})$

(b) $(5, 2\sqrt{3})$

(c) $(0, 2)$

(d) $(\sqrt{10}, 2\sqrt{3})$

41. The equation of the circle passing through the point $(-2, 4)$ and through the points of intersection of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ and the line $3x + 2y - 5 = 0$, is

(a) $x^2 + y^2 + 2x - 4y - 4 = 0$

(b) $x^2 + y^2 + 4x - 2y - 4 = 0$

(c) $x^2 + y^2 - 3x - 4y = 0$

(d) $x^2 + y^2 - 4x - 2y = 0$

42. The equation of a tangent to the parabola, $x^2 = 8y$, which makes an angle θ with the positive direction of x-axis, is:

(a) $x = y\cot\theta - 2\tan\theta$

(b) $y = x\tan\theta + 2\cot\theta$

(c) $x = y\cot\theta + 2\tan\theta$

(d) $y = x\tan\theta - 2\cot\theta$

43. If A and B are two independent events, then the probability that only one of A and B occur is:

(a) $P(A) + P(B) - 2P(A \cap B)$

(b) $P(A) + P(B) - P(A \cap B)$

(c) $P(A) + P(B)$

(d) None of these

44. The coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is:

(a) $\frac{405}{256}$

(b) $\frac{504}{259}$

(c) $\frac{450}{263}$

(d) None of these

45. If D, E, F are mid points of the sides AB, BC and CA of a triangle formed by the points $A(5, -1) B(-7, 6)$ and $C(1, 3)$, then area of ΔDEF is -

(a) $\frac{2}{5}$

(b) $\frac{5}{2}$

(c) 5

(d) 10

46. Two vertical poles $AB = 15\,m$ and $CD = 10\,m$ are standing apart on a horizontal ground with points A and C on the ground. If P is the point of intersection of BC and AD, then the height of P (in m) above the line AC is:

(a) $\frac{20}{3}$

(b) 5

(c) $\frac{10}{3}$

(d) 6

47. The equation to the tangents to the circle $x^2+y^2=4$, which are parallel to $x+2y+3=0$, are

(a) $x-2y=2$

(b) $x+2y=\pm 2\sqrt{3}$

(c) $x+2y=\pm 2\sqrt{5}$

(d) $x-2y=\pm 2\sqrt{5}$

48. $\int \sin^3 x\cos^2 x dx =$

(a) $\frac{\cos^5 x}{5}-\frac{\cos^3 x}{3}+c$

(b) $\frac{\cos^5 x}{5}+\frac{\cos^3 x}{3}+c$

(c) $\frac{\sin^5 x}{5}-\frac{\sin^3 x}{3}+c$

(d) $\frac{\sin^5 x}{5}+\frac{\sin^3 x}{3}+c$

49. If the system of linear equations
$x-2y+kz=1$
$2x+y+z=2$
$3x-y-kz=3$
has a solution (x, y, z), $z\neq 0$, then (x, y) lies on the straight line whose equation is

(a) $3x-4y-4=0$

(b) $3x-4y-1=0$

(c) $4x-3y-1=0$

(d) $4x-3y-4=0$

50. For all positive integral values of n, $3^{2n}-2n+1$ is divisible by

(a) 2 (b) 4 (c) 8 (d) 12

51. In the frequency distribution of the discrete data given below, the frequency$k$ against value 0 is missing.

Variable x :	0	1	2	3	4	5
Frequency f :	k	20	40	40	20	4

If the mean is 2.5, then the missing frequency k will be

(a) 0 (b) 1

(c) 3 (d) 4

52. The shortest distance between the line $x-y=1$ and the curve $x^2=2y$ is :

(a) $\frac{1}{2}$

(b) $\frac{1}{2\sqrt{2}}$

(c) $\frac{1}{\sqrt{2}}$

(d) 0

53. If $x^2+y^2+px+3y-5=0$ and $x^2+y^2+5x+py+7=0$ cut orthogonally, then p is

(a) $\frac{1}{2}$

(b) 1

(c) $\frac{3}{2}$

(d) 2

54. If $\frac{x-1}{l}=\frac{y-2}{m}=\frac{z+1}{n}$ is the equation of the line through $(1,2,-1)$ and $(-1,0,1)$, then (l,m,n) is -

(a) $(-1,0,1)$

(b) $(1,1-1)$

(c) $(1,2,-1)$

(d) $(0,1,0)$

55. If $x=e^{y+e^{y+.....to\infty}}$, $x>0$ then $\frac{dy}{dx}$ is

(a) $\frac{1+x}{x}$

(b) $\frac{1}{x}$

(c) $\frac{1-x}{x}$

(d) $\frac{x}{1+x}$

56. If $\sin y=x\cos(a+y)$, then $\frac{dy}{dx}$ equals -

(a) $\frac{\cos^2(a+y)}{\cos a}$

(b) $\frac{\cos a}{\cos^2(a+y)}$

(c) $\frac{\cos(a+y)}{\cos^2 a}$

(d) None of these

57. If $f(x)=\begin{vmatrix} 2\cos^4 x & 2\sin^4 x & 3+\sin^2 2x \\ 3+2\cos^4 x & 2\sin^4 x & \sin^2 2x \\ 2\cos^4 x & 3+2\sin^4 x & \sin^2 2x \end{vmatrix}$,
then $\frac{1}{5}f'(0)=$ is equal to:

(a) 1 (b) 2

(c) 6 (d) 0

58. Derivative of $\sec^{-1}\left\{\frac{1}{2x^2-1}\right\}$ w.r.t. $\sqrt{1+3x}$ at $x=-\frac{1}{3}$ is

(a) 0

(b) $\frac{1}{2}$

(c) $\frac{1}{3}$

(d) None of these

59. If $f(x)=\begin{cases} x+2, & 1<x<3 \\ 5, & x=3 \\ 8-x, & x>3 \end{cases}$ then at $x=3$, $f'(x)=$

(a) 1

(b) -1

(c) 0

(d) Does not exist.

60. The square roots of $7+24i$ are :

(a) $\pm(3+4i)$

(b) $\pm(3-4i)$

(c) $\pm(4+3i)$

(d) $\pm(4-3i)$

61. $\lim\limits_{x\to 0}\dfrac{xe^{x^2}}{\int\limits_0^x e^{t^2}dt}=$

(a) 0

(b) 1

(c) -1

(d) None

62. Let $O(0,\,0)$ and $A(0,\,1)$ be two fixed points. Then the locus of a point P such that the perimeter of ΔAOP is 4, is:

(a) $8x^2-9y^2+9y=18$

(b) $9x^2+8y^2-8y=16$

(c) $9x^2-8y^2+8y=16$

(d) $8x^2+9y^2-9y=18$

63. Let L be the line $2x+y=2$. If the axes are rotated by 45^o in clockwise direction , then the intercepts made by the line L on the new axes are respectively

(a) $\sqrt{2}$ and 1

(b) 1 and $\sqrt{2}$

(c) $2\sqrt{2}$ and $\frac{2\sqrt{2}}{3}$

(d) $\frac{2\sqrt{2}}{3}$ and $2\sqrt{2}$

64. If the lines $ax+2y+1=0,\ bx+3y+1=0$ and $cx+4y+1=0$ are concurrent, then a,b,c are in

(a) $A.P.$

(b) $G.P.$

(c) $H.P.$

(d) None of these

65. Let X be a random variable such that the probability function of a distribution is given by $P(X=0)=\frac{1}{2}$, $P(X=j)=\frac{1}{3^j}(j=1,2,3,\ldots,\infty)$. Then the mean of the distribution and $P(X\text{is positive and even})$ respectively are

(a) $\frac{3}{4}$ and $\frac{1}{9}$

(b) $\frac{3}{4}$ and $\frac{1}{16}$

(c) $\frac{3}{4}$ and $\frac{1}{8}$

(d) $\frac{3}{8}$ and $\frac{1}{8}$

66. The degree of the differential equation $\frac{d^2y}{dx^2}+3\left(\frac{dy}{dx}\right)^2=x^2\log\left(\frac{d^2y}{dx^2}\right)$ is:

(a) 1 (b) 2

(c) 3 (d) None

67. Three vertices of triangle ABC are $A(-1,11), B(-9,-8)$ and $C(15,-2)$. The equation of angle bisector of angle A is

(a) $4x-y=7$

(b) $4x+y=7$

(c) $x+4y=7$

(d) $x-4y=7$

68. If $6x^2+11xy-10y^2+x+31y+k=0$ represents a pair of straight lines, then $k=$

(a) -15

(b) 6

(c) -10

(d) -4

69. If the probabilities of three persons $A,\ B$ & C hitting a target are $\frac{3}{5}$, $\frac{2}{5}$ and $\frac{3}{4}$ respectively. If they hit at a time then the probability that two persons hit the target is:

(a) $\frac{9}{50}$

(b) $\frac{9}{20}$

(c) $\frac{11}{20}$

(d) $\frac{41}{50}$

70. The chance of India winning toss is $\frac{3}{4}$. If it wins the toss, then its chance of victory is $\frac{4}{5}$ otherwise it is only $\frac{1}{2}$. Then chance of India's victory is:

(a) $\frac{1}{5}$

(b) $\frac{3}{5}$

(c) $\frac{3}{40}$

(d) $\frac{29}{40}$

71. If the sum of the two roots of the equation $4x^3 + 16x^2 - 9x - 36 = 0$ is zero, then the roots are

(a) $1, 2 - 2$

(b) $-2, \frac{2}{3}, -\frac{2}{3}$

(c) $-3, \frac{3}{2}, -\frac{3}{2}$

(d) $-4, \frac{3}{2}, -\frac{3}{2}$

72. The equation of the bisector of the angle between the lines $3x - 4y + 7 = 0$ and $12x - 5y - 8 = 0$ is -

(a) $99x - 77y + 51 = 0,\ 21x + 27y - 131 = 0$

(b) $99x - 77y + 51 = 0,\ 21x + 27y + 131 = 0$

(c) $99x - 77y + 131 = 0,\ 21x + 27y - 51 = 0$

(d) None of these

73. Pair of tangents are drawn from every point on the line $3x + 4y = 12$ on the circle $x^2 + y^2 = 4$. Their variable chord of contact always passes through a fixed point whose co-ordinates are

(a) $\left(\frac{4}{3}, \frac{3}{4}\right)$

(b) $\left(\frac{3}{4}, \frac{3}{4}\right)$

(c) $(1, 1)$

(d) $\left(1, \frac{4}{3}\right)$

74. The length of the common chord of the circles $x^2 + y^2 + 2x + 3y + 1 = 0$ and $x^2 + y^2 + 4x + 3y + 2 = 0$ is:

(a) $\frac{9}{2}$

(b) $\frac{3}{2}$

(c) $3\sqrt{2}$

(d) $2\sqrt{2}$

75. If $f(x) = \int_{x^2}^{x^3} \log t \, dt \quad (x > 0)$, then $f'(x)$ is equal to -

(a) $(4x^2 - 9x)\log x$

(b) $(9x^2 + 4x)\log x$

(c) $(9x^2 - 4x)\log x$

(d) $(x^2 + x)\log x$

76. $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx$ equals:

(a) $\sec x - \operatorname{cosec} x + c$

(b) $\sec x + \operatorname{cosec} x + c$

(c) $\sin x - \cos x + c$

(d) None of these

77. In a $\Delta ABC, b^2 \cos 2A - a^2 \cos 2B =$

(a) $b^2 - a^2$

(b) $b^2 - c^2$

(c) $c^2 - a^2$

(d) $a^2 + b^2 + c^2$

78. An ordered pair (α, β) for which the system of linear equations
$(1 + \alpha)x + \beta y + z = 2$
$\alpha x + (1 + \beta)y + z = 3$
$\alpha x + \beta y + 2z = 2$
has a unique solution, is

(a) $(1, -3)$

(b) $(2, 4)$

(c) $(-3, 1)$

(d) $(-4, 2)$

79. If $I_n = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^n x \, dx$, then :

(a) $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$ are in G.P.

(b) $I_2 + I_4 . I_3 + I_5, I_4 + I_6$ are in A.P.

(c) $I_2 + I_4, (I_3 + I_5)^2, I_4 + I_6$ are in G.P.

(d) $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$ are in A.P.

80. If n is even and the value of ${}^nC_r$ is maximum, then $r =$

(a) $\frac{n}{2}$

(b) $\frac{n+1}{2}$

(c) $\frac{n-1}{2}$

(d) None of these

Part - B Chemistry

Section - I: Single Correct

This section contains a total of 40 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 1 marks.
For every incorrect response 0 marks shall be deducted.

81. The set in which compounds have different nature is:

(a) $B(OH)_3$ and H_3PO_3

(b) $B(OH)_3$ and $Al(OH)_3$

(c) $Be(OH)_2$ and $Al(OH)_3$

(d) NaOH and $Ca(OH)_2$

82. A crystal may have one or more planes of symmetry as well as one or more than one axis of symmetry but it has

(a) Two centres of symmetry

(b) Only one centre of symmetry

(c) No centre of symmetry

(d) Three centres of symmetry

83. Phenol treated with chloroform in presence of sodium hydroxide, which further hydrolysed in presence of an acid results

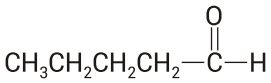
(a) Salicyclic acid

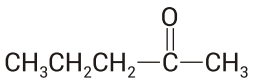
(b) Benzene-1,2-diol

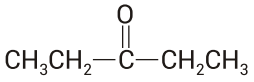
(c) Benzene-1, 3-diol

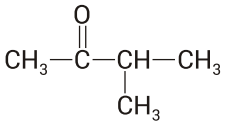
(d) 2-Hydroxybenzaldehyde

84. Which of the following is the most reactive isomer?

(a) 

(b) 

(c) 

(d) 

85. 2.9 g of gas at 95^0 C occupied the same volume as 0.184 g of dihydrogen at 17^0C,at the same pressure. What is the molar mass of the gas?

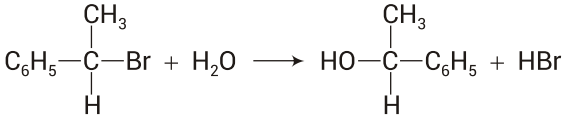
(a) 120 g mol^{-1}

(b) 20 g mol^{-1}

(c) 80 g mol^{-1}

(d) 40 g mol^{-1}

86. Consider the following reaction:



The reaction proceeds with 98% racemisation.
The reaction may follow

(a) SN1 mechanism

(b) SN2 mechanism

(c) E1 mechanism

(d) E2 mechanism.

87. World environment day is celebrated on

(a) 4^{th} May

(b) 15^{th} April

(c) 5^{th} June

(d) 15^{th} March

88. The incorrect statement regarding conformations of ethane is:

(a) Ethane has infinite number of conformations

(b) The dihedral angle in staggered conformation is 60°

(c) Eclipsed conformation is the most stable conformation

(d) The conformations of ethane are interconvertible to one-another

89. The correct statement regarding electrophile is

(a) Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile

(b) Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile

(c) Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile

(d) Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile

90. Sorption is the phenomenon

(a) Reverse of adsorption

(b) Reverse of absorption

(c) When adsorption and absorption takes place simultaneously

(d) Reverse of desorption

91. The electrons which participate in order for transition metals to exhibit variable oxidation states belong to

(a) ns only

(b) (n−1) d only

(c) ns and (n−1) d only but not np

(d) ns, np and (n−1) d

92. **Assertion:** In titrations involving potassium permanganate no indicator is used.

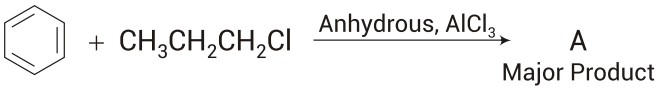
Reason: MnO_4^- acts as the self-indicator.

(a) Both assertion and reason are true, and the reason is the correct explanation for the assertion.

(b) Both assertion and reason are true, but the reason is not the correct explanation for the assertion.

(c) Assertion is true but reason is false.

(d) Both Assertion and reason are false.

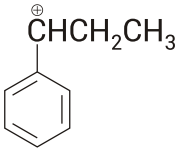
93. 

The stable carbocation formed in the above reaction is :

(a) $CH_3CH_2\overset{\oplus}{C}H_2$

(b) $CH_3\overset{\oplus}{C}H_2$

(c) $CH_3—\overset{\oplus}{C}H—CH_3$

(d) 

94. **Statement I:** 12 parts by mass of carbon in CO and CO_2 molecules combine with 16 and 32 parts by mass of oxygen.

Statement II: A given compound always contains exactly the same proportion of elements by weight.

(a) Statement I and Statement II are true and the Statement II is the correct explanation of the Statement I.

(b) Statement I and Statement II are true but the Statement II is not the correct explanation of the Statement I.

(c) Statement I is true but Statement II is false.

(d) Statement I and Statement II are false.

95. ΔS for the reaction: $MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$

(a) Zero

(b) −ve

(c) +ve

(d) ∞

96. A buffer solution can be obtained from

(a) HCN and KCN

(b) CH_3COONH_4

(c) NH_4Cl and NH_4OH

(d) All of these

97. Choose the correct statements about the hydrides of group 15 elements.

A. The stability of the hydrides decreases in the order $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$

B. The reducing ability of the hydrides increases in the order $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

C. Among the hydrides, NH_3 is strong reducing agent while BiH_3 is a mild reducing agent.

D. The basicity of the hydrides increases in the order $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

Choose the most appropriate from the option given below:

(a) B and C only

(b) C and D only

(c) A and B only

(d) A and D only

98. The group of molecules having identical shape is:

(a) PCl_5, IF_5, XeO_2F_2

(b) BF_3, PCl_3, XeO_3

(c) $ClF_3, XeOF_2, XeF_3^+$

(d) SF_4, XeF_4, CCl_4

99. Drugs can be classified on the basis of

(a) Pharmocological effect

(b) Drug action

(c) Chemical structure

(d) All of these

100. The mixture of CO & H_2 is known as

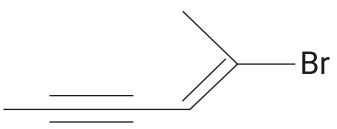
(a) Water gas or producer gas

(b) Water gas or synthesis gas

(c) Synthesis gas or producer gas

(d) Producer gas

101. Choose the correct name for the compound given below:



(a) (4E)-5-Bromo-hex-4-en-2-yne

(b) (2E)-2-Bromo-hex-4-yn-2-ene

(c) (2E)-2-Bromo-hex-2-en-4-yne

(d) (4E)-5-Bromo-hex-2-en-4-yne

102. Calculate the percentage ionization of 0.01 M acetic acid in 0.1 M HCl K_a of acetic acid is 1.8×10^{-5}

(a) 0.18%

(b) 0.018%

(c) 1.8%

(d) 18%

103. The region in the electromagnetic spectrum where the Balmer series (for H–atom) lines appear is:

(a) Visible

(b) Microwave

(c) Ultraviolet

(d) Infrared

104. The ores that are concentrated by the Froth flotation method are

(a) Carbonate

(b) Sulphides

(c) Oxides

(d) Phosphates

105. The relationship between the values of osmotic pressure of 0.1M solutions of $KNO_3(P_1)$ and $CH_3COOH(P_2)$ is

(a) $P_1 > P_2$

(b) $P_2 > P_1$

(c) $P_1 = P_2$

(d) $\frac{P_1}{P_1+P_2} = \frac{P_2}{P_1+2P_2}$

106. Alkenes usually show which type of reaction

(a) Addition

(b) Substitution

(c) Elimination

(d) Superposition

107. The aqueous solution of which of the following salts will be coloured?

(a) $Zn(NO_3)_2$

(b) $LiNO_3$

(c) $CrCl_3$

(d) Potash alum

108. Positive Beilstein test for halogen shows that

(a) A halogen is definitely present

(b) A halogen may be present

(c) A halogen is absent

(d) None of these

109. E^o value of Ni^{2+}/Ni is −0.25 V and Ag^+/Ag is +0.80 V. If a cell is made by taking the two electrodes what is the feasibility of the reaction?

(a) Since E^o value for the cell will be positive, redox reaction is feasible.

(b) Since E^o value for the cell will be negative, redox reaction is not feasible.

(c) Ni cannot reduce Ag^+ to Ag hence reaction is not feasible.

(d) Ag can reduce Ni^{2+} to Ni hence reaction is feasible.

110. For which pair of complexes is the order of values of Δ_0 correct ?

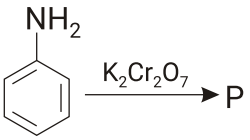
(a) $[Cr(H_2O)_6]^{+2} > [Cr(H_2O)_6]^{+3}$

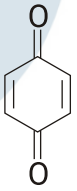
(b) $[Fe(CN)_6]^{-4} > [Fe(CN)_6]^{-3}$

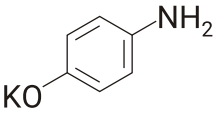
(c) $[Rh(NH_3)_6]^{+3} > [Co(NH_3)_6]^{+3}$

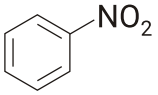
(d) $[CrF_6]^{-3} > [Cr(CN)_6]^{-3}$

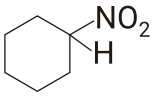
111. Identify P in the following reaction.



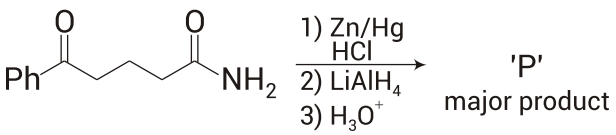
(a) 

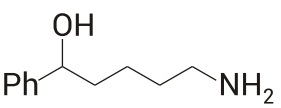
(b) 

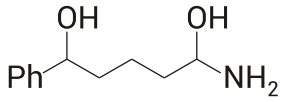
(c) 

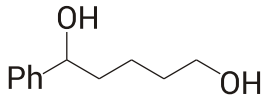
(d) 

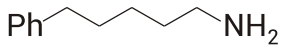
112. The major product 'P' for the following sequence of reactions is:



(a) 

(b) 

(c) 

(d) 

113. For the reaction, $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$; ΔH = -571 kJ, bond energy of (H–H) = 435 kJ; of (O=O) = 498 kJ; then calculate the average bond energy of (O – H) bond using the above data.

(a) 484 kJ

(b) −484 kJ

(c) 271 kJ

(d) −271 kJ

114. Consider the reaction, $2N_2O_5 \longrightarrow 4NO_2 + O_2$
In the reaction, NO_2 is being formed at the rate of 0.0125 mol L^{-1} s^{-1}. What is the rate of reaction at this time ?

(a) 0.0018 mol L^{-1} s^{-1}

(b) 0.0031 mol L^{-1} s^{-1}

(c) 0.0041 mol L^{-1} s^{-1}

(d) 0.050 mol L^{-1} s^{-1}

115. Molecular formula of Glauber's salt is

(a) $MgSO_4 \cdot 7H_2O$

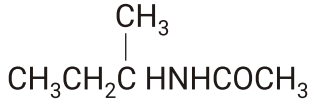
(b) $CuSO_4 \cdot 5H_2O$

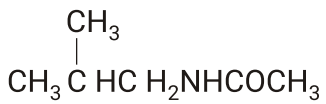
(c) $FeSO_4 \cdot 7H_2O$

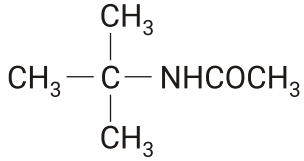
(d) $Na_2SO_4 \cdot 10H_2O$

116. An organic compound X having molecular formula $C_3H_{11}N$ reacts with p-toluene sulphonyl chloride to form a compound Y that is soluble in aqueous KOH. Compound X is optically active and reacts with acetyl chloride to form compound Z. Identify the compound Z.

(a) $CH_3CH_2CH_2CH_2NHCOCH_3$

(b) 

(c) 

(d) 

117. Which position of hydrogen explain its properties?

(a) At the top of halogens

(b) At the top of alkali metals

(c) At the top of chalcogens

(d) Both (a) & (b)

118. Statement I: At equilibrium concentration of the reactant and product does not change with time for a chemical reaction.
Statement II: The rate of reaction is zero at equilibrium.

(a) Statement I and Statement II are true and the Statement II is the correct explanation of the Statement I

(b) Statement I and Statement II are true but the Statement II is not the correct explanation of the Statement I

(c) Statement I is true but Statement II is false

(d) Statement I and Statement II are false

119. The water–soluble protein is

(a) Albumin

(b) Collagen

(c) Myosin

(d) Fibrin

120. An example of natural biopolymer is

(a) Teflon

(b) Rubber

(c) DNA

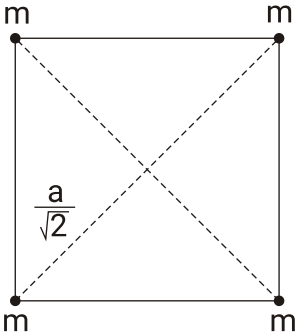
(d) Nylon

Part - C Physics

Section - I: Single Correct

This section contains a total of 40 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 1 marks.
For every incorrect response 0 marks shall be deducted.

121. Four particles each of mass m are kept at the four corners of a square of edge a. Find the MOI of the system about a line perpendicular to the plane of the square and passing through the center of the square.



(a) 3 ma^2

(b) ma^2

(c) 2 ma^2

(d) 4 ma^2

122. The ratio of specific heats $\left(\frac{C_P}{C_V}\right)$ in terms of degree of freedom (f) is given by:

(a) $\left(1+\frac{f}{3}\right)$

(b) $\left(1+\frac{2}{f}\right)$

(c) $\left(1+\frac{f}{2}\right)$

(d) $\left(1+\frac{1}{f}\right)$

123. If velocity, time and force (V, T & F) are considered as fundamental quantities, the dimensional formula for mass will be

(a) [FTV]

(b) $[F^{-1}TV]$

(c) $[FTV^{-1}]$

(d) $[FT^{-1}V]$

124. A particle has a displacement of 12 m towards east, 5 m towards north then 6 m vertically upward. The sum of these displacements is:

(a) 12 m

(b) 10.04 m

(c) 14.31 m

(d) 23 m

125. A solid sphere slides down a smooth inclined plane of inclination θ with acceleration a_1 and a disc rolls down a rough inclined plane of inclination θ with acceleration a_2. Value of $\frac{a_1}{a_2}$ is:

(a) $\frac{3}{2}$

(b) $\frac{2}{3}$

(c) $\frac{1}{2}$

(d) 2

126. A particle moves with a velocity $\left(6\hat{i}-4\hat{j}+3\hat{k}\right)$ m/s under the influence of a constant force $\vec{F}=\left(20\hat{i}+15\hat{j}-5\hat{k}\right)$ N. The instantaneous power applied to the particle is

(a) 35 J/s

(b) 45 J/s

(c) 25 J/s

(d) 195 J/s

127. Assuming the Earth to be a sphere of uniform mass density, the weight of a body at a depth $d=\frac{R}{2}$ from the surface of the Earth, if its weight on the surface of the Earth is 200 N, will be:
(Given: $R=$ The radius of the Earth)

(a) 400 N

(b) 500 N

(c) 300 N

(d) 100 N

128. If the velocity of a particle is given by $v=(180-16x)^{\frac{1}{2}}$ m/s, then its acceleration will be:

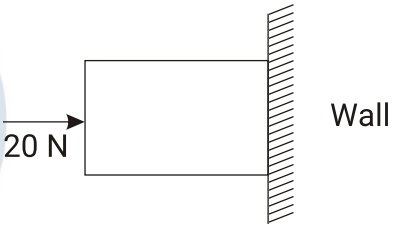
(a) Zero

(b) 8 m/s^2

(c) −8 m/s^2

(d) 4 m/s^2

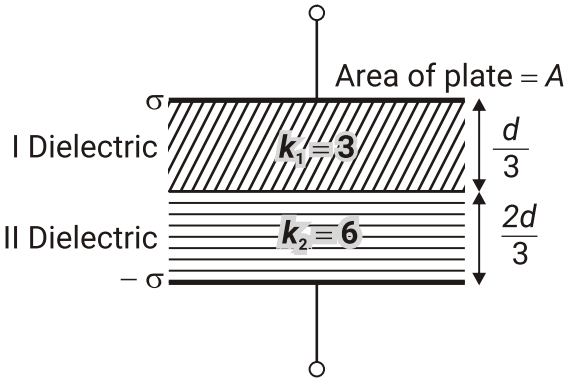
129. A horizontal force of 20 N is necessary to just hold a block stationary against a wall. The coefficient of friction between the block and wall is 0.15. The weight of the block is:



(a) 20 N (b) 3 N

(c) 30 N (d) 0.3 N

130. In the figure shown σ is the surface charge density on the upper metallic plate. Which of the following statemets is correct?



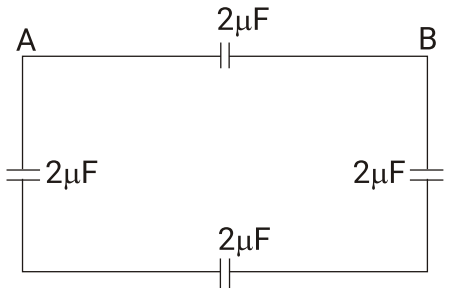
(a) The ratio of energy density in I dielectric to II dielectric is 2

(b) The ratio of energy density in I dielectric to II dielectric is 4

(c) The ratio of energy density in I dielectric to II dielectric is 1

(d) The ratio of energy density in II dielectric to I dielectric is 8.

131. The equivalent capacitance between points A and B in the given diagram is



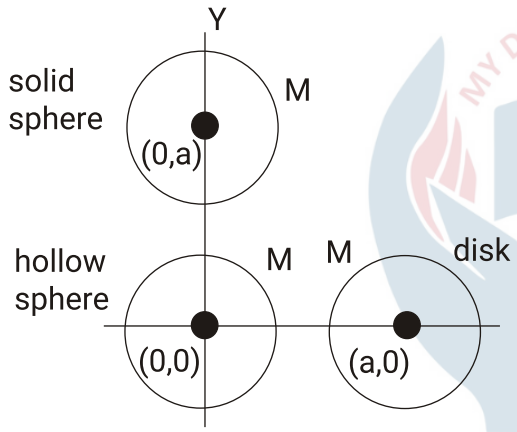
(a) $8\ \mu F$

(b) $6\ \mu F$

(c) $\frac{8}{3}\mu F$

(d) $\frac{3}{8}\mu F$

132. The coordinates of the centre of mass of a system as shown in figure are



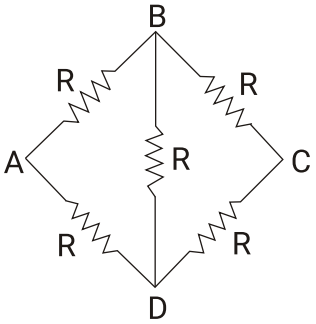
(a) $\left(\frac{a}{3}, 0\right)$

(b) $\left(\frac{a}{2}, \frac{a}{2}\right)$

(c) $\left(\frac{a}{3}, \frac{a}{3}\right)$

(d) $\left(0, \frac{a}{3}\right)$

133. Five equal resistances each of value R are connected in as shown in figure. The equivalent resistance of the network:-



(a) Between the points B and D is R

(b) Between the points B and D is 2R

(c) Between the points A and C is R

(d) Between the points A and C is $\frac{R}{2}$

134. A particle is executing S.H.M. If the ratio of$K.E.$ & $P.E.$ is equal to 3 then the ratio of displacement & amplitude will be:

(a) $\frac{1}{\sqrt{2}}$

(b) $\sqrt{2}$

(c) $\frac{1}{2}$

(d) $\frac{3}{2}$

135. The magnetic energy stored in an inductor of inductance 4 μH carrying a current of 2 A is:

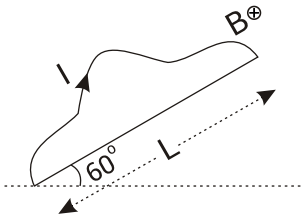
(a) 4 mJ

(b) 8 mJ

(c) 8 μJ

(d) 4 μJ

136. What will be the force on curved part of the current carrying loop placed in uniform field B as shown in figure:-



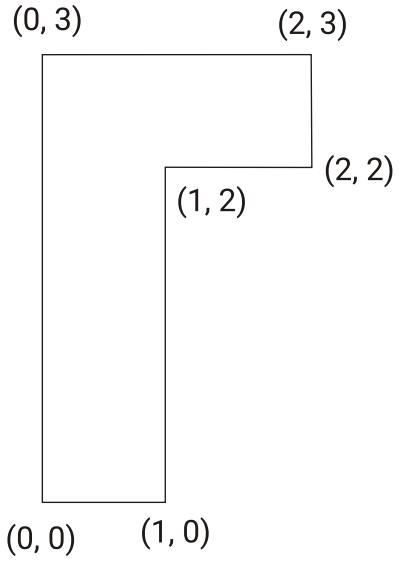
(a) 0

(b) BIL

(c) $\frac{1}{2}$ BIL

(d) $\frac{1}{\sqrt{3}}$ BIL

137. The coordinates of centre of mass of a uniform flag shaped lamina (thin flat plate) of mass 4 kg are:



(a) (1.25 m, 1.50 m)
(b) (0.75 m, 0.75 m)
(c) (0.75 m, 1.75 m)
(d) (1 m, 1.75 m)

138. The intensity ratio of two waves is $9:1$. If they produce interference, the ratio of the maximum to the minimum intensity will be

(a) $4:1$
(b) $2:1$
(c) $9:1$
(d) $3:2$

139. Match List – I with List –II

List - I (Electromagnetic waves)		List - II (Wavelength)	
A.	AM radio waves	(i)	10^{-10} m
B.	Microwaves	(ii)	10^{2} m
C.	Infrared radiations	(iii)	10^{-2} m
D.	X-rays	(iv)	10^{-4} m

Choose the correct answer from the options given below:

(a) (a) – (iii), (b) – (ii), (c) – (i), (d) – (iv)
(b) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)
(c) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)
(d) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

140. A long solenoid of radius 1 mm has 100 turns per mm. If 1 A current flows in the solenoid, the magnetic field strength at the centre of the solenoid is

(a) $12.56 \times 10^{-2}\mathrm{T}$
(b) $12.56 \times 10^{-4}\mathrm{T}$
(c) $6.28 \times 10^{-4}\mathrm{T}$
(d) $6.28 \times 10^{-2}\mathrm{T}$

141. In order to change the range of a galvanometer of $\mathrm{G}\ \Omega$ resistance from V volts to nV volts what will be the value of resistance in Ω connected in series with it?

(a) $(\mathrm{n}-1)\mathrm{G}$
(b) $\frac{\mathrm{G}}{\mathrm{n}}$
(c) nG
(d) $\frac{\mathrm{G}}{\mathrm{n}-1}$

142. The de Broglie wavelength of a proton and α-particle are equal. The ratio of their velocities is:

(a) 4 : 3 (b) 4 : 1
(c) 4 : 2 (d) 1 : 4

143. The charge density of a uniform sphere is ρ. The electric field due to the sphere at a distance r from the center inside the sphere is

(a) $\frac{\rho \mathrm{r}}{\epsilon_0}$
(b) $\frac{\rho \mathrm{r}}{3\epsilon_0}$
(c) $\frac{\rho \mathrm{r}}{2\epsilon_0}$
(d) none of the above

144. In an EM wave, magnitude of electric field at certain point at some time is 6 V/m. What is the magnitude of magnetic field at the same point and same time?

(a) 5×10^{7} T
(b) 2 T
(c) 2×10^{-8} T
(d) 0.5 T

145. Which of the following is a vector?

(a) Current
(b) Time
(c) Acceleration
(d) Volume

146. If the kinetic energy of a body is increased by 800%, the momentum will increase by:

(a) 100% (b) 200%
(c) 150% (d) 300%

147. If the electron in a hydrogen atom jumps from the third orbit to the second orbit, the wavelength of the emitted radiation is given by

(a) $\lambda = \frac{36}{5\mathrm{R}}$
(b) $\lambda = \frac{5\mathrm{R}}{36}$

(c) $\lambda = \frac{5}{R}$

(d) $\lambda = \frac{R}{6}$

148. The displacement x (in meters) of a particle performing simple harmonic motion is related to time t (in second) as $x = 0.05\cos\left(4\pi t + \frac{\pi}{4}\right)$. The frequency of the motion will be

(a) 5 Hz

(b) 1.0 Hz

(c) 1.5 Hz

(d) 2.0 Hz

149. If an alternating current of 60 Hz frequency is flowing through an inductance of $L = 1$ mH and the voltage across the inductor is 0.6 Volt, then the current is

(a) $\frac{1}{\pi}$ A

(b) $\frac{5}{\pi}$ A

(c) $\frac{50}{\pi}$ A

(d) $\frac{20}{\pi}$ A

150. A body covers one-third of the time with a velocity v_1, the second one-third of the time with a velocity v_2, and the last one-third of the time with a velocity v_3. The average velocity is:

(a) $\frac{v_1 + v_2 + v_3}{3}$

(b) $\frac{3v_1v_2v_3}{v_1v_2 + v_2v_3 + v_3v_1}$

(c) $\frac{v_1v_2 + v_2v_3 + v_3v_1}{3}$

(d) $\frac{v_1v_2v_3}{3}$

151. Choose correct option of acceleration due to gravity for poles and equator.

(a) $g_p > g_{eq}$

(b) $g_p < g_{eq}$

(c) $g_p = g_e$

(d) Can be either of the three options (A), (B) and (C) depending upon whether it is day or night

152. If an α-particle and a proton are accelerated from rest by a potential difference of 1 Megavolt then the ratio of their kinetic energy will be

(a) $\frac{1}{2}$

(b) 1

(c) 2

(d) 4

153. Two charges 4q and q are placed at a distance l apart. A third charged particle Q is placed at the middle of them. If the resultant force on q is zero then the value of Q is

(a) q

(b) $-q$

(c) $2q$

(d) $-2q$

154. A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre

(a) Increases as r increases for $r < R$ as well as for $r > R$

(b) Zero as r increases for $r < R$, decreases as r increases for $r > R$

(c) Zero as r increases for $r < R$, increases as r increases for $r > R$

(d) Decreases as r increases for $r < R$ as well as for $r > R$

155. A man fires a bullet of mass 200 g at a speed of 5 m/s. The gun is of one kg mass. By what velocity the gun rebounds backwards?

(a) 0.1 m/s

(b) 10 m/s

(c) 1 m/s

(d) 0.01 m/s

156. If the heat of 140 J is added to a gaseous system and change in internal energy is 30 J, then the amount of work done by the gas is:

(a) 180 J

(b) 70 J

(c) 110 J

(d) 30 J

157. If the length of the second's hand in a stop clock is 3 cm the angular velocity and linear velocity of the tip is:

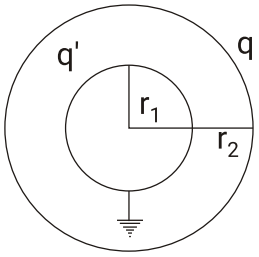
(a) 0.2047 rad/sec., 0.0314 m/sec

(b) 0.2547 rad/sec., 0.314 m/sec

(c) 0.1472 rad/sec., 0.06314 m/sec

(d) 0.1047 rad/sec., 0.00314 m/sec

158. Two concentric conducting shells are of radii r_1 and r_2. The outer shell is given a charge q. The electric field at a distance r from the common centre of the shells is $(r_1 < r < r_2)$



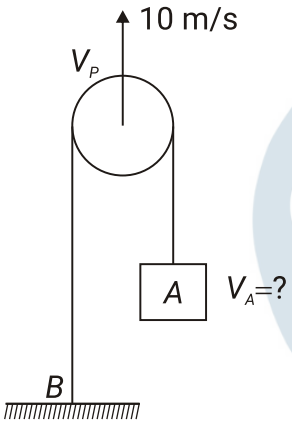
(a) zero

(b) $\frac{kqr_1^2}{r_2r^2}$

(c) $\frac{kqr_1}{r_2r}$

(d) $\frac{kqr_1}{r_2r^2}$

159. Find out the velocity of Block A, in the given system?



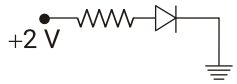
(a) $40m/s^{-1}$ (upward direction)

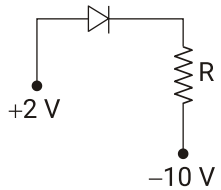
(b) $20m/s^{-1}$ (upward direction)

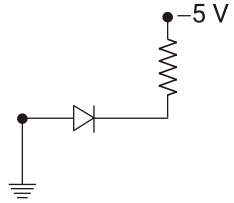
(c) $80m/s^{-1}$ (downward direction)

(d) $60m/s^{-1}$ (upward direction)

160. Which of the following circuits is reverse-biased?

(a) 

(b) 

(c) 

(d)