EAMCET MODEL PAPER

ENGINEERING

No. of Questions: 160 **Maximum Marks: 160** **Time: 3 hours**

MATHEMATICS

1 If A = {1, 2, 3 } and B = {1, 2, 3, 4, 5 } then the number of onto functions that can be defined from A to B is

1) 0 2) 48 3) 36 4) 81

2. The range of $f(x) = \frac{1}{3 - \cos 4x}$ is

1) $\left[\frac{1}{4}, \frac{1}{2}\right]$ 2) $\left(\frac{1}{4}, \frac{1}{3}\right)$ 3) $[-2, 2]$ 4) $[0, \infty)$

3. If the graph of the function y = f(x) is symmetrical about the line x = 2 then

1) f(x) = f(–x) 2) f(2 + x) = f(2 – x)

3) f(x + 2) = f(x – 2) 4) f(x) = –f(–x)

4. The value of the sum in the nth bracket of (1) + (2 + 3) + (4 + 5 + 6 + 7) + (8 + 9 + 10 + ...15) + ... (n > 1) is

1) $2^n (2^n + 2^{n-1} - 1)$ 2) $2^{n-1}(2^n + 2^{n-1} - 1)$

3) $2^{n-2}(2^n + 2^{n-1} - 1)$ 4) $2^n (2^n + 2^{n-1})$

5. The sum of the series $\frac{1}{\sin 45° \sin 46°} + \frac{1}{\sin 47° \sin 48°} + ... + \frac{1}{\sin 133° \sin 134°}$

is cosec n° then n =

1) 2 2) 3 3) 10 4) 1

6. If $\frac{\cos x}{\cos(x - 2y)} = \lambda$, then $\frac{1 - \lambda}{1 + \lambda} \cot y$ =

1) tan (x – 2y) 2) tan (x + 2y)

3) tan (x – y) 4) tan (x + y)

7. cot 16° cot 44° + cot 44° cot 76° – cot 76° cot 16° =

1) 0 2) 1 3) 3 4) 4

8. If tan ax – tan bx = 0, a ≠ b then the solutions of 'x' form a

1) H.P. 2) G.P. 3) A.P. 4) A.G.P.

9. The value of $\sin^{-1}$ (sin 10) is

1) 10 2) 10 – 3π 3) 3π – 10 4) 2π – 10

10. If $x = \log\left[\tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)\right]$ then cos hx =

1) sin θ 2) cos θ 3) sec θ 4) cosec θ

11. In ΔABC, if $2r_1 = 3r_2 = r_3$, then a : b : c =

1) 4 : 3 : 5 2) 3 : 4 : 5 3) 5 : 3 : 4 4) 3 : 5 : 4

12. In ΔABC if A is right angle, then $\cos^{-1}\left[\frac{R}{r_2 + r_3}\right]$ is

1) 30° 2) 60° 3) 90° 4) 45°

13. A 20 mt long tree is broken by wind and the top struck the ground at an angle of 30°. The height of the point where the tree is broken is

1) $\frac{10}{3}$ mt 2) $\frac{20}{3}$ mt 3) $\frac{16}{3}$ mt 4) 7 mt

14. If $z_k = \cos\left(\frac{k\pi}{10}\right) + i \sin\left(\frac{k\pi}{10}\right)$, Then $z_1\, z_2\, z_3\, z_4$ =

1) –1 2) 1 3) –2 4) 2

15. If $|z + 4| \le 3$ then the maximum value of $|z + 1|$ is

1) 6 2) 0 3) 4 4) 10

16. If $\left(\sqrt{3} + i\right)^{100} = 2^{99}$ (a + ib) then b =

1) 1 2) $\sqrt{3}$ 3) $\sqrt{2}$ 4) 2

17. $\left(a . \bar{i}\right)^2 + \left(\bar{a} . \bar{j}\right)^2 + \left(\bar{a} . \bar{k}\right)^2$ =

1) a^{-2} 2) $2a^{-2}$ 3) $3a^{-2}$ 4) $4a^{-2}$

18. If $|\bar{a}| = 3, |\bar{b}| = 4, |\bar{a} - \bar{b}| = 5$, then $|\bar{a} + \bar{b}|$ =

1) 6 2) 5 3) 4 4) 3

19. ABC is an equilateral triangle of side 'a'.

Then $\overline{AB} . \overline{BC} + \overline{BC} . \overline{CA} + \overline{CA} . \overline{AB}$ =

1) $-\frac{a^2}{2}$ 2) $-a^2$ 3) $-\frac{3a^2}{2}$ 4) $-2a^2$

20. Observe the following statements and choose the correct answer:

Assertion (A): Vector equation of the plane passing through the point (1, –2, –3) and parallel to the Vectors (2, –1, 3), (2, 3, –6) is $\bar{r} = (\bar{i} - 2\bar{j} - 3\bar{k}) + \alpha(2\bar{i} - \bar{j} + 3\bar{k}) + \beta(2\bar{i} + 3\bar{j} - 6\bar{k})$ $\alpha, \beta \in R$.

Reason (R): Vector equation of plane through the point A $(\bar{a})$ and parallel to the vectors $\bar{b}$, $\bar{c}$ is $\bar{r} = \bar{a} + \alpha b + \beta c$ where $\alpha, \beta \in R$

1) A is true, R is false

2) A is false, R is true

3) A, R are true and R $\Rightarrow$ A

4) A, R are true but R $\not\Rightarrow$ A

21. If $\bar{a}, \bar{b}, \bar{c}$ are unit vectors then $\left|\bar{a} - \bar{b}\right|^2 + \left|\bar{b} - \bar{c}\right|^2 + \left|\bar{c} - \bar{a}\right|^2$ does not exceed

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

22. If the quadratic equation $ax^2 + 2cx + b = 0$ and $ax^2 + 2bx + c = 0$ $(b \ne c)$ have a common root, then a + 4b + 4c =

1) 0 2) 1 3) –1 4) 2

23. The roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ are

1) $\frac{c(a-b)}{a(b-c)}, \frac{b(c-a)}{c(a-b)}$ 2) $\frac{b(c-a)}{c(a-b)}, 1$

3) $1, \frac{c(a-b)}{a(b-c)}$ 4) $\frac{c(a-b)}{b(c-a)}, 1$

24. To remove 2nd term in $f(x) = x^4 + 8x^3 + x - 5 = 0$, we have to translate the equation to $f(x+h) = 0$ then $h =$

1) 1 2) 2 3) –2 4) –1

25. The equation of lowest degree with rational coefficients having a root $\sqrt{3} + \sqrt{2}$ is

1) $x^4 + 10x^2 - 1 = 0$ 2) $x^4 - 10x^2 + 1 = 0$

3) $x^4 + 10x^2 + 1 = 0$ 4) $x^4 - 10x^2 - 1 = 0$

26. If $f(x) = \begin{vmatrix} x+\lambda & x & x \\ x & x+\lambda & x \\ x & x & x+\lambda \end{vmatrix}$ then $f(3x) - f(x)$ is equal to

1) $3x\lambda^2$ 2) $6x\lambda^2$ 3) $x\lambda^2$ 4) $5x\lambda^2$

27. If $A = \begin{pmatrix} \cos x & \sin x & 0 \\ -\sin x & \cos x & 0 \\ 0 & 0 & 1 \end{pmatrix} = f(x)$, then $A^{-1} =$

1) $f(-x)$ 2) $f(x)$ 3) $-f(x)$ 4) $-f(-x)$

28. The number of solutions of the system $x - y + z = 0$, $x + 2y - z = 0$, $2x + y + 3z = 0$ is

1) 1 2) 2 3) 3 4) Infinite

29. The number of four letter words that can be formed using the letters of the word MIXTURE which contains the letter X is

1) 120 2) 360 3) 480 4) 240

30. There are '10' points in a plane of which no three points are collinear and four points are concyclic. The number of different circles that can be drawn through at least 3 points is

1) 117 2) 116 3) 115 4) 120

31. The number of different nine digit numbers can be formed from the number 223355888 by rearranging its digits so that the odd digits occupy even position is

1) 16 2) 36 3) 60 4) 180

32. ${}^{15}C_0 \cdot {}^5C_5 + {}^{15}C_1 \cdot {}^5C_4 + {}^{15}C_2 \cdot {}^5C_3 + {}^{15}C_3 \cdot {}^5C_2 + {}^{15}C_4 \cdot {}^5C_1 =$

1) $20^{20}, -2^5$ 2) $\frac{20!}{5!15!}$ 3) $\frac{20!}{5!15!} - 1$ 4) $\frac{20!}{5!15!} - \frac{15!}{5!10!}$

33. Coefficient of x^{16} in $(x^2+1)(x^2+4)(x^2+9)\ldots\ldots(x^2+81)$ is

1) –385 2) 385 3) 285 4) –285

34. The integer just less than $\left(\sqrt{2}+1\right)^6 =$

1) 196 2) 197 3) 198 4) 199

35. Number of diagonals in a pentagon

1) 5 2) 4 3) 10 4) 35

36. The mean and S.D. of the marks of 200 candidates were found to be 40 and 15 respectively. Later, it was discovered that a score of 40 was wrongly read as 50. The correct mean and S.D. respectively are

1) 14.98, 39.95 2) 39.95, 14.98

3) 39.95, 224.5 4) None of these

37. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is

1) $\frac{2}{9}$ 2) $\frac{1}{9}$ 3) $\frac{8}{9}$ 4) $\frac{7}{9}$

38. In a class 60% are boys and the rest are girls. 50% of boys and 25% of girls know cricket. If a student is selected at random and given that the selected student is a cricketer. The probability that the selected student is a girl is

1) $\frac{1}{4}$ 2) $\frac{1}{3}$ 3) $\frac{2}{3}$ 4) $\frac{3}{4}$

39. $\frac{1+3p}{3}, \frac{1-p}{4}, \frac{1-2p}{2}$ are the probability of three mutually exclusive events then the set of all values of p is

1) $\left[\frac{1}{4}, \frac{1}{3}\right]$ 2) $\left[\frac{1}{4}, \frac{1}{2}\right]$ 3) $\left[\frac{1}{3}, \frac{1}{2}\right]$ 4) $\left[\frac{1}{4}, \frac{2}{3}\right]$

40. If the mean and the variance of a binomial variate X are 2 and 1 respectively, then the probability that X takes a value greater than 1 is equal to

1) $\frac{3}{16}$ 2) $\frac{5}{16}$ 3) $\frac{11}{16}$ 4) $\frac{13}{16}$

41. If a point (x, y) = (tan θ + sin θ, tan θ − sin θ), then the locus of (x, y) is

1) $(yx^2)^{2/3} + (xy^2)^{2/3} = 1$ 2) $x^2 + y^2 = 4xy$

3) $x^2 - y^2 = 12xy$ 4) $(x^2 - y^2)^2 = 16xy$

42. The point (4, 1) undergoes the following transformations successively

i) Reflection about the line y = x

ii) Translation through 4 units along the positive direction of X – axis.

iii) Rotation through an angle $\frac{\pi}{4}$ about the

origin in the clock wise direction. The final position of the point is

1) $\left(\frac{9}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ 2) $\left(\frac{9}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

3) $\left(-\frac{9}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ 4) $\left(-\frac{9}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

43. The equation of the two sides of a square whose area is 25 sq. units are 3x – 4y = 0 and 4x + 3y = 0, the equations of the other two sides of the square are

1) 3x – 4y ± 25 = 0, 4x + 3y ± 25 = 0

2) 3x – 4y ± 5 = 0, 4x + 3y ± 5 = 0

3) 3x – 4y ± 5 = 0, 4x + 3y ± 25 = 0

4) 3x – 4y = 0, 4x + 3y = 0

44. The equation of perpendicular bisectors of the sides AB and AC of triangle ABC are $x - y + 5 = 0$ and $x + 2y = 0$ respectively. If the vertex A is $(1, -2)$ then the vertex B is

1) $\left(\frac{11}{5}, \frac{2}{5}\right)$ 2) $\left(\frac{2}{5}, \frac{11}{5}\right)$ 3) $(-7, 6)$ 4) $(-7, -6)$

45. A diagonal of the rectangle formed by the lines $x^2 - 7x + 6 = 0$ and $y^2 - 14y + 40 = 0$ is

1) $5x + 6y = 0$ 2) $5x - 6y = 0$

3) $6x - 5y + 14 = 0$ 4) $6x - 5y - 14 = 0$

46. The equation of one diagonal of the square formed by the pair lines $3x^2 + 8xy - 3y^2 = 0$, $3x^2 + 8xy - 3y^2 + 2x - 4y - 1 = 0$ is

1) $2x + 4y - 1 = 0$ 2) $2x - 4y - 1 = 0$

3) $2x - 4y + 1 = 0$ 4) $2x - 4y = 0$

47. A point of the form $(2 \sec\alpha \cos\beta, 2 \sec\alpha \sin\beta, 2 \tan\alpha)$ for $\alpha, \beta \in R$ always lies on

1) $x^2 + y^2 + z^2 = 4$ 2) $x^2 + y^2 + z^2 = 1$

3) $x^2 + y^2 - z^2 = 4$ 4) $x^2 + y^2 - z^2 = 1$

48. If the feet of the perpendiculars from (3, 4, 5) to the coordinate axes are A, B, C and the angle between AB and AC is $\cos^{-1}\left(\frac{9}{a}\right)$ then a =

1) $5\sqrt{34}$ 2) $3\sqrt{34}$ 3) $\sqrt{34}$ 4) 25

49. If P = (1, 5, 6) and Q = (2, 1, 3), then the length of projection of PQ on the plane $2x + 3y - z + 17 = 0$ is

1) $2\sqrt{10}$ 2) $3\sqrt{10}$ 3) $\left(\frac{2}{3}\right)\sqrt{10}$ 4) $\left(\frac{3}{2}\right)\sqrt{10}$

50. The planes $x = 0$, $x = a$, $y = 0$, $y = a$, $z = 0$ and $z = a$ form a

1) Parallelepiped

2) Rectangular parallelepiped with distinct edges

3) Cube

4) Tetrahedron

51. For the circle $x^2 + y^2 = 25$, the points $(-3, 4)$, $(3, -4)$ are

1) Inverse points

2) Conjugate points

3) Extremities of diameter

4) Poles of $x + y + 15 = 0$, $x + y - 2 = 0$ with respect to $x^2 + y^2 = 25$

52. For all real values of λ, the polar of $(2\lambda, \lambda - 4)$ with respect to $x^2 + y^2 - 4x - 6y + 1 = 0$ passes through the point

1) (0, 0) 2) (3, 1) 3) (3, −1) 4) (−3, −1)

53. In a series of 2n observations, half of them equal to a and remaining half equal to −a. If the standard deviation of the observations is 2, then $|a|$ equals to

1) $\frac{\sqrt{2}}{n}$ 2) $\sqrt{2}$ 3) 2 4) $\frac{1}{n}$

54. The equation of circle touching the line $2x + 3y + 1 = 0$ at the points $(1, -1)$ and orthogonal to the circle which has the line segment having end points $(0, -1)$ and $(-2, 3)$ as diameter is

1) $2x^2 + 2y^2 - 10x - 5y + 1 = 0$

2) $x^2 + y^2 - 10x + 5y + 1 = 0$

3) $x^2 + y^2 - 10x - 5y - 1 = 0$

4) $2(x^2 + y^2) + 10x + 5y - 1 = 0$

55. If $a \neq 0$ and the line $2bx + 3cy + 4d = 0$ passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ then

1) $d^2 + (2b - 3c)^2 = 0$ 2) $d^2 + (3b + 2c)^2 = 0$

3) $d^2 + (2b + 3c)^2 = 0$ 4) $d^2 + (3b - 2c)^2 = 0$

56. The number of normals to the parabola $y^2 = 4x$ through $(5, 2)$ is

1) 0 2) 1 3) 2 4) 3

57. If the normal at a point P on the ellipse $x^2/a^2 + y^2/b^2 = 1$, $a > b$ meets the axes in M and N so that $\frac{PM}{PN} = \frac{2}{3}$. Then the value of eccentricity e is

1) $\frac{1}{\sqrt{2}}$ 2) $\sqrt{\left(\frac{2}{3}\right)}$ 3) $\frac{1}{\sqrt{3}}$ 4) $\frac{2}{3}$

58. The eccentric angles of the extremities of a focal chord of an ellipse are $\frac{7\pi}{12}$ and $\frac{-\pi}{12}$ then e =

1) $\frac{1}{\sqrt{2}}$ 2) $\sqrt{\left(\frac{2}{3}\right)}$ 3) $\frac{\sqrt{3}}{4}$ 4) $\frac{\sqrt{3}}{2}$

59. If the circle $x^2 + y^2 = a^2$ intersects the hyperbola $xy = c^2$ in four points $P(x_1, y_1)$, $Q(x_2, y_2)$, $R(x_3, y_3)$, $S(x_4, y_4)$ then which of the following is not true?

1) $x_1 + x_2 + x_3 + x_4 = 0$ 2) $y_1 + y_2 + y_3 + y_4 = 0$

3) $x_1x_2x_3x_4 = C^4$ 4) $y_1y_2y_3y_4 = C^2$

60. If the complex numbers z_1, z_2, z_3 are such that $\frac{z_1 - z_3}{z_2 - z_3} = \frac{1 - i\sqrt{3}}{2}$, then z_1, z_2, z_3 form

1) right angled triangle

2) isosceles and right angled triangle

3) equilateral triangle

4) collinear points

61. $\lim_{n\to\infty}\left(\frac{1^2+1}{n^3} + \frac{2^2+2}{n^3} + \frac{3^2+3}{n^3} + \ldots\ldots\ldots \frac{n^2+n}{n^3}\right) =$

1) $\frac{1}{6}$ 2) $\frac{1}{4}$ 3) $\frac{1}{3}$ 4) $\frac{1}{2}$

62. $\lim_{x\to 0} \frac{(ab)^x - a^x - b^x + 1}{x^2}$ is

1) log a 2) log b 3) log a log b 4) 1

63. If $\sqrt{\frac{v}{u}} + \sqrt{\frac{u}{v}} = 6$ then $\frac{dv}{du} =$

1) $\frac{17u - v}{u - 17v}$ 2) $\frac{u - 17v}{17u - v}$ 3) $\frac{17u + v}{u - 17v}$ 4) $\frac{u + 17v}{17u - v}$

64. If $y = \tan^{-1}\left(\frac{1}{1 + x + x^2}\right) + \tan^{-1}\left(\frac{1}{x^2 + 3x + 3}\right) + \tan^{-1}\left(\frac{1}{x^2 + 5x + 7}\right)$ then $y'(0) =$

1) $-\frac{3}{10}$ 2) $-\frac{5}{10}$ 3) $-\frac{7}{10}$ 4) $-\frac{9}{10}$

65. At x = 0, the equation to the normal to the curve $y = (1 + x)^y + \sin^{-1}(\sin^2 x)$ is

1) $x + y + 1 = 0$ 2) $x + y - 1 = 0$ 3) $x + y = 0$ 4) $x - y + 1 = 0$

66. If $a^2x^4 + b^2y^4 = c^6$, the maximum value of xy is

1) $\frac{c^2}{\sqrt{ab}}$ 2) $\frac{c^3}{ab}$ 3) $\frac{c^3}{\sqrt{2ab}}$ 4) $\frac{c^3}{2ab}$

67. The height of a cylinder of the greatest possible volume which can be inscribed in a sphere of radius R is

1) $\frac{R}{\sqrt{3}}$ 2) $\frac{\sqrt{3}}{R}$ 3) $\frac{2\sqrt{3}}{R}$ 4) $\frac{2R}{\sqrt{3}}$

68. The equation of the common tangent to the curves $y^2 = 8x$ and $xy = -1$ is

1) $3y = 9x + 2$ 2) $y = 2x + 1$ 3) $2y = x + 8$ 4) $y = x + 2$

69. Tangents drawn from P(1, 8) to the circle $x^2 + y^2 - 6x - 4y - 11 = 0$ touch the circle at A and B. The equation of circumcircle of triangle PAB is

1) $x^2 + y^2 - 2x + 6y - 29 = 0$ 2) $x^2 + y^2 - 6x - 4y + 19 = 0$

3) $x^2 + y^2 + 4x - 6y + 19 = 0$ 4) $x^2 + y^2 - 4x - 10y + 19 = 0$

70. Value of $\frac{\int_0^n [x]dx}{\int_0^n \{x\}dx}$ where [x] and {x} are integral and fractional parts of x and $n \in N$, is equal to

1) n 2) n − 1 3) $\frac{1}{n-1}$ 4) $\frac{1}{n}$

71. If $\int 1 + \tan(x - \alpha)\tan(x + \alpha)dx = \lambda \log_e\left|\frac{\cos(x + \alpha)}{\cos(x - \alpha)}\right| + c$ then $\lambda =$

1) $\cot 2\alpha$ 2) $\tan 2\alpha$ 3) $-\cot 2\alpha$ 4) $-\tan 2\alpha$

72. If $\int \frac{e^x - e^{-x}}{e^{2x} + e^{-2x}} dx = A \log_e\left|\frac{e^x + e^{-x} + a}{e^x + e^{-x} - a}\right| + c$, then (A, a) =

1) $\left(\frac{1}{2\sqrt{2}}, \sqrt{2}\right)$ 2) $\left(\frac{1}{2\sqrt{2}}, 2\sqrt{2}\right)$

3) $\left(\frac{1}{2\sqrt{2}}, -2\sqrt{2}\right)$ 4) $\left(\frac{1}{2\sqrt{2}}, -\sqrt{2}\right)$

73. $\int_1^{16} \frac{dx}{\sqrt[4]{x}\ \sqrt{1+\sqrt[4]{x^3}}} =$

1) 8 2) $\frac{8}{3}\left(\sqrt{7}-\sqrt{2}\right)$ 3) $\frac{8}{3}\left(3-\sqrt{2}\right)$ 4) $\frac{8}{3}\left(\sqrt{8}-\sqrt{2}\right)$

74. $\int_{1/2}^{2} \frac{1}{x}\sin\left(\frac{1}{x}-x\right)dx =$

1) $\frac{\sqrt{3}}{2}$ 2) $2\sin\left(\frac{3}{2}\right)$ 3) 0 4) $4\sin\left(\frac{3}{2}\right)$

75. Match the following

List - I	**List - II**
1) Area bounded by $y^2 = 4ax$ and $x^2 = 4ay$ is	a) $\frac{8a^2}{3}$
2) Area bounded by $y^2 = 4ax$ and its latus rectum is	b) πa^2
3) Area bounded by $y = \sqrt{a^2 - x^2}$ and its diameter $y = 0$ is	c) $\frac{16a^2}{3}$
4) Area bounded by $x = a\cos\theta$, $y = a\sin\theta$ is	d) $\frac{\pi a^2}{2}$

The correct match from List – I to List – II is

1) 1-c, 2-a, 3-d, 4-b 2) 1-d, 2-b, 3-a, 4-c

3) 1-a, 2-c, 3-b, 4-d 4) 1-b, 2-d, 3-c, 4-a

76. $\lim_{x\to\infty} x^2\sqrt{\left(1-\cos\frac{1}{x}\right)\sqrt{\left(1-\cos\frac{1}{x}\right)\sqrt{\left(1-\cos\frac{1}{x}\right)\sqrt{...\ to\ \infty}}}}$ equals

1) $\frac{1}{4}$ 2) $\frac{1}{2}$ 3) 1 4) 0

77. Area of the region bounded by $a^2y^2 = x^2(a^2 - x^2)$ is

1) $\frac{4a^2}{3}$ 2) $\frac{a^2}{3}$ 3) $\frac{2a^2}{3}$ 4) $\frac{8a^2}{3}$

78. The curve whose sub tangent is twice the abscissa of the point of contact and passing through (1, 2) is

1) $y^2 = 4x$ 2) $y^2 = 2x + 2$ 3) $x^2 = 4y - 3$ 4) $x^2 = -4y$

79. If $\frac{dy}{dx} = \frac{y + x\tan\frac{y}{x}}{x} \Rightarrow \sin\frac{y}{x} =$

1) cx^2 2) cx 3) cx^3 4) cx^4

80. The differential equation of family of circles $x^2 + y^2 + 2\lambda x + c = 0$ is (where λ, c both are parameters)

1) $y\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + 1 = 0$ 2) $y\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 = 0$

3) $\left(\frac{d^2y}{dx^2}\right) + \left(\frac{dy}{dx}\right)^2 = 0$ 4) $\left(\frac{d^2y}{dx^2}\right) + \left(\frac{dy}{dx}\right)^2 + 1 = 0$

PHYSICS

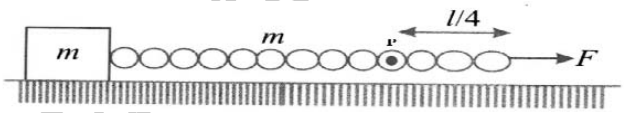
81. When a wave traverses a medium the displacement of a particle located at 'x' at a time 't' is given by y = asin (bt – cx), where a, b, c are constants of the wave, which of the following is a quantity with dimensions

1) $\frac{y}{a}$ 2) bt 3) cx 4) $\frac{b}{c}$

82. At time t = 0, two bodies A and B are at the same point. A moves with constant velocity V and B starts from rest and moves with constant acceleration along same direction. Relative velocity of B with respect to A when the bodies again meet each other is

1) 2V 2) $\frac{V}{2}$ 3) $\frac{V}{3}$ 4) V

83. A block of mass m is pulled by a uniform chain of mass 'm' tied to it by applying a force 'F' at the other end of the chain. The tension at a point 'P' which is at a distance of quarter of the length of the chain from the free end, will be



1) $\frac{3F}{4}$ 2) $\frac{7F}{8}$ 3) $\frac{6F}{7}$ 4) $\frac{4F}{5}$

84. A block of mass m is placed on a surface with a vertical cross-section given by $y = \frac{x^3}{6}$.

If the coefficient of friction is 0.5, the maximum height above the ground at which the block can be placed without slipping is

1) $\frac{1}{6}$ m 2) $\frac{2}{3}$ m 3) $\frac{1}{3}$ m 4) $\frac{1}{2}$ m

85. A coin is placed at the edge of a horizontal disc rotating about a vertical axis through its axis with a uniform angular speed 2 rad s^{-1}. The radius of the disc is 50 cm. The minimum coefficient of friction between disc and coin so that the coin does not slip

$\left(g = 10\ ms^{-2}\right)$ is

1) 0.1 2) 0.2 3) 0.3 4) 0.4

86. A pendulum consist of a wooden bob of mass (m) and length (*l*). A bullet of mass (m_1) is fired towards the pendulum with a speed υ_1.The bullet emerges out of the bob with a speed $\frac{\upsilon_1}{3}$, and the bob just complete the vertical circle. The value of υ_1 is

1) $\left(\frac{m}{m_1}\right)\sqrt{5gl}$ 2) $\frac{m}{m_1}\sqrt{\frac{g}{l}}$ 3) $\frac{2}{3}\left(\frac{m}{m_1}\right)\sqrt{5\,gl}$ 4) $\frac{3}{2}\left(\frac{m}{m_1}\right)\sqrt{5\,gl}$

87. A helicopter of power P can rise vertically upwards with a maximum uniform speed V. It can move horizontally with uniform speed V_1. If the air resistance is R times the velocity. The mass of the helicopter (in terms R, V, V_1 and g) is

1) $\frac{R\left[(V_1)^2 - V^2\right]}{gV}$ 2) $\frac{R\left[V^2 - (V_1)^2\right]}{gV}$

3) $\frac{R\left[V^2 + (V_1)^2\right[}{gV}$ 4) $\frac{R\left(V_1 + V\right)}{g}$

88. Two balls are thrown simultaneously in air. The acceleration of centre of mass of the two balls while in air

1) depends on the direction of the motion of the balls

2) depends on the masses of the two balls

3) depends on the speeds of the two balls

4) is equal to g

89. A ball is projected with $20\sqrt{2}$ m/s at angle 45° with horizontal. The angular velocity of the particle at highest point of its journey about point of projection is

1) 0.1 rad/s 2) 0.2 rad/s 3) 0.3 rad/s 4) 0.4 rad/s

90. **Assertion (A):** A wheel moving down a perfectly frictionless inclined plane will undergo slipping without rolling.

Reason (R): For perfect rolling motion, work done against friction is zero.

1) Both (A) and (R) are true and (R) is the correct explanation of (A)

2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

3) (A) is true but (R) is false

4) (A) is false but (R) is true

91. The period of simple pendulum on the surface of earth is 'T'. At an attitude of half of the radius of earth from the surface, its period will be

1) $\sqrt{\frac{3}{2}}$ T 2) $\frac{3T}{2}$ 3) $\frac{2T}{3}$ 4) $\sqrt{\frac{2}{3}}$ T

92. A rocket is launched vertically from the surface of the earth of radius 'R' with an initial speed v. If atmospheric resistance is neglected, the maximum height attained by the rocket is given by

1) $h = \frac{R}{\left(\frac{2gR}{v^2} - 1\right)}$ 2) $h = \frac{R}{\left(\frac{2gR}{v^2} + 1\right)}$

3) $h = R\left(\frac{2gR}{v^2} - 1\right)$ 4) $h = R\left(\frac{2gR}{v^2} + 1\right)$

93. One large soap bubble of diameter D breakes into 27 bubbles having surface tension T. The change in surface potential energy is

1) $2\pi TD^2$ 2) $4\pi TD^2$ 3) πTD^2 4) $8\pi TD^2$

94. If there were no gravity, which of the following will not be associated for a fluid?

1)Viscosity

2) Surface tension

3) Pressure

4) Archimedes' upward thrust

95. A uniform solid brass sphere is rotating with an angular speed ω0 about a diameter. If its temperature is now increased by 100°C then its new angular speed will be

($\alpha_B = 2 \times 10^{-5}$ /°C)

1) 1.1 ω_0 2) 1.01 ω_0 3) 0.996 ω_0 4) 0.824 ω_0

96. Read the following.

A) Radius of curvature of Bimetallic strip is inversely proportional to Δt.

B) Water has maximum density & minimum volume at 4°C.

C) If the pressure at triple point is kept constant and temperature increases then only vapour state exists.

D) For a cooking pot, specific heat is low and thermal conductivity is high.

1) ABCD are false
2) ABCD are true
3) Only AC are true
4) Only B & D are true

97. Two tanks A and B contain water at 30°C and 80°C respectively. Calculate the amount of water that must be taken from each tank to prepare 40 kg of water at 50°C ($S_w = 1\ calg^{-1}°C$)

1) 24 kg, 16 kg
2) 20 kg, 20 kg
3) 16 kg, 24 kg
4) 30 kg, 10 kg

98. Two spherical stars A and B emit black body radiation. The radius of A is 400 times that of B and A emits 10^4 times the power emitted from B. The ratio $\left(\frac{\lambda_A}{\lambda_B}\right)$ of their wavelength λ_A and λ_B at which the peaks occur in their respective radiation curves is

1) 3 : 2
2) 2 : 1
3) 5 : 4
4) 1 : 2

99. An ideal gas in addition to other gas laws, also obeys a law $P \propto T^3$ and undergoes an adiabatic change, then the gas behaves as

1) mono atomic
2) di atomic
3) mixture of mono and diatomic
4) mixture of mono and polyatomic

100. If oxygen has root mean square velocity of C m/s then root mean square velocity of Hydrogen will be

1) C m/s
2) $\frac{C}{2}$ m/s
3) 4C m/s
4) $\frac{C}{4}$ m/s

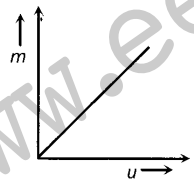
101. A tuning fork produces a wave of wavelength 110 cm in air at 0°C. The wavelength at 25°C would be

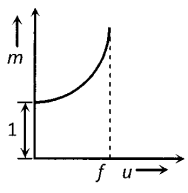
1) 110 cm
2) 115 cm
3) 120 cm
4) 130 cm

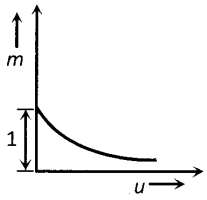
102. A locomotive engine approaches a platform and whistles at a frequency 400 Hz. A stationary observer on the platform observes a change of 40 Hz as the engine passes across him. If velocity of sound in air is 330 m/s, the speed of engine is

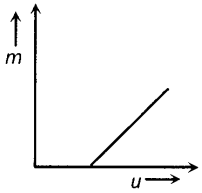
1) 33 m/s
2) 18 m/s
3) 16.5 m/s
4) 24 m/s

103. For a concave mirror, if virtual images formed, the graph between magnification (m) and u is of the form

1) 

2) 

3) 

4) 

104. One of the refracting surfaces of a prism of angle 30° is silvered. A ray of light incident at an angle 60° retraces its path. The refractive index of the material of prism is

1) $\sqrt{2}$
2) $\sqrt{3}$
3) $\frac{3}{2}$
4) 2.0

105. An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation between the objective and the eye piece is 36 cm and the final image is formed at infinity. The focal length f_0 of the objective and the focal length f_e of the eye piece are

1) $f_0 = 45$ cm, $f_e = -9$ cm
2) $f_0 = 7.2$ cm, $f_e = 5$ cm
3) $f_0 = 50$ cm, $f_e = 10$ cm
4) $f_0 = 30$ cm, $f_e = 6$ cm

106. The correct one of the following statements is

1) Diffraction cannot take place without interference of light waves.
2) Interference will not take place with out diffraction of light waves.
3) Interference and diffraction are the result of polarization of light waves.
4) The fringe width in Young's double slit experiment does not depends on the wave length of light used.

107. Three charges 2q, −q, and −q are located at the vertices of an equilateral triangle. At the centroid (E = Intensity of electric field, V = electric potential)

1) E = 0, V = 0
2) E = 0, V ≠ 0
3) E ≠ 0, V ≠0
4) E ≠ 0, V = 0

108. A parallel plate air capacitor is fully charged and then battery is removed. A dielectric slab is now put between the plates. The correct one of the following statements is

1) The charge on the plates decreases
2) The charge on the plates does not change, but the potential difference increases
3) The charge on the plates does not change, the potential difference between the plates decreases and the energy stored also decreases
4) The charge on the plates does not change, the potential difference between the plates increases and the energy stored also increases

109. The colour code for a resistor of resistance 350 mΩ with 5% tolerance is

1) Orange, Green, Yellow, Gold
2) Orange, Green, Gold, Gold
3) Orange, Green, Red, Gold
4) Orange, Green, Silver, Gold

110. In a potentiometer experiment for measuring the e.m.f. of a cell, the null point is at 480 cm when we have a 400 Ω resistor in series with the cell and galvanometer. If the series resistance is reduced to half, the null point will be at

1) 120 cm
2) 240 cm
3) 480 cm
4) 600 cm

111. A square current carrying loop is suspended in uniform magnetic field acting in the plane of the loop. If the force on one arm of the loop is F, the net force on the remaining three arms of the loop is

1) zero
2) −F
3) −3F
4) F

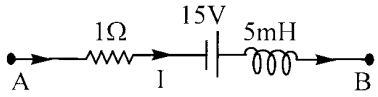
112. If the number of turns of uniform wire used in moving coil galvanometer is doubled then

A) Current sensitivity is doubled

B) Voltage sensitivity remains same

1) Both A and B are true
2) Only A is true
3) Only B is true
4) Neither A not B is true

113. The network shown in figure, is a part of a complete circuit. The potential difference $V_B - V_A$, when the current is 5 A and is decreasing at a rate of 10^3 A/ s is



1) 5 V 2) 10 V 3) 15 V 4) 25 V

114. When the rms voltages V_L,V_C and V_R are measured respectively across the inductor series LCR circuit connected to an AC source, it is found that the ratio $V_L : V_C : V_R = 1 : 2 : 3$. If the rms voltage of the AC source is 100 V, then V_R is close to:

1) 70 V 2) 100 V 3) 50 V 4) 90 V

115. A parallel plate capacitor with plate area A and separation between the plates d, is charged by a constant current I. Consider a plane surface of area A/2 parallel to the plates. The displacement current through the area is

1) I 2) $\frac{I}{2}$ 3) $\frac{I}{4}$ 4) $\frac{I}{8}$

116. A small ball is projected with initial speed u and at an angle θ (> 45°) with horizontal from ground. The de – Broglie wave length of ball at the moment its velocity vector becomes perpendicular to initial velocity vector is

1) $\left(\frac{h}{mu}\right)$ sin θ 2) $\left(\frac{h}{mu}\right)$ cot θ 3) $\left(\frac{h}{mu}\right)$ tan θ 4) $\left(\frac{h}{mu}\right)$ cos θ

117. The angular momentum of an electron in the hydrogen atom is $\frac{3h}{2\pi}$. The kinetic energy of this electron is

1) 4.35 eV 2) 1.51 eV 3) 3.4 eV 4) 6.8 eV

118. After 280 days, the activity of a radioactive sample is 6000 dps. The activity reduces to 3000 dps after another 140 days. The initial activity of the sample in dps is

1) 6000 2) 9000 3) 3000 4) 24000

119. The value of potential barrier of a semi conductor diode depends on

a) Nature of the crystal b) Temperature c) Amount of doping

1) a, b only 2) a, c only 3) b, c only 4) a, b and c

120. Which of the following are different blocks used in detection circuit of Amplitude Modulated wave

A) Square law device B) BAND pass filter

C) Rectifier D) Envelope detector

1) A and B 2) B and C 3) A and C 4) C and D

CHEMISTRY

121. Which one of the following combinations of quantum numbers can refer to an electron in a ground state cobalt atom (z = 27)?

1) n = 3, l = 0, m_l = 2 2) n = 4, l = 2, m_l = –2

3) n = 3, l = 1, m_l = 0 4) n = 2, l = 2, m_l = 0

122. A photon of energy 21.50 eV strikes the metal surface resulting in the ejection of an electron which moves with a kinetic energy of 5.80 eV. The value of threshold energy (work function W) is:

1) 27.90 eV 2) 15.70 eV 3) 21.50 eV 4) 5.80 eV

123. The first ionisation enthalpies of Carbon, Nitrogen and Oxygen respectively are (in eV)

1) 11.3, 13.6, 14.5 2) 13.6, 11.3, 14.5

3) 14.5, 13.6, 11.3 4) 11.3, 14.5, 13.6

124. If Na^+ ion is larger than Mg^{2+} ion and ion is larger than Cl^- ion, which one of the following is least soluble in water?

1) NaCl 2) Na_2S 3) $MgCl_2$ 4) MgS

125. Which one of the following pairs is diamagnetic?

1) B_2, O_2^+ 2) C_2, O_2 3) O_2^{-2}, N 4) N_2, NO

126. Select the true statement about a real gas at high pressure and low temperature.

1) The pressure exerted is greater than ideal gas.

2) Molecular volumes are very much negligible in comparision with the volume of the container.

3) Volume occupied by real gas is less than that of ideal gas.

4) Compressibility factor is equal to one.

127. Which of the following statements regarding noble gases is not correct:

1) All noble gases are monoatomic gases.

2) The inactive nature of noble gases is ascribed to their closed shell structures.

3) Noble gases exhibit low ionisation enthalpy values.

4) Noble gases have very low melting and boiling points.

128. $xI^- + yIO_3^- zH^+ \rightarrow I_2H_2O$ the coefficients x, y, z in the balanced redox reaction respectively

1) 1, 1, 6 2) 1, 5, 6 3) 1, 3, 6 4) 5, 1, 6

129. The molar heat capacity of water is 75 $JK^{-1}mol^{-1}$. What is the amount of heat required to raise the temperature of 100 g of water from 300 to 302.4 K?

1) 10 J 2) 1000 J 3) 375 J 4) 10 kJ

130. When one mole of I_2 is introduced into a 1 L vessel at 1200°C, 5% of it dissociated into iodine atoms. What is the value of the equilibrium constant for the reaction

$I_2(g) \rightleftharpoons 2I$ (g) at 1200°C?

1) 1.05×10^{-3} 2) 1.05×10^{-2} 3) 1.05×10^{-1} 4) 1.05

131. The % of dissociation of 0.05M NH_4OH at 25°C in a solution of pH = 11.

1) 2 2) 3 3) 4 4) 1

132. When equal volumes of the following solutions are mixed, precipitation of AgCl ($K_{SP} = 1.8 \times 10^{-10}$) will occur only with,

1) 10^{-4} M Ag^+ and 10^{-4} M Cl^- 2) 10^{-5} M Ag^+ and 10^{-5} M Cl^-

3) 10^{-6} M Ag^+ and 10^{-6} M Cl^- 4) 10^{-10} M Ag^+ and 10^{-10} M Cl^-

133. Which of the following is the coal gasification reaction?

1) C (s) + H_2O (g) → CO (g) + H_2 (g)

2) CO(g) H_2O(g) → CO2 (g) + H_2 (g)

3) C(s) + $2H_2O$(g) → CH_4(g) + O_2 (g)

4) C + CO_2 → 2CO

134. The correct statement is....

1) alkali metals exist in free state in nature

2) K has higher density than Na

3) excited alkali metals emit radiation in the visible region

4) the harder lithium sinks when thrown into water

135. Match the following

List – I	**List – II**
Diboranae reacts with	**Products formed**
A) H_2O	I) $BCl_3 + HCl$
B) KOH	II) $B_2O_3 + H_2O$
C) Cl_2	III) $H_3BO_3 + H_2$
D) O_2	IV) $KBO_2 + H_2$

The correct match is

1) A–III, B–IV, C–I, D–II

2) A–IV, B–III, C–I, D–II

3) A–III, B–II, C–I, D–IV

4) A–I, B–III, C–II, D–IV

136. **Assertion (A):** Excess amount of CO_2 in air is responsible for green house effect.

Reason (R): CO_2 is largely produced in respiratory functions.

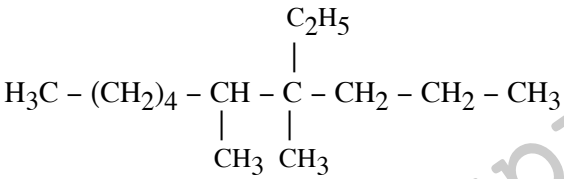
1) Both (A) and (R) are true and (R) is the correct explanation of (A).

2) Both (A) and (R) are true and (R) is not the correct explanation of (A).

3) (A) is true but (R) is false.

4) (A) is false but (R) is true.

137. IUPAC name of the compound is.....



1) 4 - ethyl - 4, 5 – dimethyldecane

2) 3, 4 - dimethyl - 3 – propylnonane

3) 6, 7 - dimethyl - 7 ethyldecane

4) 6, 7 - dimethyl - 7 – propylnonane

138. Boiling point of glycerol is 563 K, but decomposes below its boiling temperature. Therefore best method to purify it is....

1) simple distillation

2) distillation under reduced pressure

3) steam distillation

4) simple vapourisation

139. Methane on heating in air at high pressure in the presence of copper as catalyst gives

1) HCHO 2) CH_3COOH 3) CH_3OH 4) Carbon black

140. In the following reaction X $\xrightarrow{Ozonolysis}$ dial and Y $\xrightarrow[Reagent]{Baeyer\ 's}$ diol; X, Y are

1) C_2H_6, C_2H_6 2) C_2H_4, C_3H_6

3) C_2H_2, C_2H_4 4) C_2H_6, C_6H_6

141. The characteristic axial distances and their angles for orthorhombic crystal sytem are

1) $a = b = c$, $\alpha = \beta = \gamma = 90°$

2) $a \neq b \neq c$, $\alpha = \beta = \gamma = 90°$

3) $a \neq b \neq c$, $\alpha \neq \beta \neq \gamma$

4) $a = b = c$, $\alpha = \beta = \gamma \neq 90°$

142. The lowering of vapour pressure of a solution containing 15 g of non electrolyte in 90 g of water at 373 K is 1.013×10^3 $N.m^{-2}$. The molecular weight of the solute is nearly...

1) 300 g mole^{-1} 2) 90 g mole^{-1} 3) 150 g mole^{-1} 4) 135 g mole^{-1}

143. The osmotic pressure of aqueous solution of K_3 [$Fe(CN)_6$] is same as that of 0.4 M aqueous solution of urea. Then the concentration of K_3 [$Fe(CN)_6$] is..

1) 0.4 M 2) 0.1M 3) 0.2 M 4) 0.8 M

144. The time required for complete decomposition of 2 moles of water using 8 amperes of current in seconds is

1) 4.825×10^4 2) 9.650×10^4

3) 19.300×10^4 4) 38.600×10^4

145. The standard reduction potential of Zn, Ni and Fe electrodes – 0.76 V, –0.23 V and – 0. 44 V respectively.

The reaction $x + y^{2+} \rightarrow x^{2+} + y$ is not spontaneous when....

1) x = Fe, y = Ni 2) x = Ni, y = Fe

3) x = Zn, y = Fe 4) x = Zn, y = Ni

146. For a first order reaction A → B , when concentration A is 0.01 M the rate is found to be 2×10^{-5} mol $L^{-1}S^{-1}$. The half life of the reaction is...

1) 200 s 2) 400 s 3) 436.5 s 4) 346.5 s

147. Which one the following colloids is negatively charged colloid?

1) As_2S_3 2) TiO_2 sol 3) Al_2O_3 xH_2O 4) Fe_2O_3 xH_2O

148. The slag obtained during the extraction of copper from copper pyrites is composed mainly of...

1) $CaSiO_3$ 2) $FeSiO_3$ 3) $CuSiO_3$ 4) SiO_2

149. Which of the following statement is not correct?

1) Basic character of hydrides of group 15 elements decreases from NH_3 to BiH_3

2) NO_2 is the only oxide of nitrogen which dimerises

3) Being small is size nitrogen is highly reactive at ordinary temperature

4) White phosphorous is more reactive than red phosphorous

150. Which of the following statements regarding Ozone is not correct?

1) Ozone is a bent molecule

2) Ozone is a good oxidising aagent

3) Decomeposition of Ozone is endothremic

4) Ozone is diamagnetic in nature

151. Which of the following reactions is feasible?

1) $Br_2 + 2\,Cl^- \rightarrow 2\,Br^- + Cl_2$ 2) $Cl_2 + 2\,F^- \rightarrow 2\,Cl^- + F_2$

3) $Cl_2 + 2\,Br^- \rightarrow 2\,Cl^- + Br_2$ 4) $Cl_2 + 2\,Br^- \rightarrow 2\,I^- + Br_2$

152. Which of the following groups of cations contain two unpaired electrons associated with each of them?

1) Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+} 2) Ti^{4+}, V^{3+}, Cr^{2+}, Mn^{3+}

3) Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+} 4) Ti^{+}, V^{4+}, Cr^{3+}, Mn^{2+}

153. The incorrect statement in the following is...

1) $La(OH)_3$ is less basic than $Lu(OH)_3$

2) In the lanthanoid series the size of Lu^{3+}decreases as atomic number increases

3) Zr and Hf have similar size because of lanthanide contraction

4) Lanthanum belongs to 'd' block

154. Which of the Polymers is formed by step growth polymerization?

1) Nylon 6, 6 2) Polythene 3) PVC 4) Polystyrene

155. The incorrect statement about sucrose is

1) A disaccharide of monomer units glucose and fructose

2) C – 1 of α – glucose and C – 2 of β – fructose form glycosidic linkage

3) Its hydrolysed product has same type of optical rotation (dextro) as that of sucrose

4) A non – reducing sugar

156. Which element is not present in Saccharin, an artificial sweetener?

1) C 2) N 3) S 4) P

157. $CH_3 - CH_2 - CH_2 - \underset{\underset{Br}{|}}{CH} - CH_3 + alc\ KOH \rightarrow \underset{major}{X} + \underset{minor}{Y}$; X, Y are:

1) Pent – 1 – ene, Pent – 2 – ene 2) Pent – 2 ene, Pent – 1 – ene

3) Pentan – 1 – ol, Pentan – 2 – ol 4) Pentan – 2 – ol, Pentan – 1 – ol

158. $CH_3 - CH_2 - OH \xrightarrow[PBr_3]{Na} \begin{matrix}(X)\\(Y)\end{matrix}$ (X) + (Y) → (Z); Z is

1) $H_3C - CH_2 - Br$ 2) $H_3C - CH_2 - ONa$

3) $H_3C - O - CH_2 - CH_3$ 4) $H_3C - CH_2 - O - CH_2 - CH_3$

159. Cannizzaro reaction is not given by

1) CH_3CHO 2) PhCHO 3) HCHO 4) $(CH_3)_3$ CCHO

160. Which one of the following is a Gatterman's reaction?

1) $C_6H_5\overset{+}{N}_2\overset{-}{X} \xrightarrow[HBr]{Cu_2Br_2} C_6H_5Br$

2) $C_6H_5\overset{+}{N}_2\overset{-}{X} \xrightarrow{KI} C_6H_5I$

3) $C_6H_5\overset{+}{N}_2\overset{-}{X} \xrightarrow[HBr]{Cu\ powder} C_6H_5Br$

4) $C_6H_5\overset{+}{N}_2\overset{-}{X} \xrightarrow{C_2H_5OH} C_6H_5Br$

KEY

1-1; 2-1; 3-2; 4-3; 5-4; 6-3; 7-3; 8-3; 9-3; 10-3; 11-1; 12-2; 13-2; 14-1; 15-1; 16-2; 17-1; 18-2; 19-3; 20-3; 21-4; 22-1; 23-3; 24-3; 25-2; 26-2; 27-1; 28-1; 29-3; 30-1; 31-3; 32-4; 33-3; 34-2; 35-1; 36-2; 37-2; 38-1; 39-3; 40-3; 41-4; 42-2; 43-1; 44-3; 45-3; 46-2; 47-3; 48-1; 49-4; 50-3; 51-3; 52-2.; 53-3; 54-1; 55-3; 56-3; 57-3; 58-1; 59-4; 60-3; 61-3; 62-3; 63-2; 64-4; 65-2; 66-3; 67-4; 68-4; 69-4; 70-2; 71-3; 72-4; 73-3; 74-3; 75-1; 76-2; 77-1; 78-1; 79-2; 80-1; 81-4; 82-4; 83-2; 84-1; 85-2; 86-4; 87-1; 88-4; 89-2; 90-2; 91-2; 92-1; 93-2; 94-4; 95-3; 96-2; 97-1; 98-2; 99-3; 100-3; 101-2; 102-3; 103-2; 104-2; 105-4; 106-1; 107-4; 108-3; 109-4; 110-3; 111-2; 112-1; 113-3; 114-4; 115-2; 116-3; 117-2; 118-4; 119-4; 120-4; 121-3; 122-2; 123-4; 124-4.; 125-3; 126-3; 127-3; 128-4; 129-2; 130-2; 131-1; 132-1; 133-1; 134-3; 135-1; 136-2; 137-1; 138-2; 139-3; 140-3; 141-2; 142-1; 143-2; 144-1; 145-2; 146-4; 147-1; 148-4; 149-3; 150-3; 151-3; 152-1; 153-1; 154-1; 155-3; 156-4; 157-2; 158-4; 159-1; 160-3.

(ఈ నమూనా ప్రశ్నపత్రాన్ని శ్రీచైతన్య విద్యాసంస్థలకు చెందిన అధ్యాపకులు రూపొందించారు.)