Subject Code : 101 Section Code : -Select- Difficulty: 1

Subject Code	Q Id	Questions	Answer Key
101	2701	The relation R defined in the set $\{1, 2, 3, 4, 5, 6\}$ as $R = \{(a, b) : b = a + 1\}$ is (A) reflexive (B) symmetric (C) transitive (D) neither reflexive nor symmetric	(D)
101	2702	Let f :R→R be defined by $f(x) = 3x$. Then (A) f is one-one and onto (B) f is onto but not one-one (C) f is one-one but not onto (D) f is neither one-one nor onto	(A)
101	2703	Let f: [−1, 1] →R be a function defined as $f(x) = \frac{x}{x+2}$. The inverse of the function f: [−1, 1] →Range of f is (A) $f^{-1}(y) = \frac{2y}{1-y}, y \neq 1$ (B) $f^{-1}(y) = \frac{y}{1-y}, y \neq 1$ (C) $f^{-1}(y) = \frac{2y}{1+y}$ (D) $f^{-1}(y) = \frac{y}{1+y}$	(A)
101	2704	The binary operation $*$ on Z^+, defined by $a * b = a - b$, is (A) commutative (B) associative (C) commutative and associative (D) neither commutative nor associative	(D)
101	2705	Number of binary operations on the set $\{a, b\}$ (A) 10	(D)

		(B) 16 (C) 20 (D) 8	
101	2706	The principal value of $\tan^{-1}(-\sqrt{3})$ is (A) $-\frac{\pi}{3}$ (B) $\frac{\pi}{3}$ (C) $\frac{2\pi}{3}$ (D) $-\frac{2\pi}{3}$	(C)
101	2707	The value of $\sin^{-1}\left(\sin\frac{3\pi}{5}\right)$ is (A) $\frac{6\pi}{5}$ (B) $\frac{2\pi}{5}$ (C) $\frac{4\pi}{5}$ (D) $\frac{\pi}{5}$	(B)
101	2708	If $x \in [-1, 1]$, then $\sin^{-1} x + \cos^{-1} x$ is (A) π (B) 0 (C) π/2 (D) π/4	(C)
101	2709	If $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, then (adj$A$) A = (A)	(D)

		$\begin{bmatrix} \frac{1}{5} & 0 \\ 0 & \frac{1}{5} \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 5 & 0 \\ 0 & -5 \end{bmatrix}$ (D) $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$	
101	2710	Let $A = \begin{pmatrix} 1 & 2 & x \\ 3 & -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} y \\ x \\ 1 \end{pmatrix}$ be such that $AB = \begin{pmatrix} 6 \\ 8 \end{pmatrix}$. Then (A) y = 2x (B) y = –2x (C) y = x (D) y = –x	(A)
101	2711	If the rank of the matrix $\begin{pmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{pmatrix}$ is 2, then λ is (A) λ = 1 (B) λ = –1 (C) λ= 2 (D) λ= –2	(A)
101	2712	Matrices A and B will be inverse of each other only if (A) AB = BA ≠I (B) AB = BA = 0 (C) AB = 0, BA = I (D) AB = BA=I	(D)
101	2713	The system of equations αx + y +z = 0, x + βy + z = 0, x + y + γz = 0 has a non trivial solution. Then $\frac{1}{1-\alpha}+\frac{1}{1-\beta}+\frac{1}{1-\gamma}=$ (A) 1 (B) 2 (C) –1	(A)

		(D) 0	
101	2714	Force $\vec{F} = \vec{i} + \vec{j} + \vec{k}$ is acting on a particle. If the particle is displaced from $A(3, 3, 3)$ to the point $B(4, 4, 4)$, then work done is (A) 2 units (B) 4 units (C) 3 units (D) 7 units	(C)
101	2715	The area of the parallelogram having a diagonal $3\vec{i} + \vec{j} - \vec{k}$ and a side $\vec{i} - 3\vec{j} - \overrightarrow{4k}$ is (A) $10\sqrt{3}$ (B) $6\sqrt{30}$ (C) $\left(\frac{3}{2}\right)\sqrt{30}$ (D) $3\sqrt{30}$	(D)
101	2716	If $x^2 + y^2 = 1$, then the value of $\frac{1+x+iy}{1+x-iy}$ is (A) $x - iy$ (B) $x + iy$ (C) $2x$ (D) $-2iy$	(B)
101	2717	If ω is the cube root of unity, then the value of $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)$ is (A) 9 (B) –9 (C) 16 (D) 32	(A)
101	2718	The value of $\left[\frac{-1+i\sqrt{3}}{2}\right]^{100} + \left[\frac{-1-i\sqrt{3}}{2}\right]^{100}$ is (A) 2 (B) 0 (C) –1 (D) 1	(C)

101	2719	Area of the region bounded by the curve $y^2 = 4x$, y axis and the line $y = 3$ is (A) 2 (B) 9/4 (C) 9/3 (D) 9/2	(B)
101	2720	If $f(x) = \int_0^x t \sin t dt$, then $f'(x)$ is (A) $\cos x + x \sin x$ (B) $x \sin x$ (C) $x \cos x$ (D) $\sin x + x \cos x$	(B)
101	2721	The integrating factor of $\frac{dy}{dx} + \frac{y}{(x \log x)} = \frac{2}{x^2}$ is (A) e^x (B) $\log x$ (C) $1/x$ (D) e^{-x}	(B)
101	2722	The particular integral of the differential equation $f(D)\, y = e^{ax}$, where $f(D) = (D - a)g(D), g(a) \neq 0$ is (A) $m\, e^{ax}$ (B) $\frac{xe^{ax}}{g(a)}$ (C) $\frac{e^{ax}}{g(a)}$ (D) $g(a)\, e^{ax}$	(B)
101	2723	The value of 'a' so that the curves $y = 3e^x$ and $y = a\, e^{-x}$ intersect orthogonally, is (A) –1 (B) 1 (C) 1/3 (D) 3	(C)

101	2724	The line $y = x + 1$ is a tangent to the curve $y^2 = 4x$ at the point (A) (1, 2) (B) (2, 1) (C) (1, –2) (D) (–1, 2)	(A)
101	2725	The approximate change in the volume of a cube of side x metres caused by increasing the side by 3% is (A) 0.06 x^3 m^3 (B) 0.6 x^3 m^3 (C) 0.09 x^3 m^3 (D) 0.9 x^3 m^3	(C)
101	2726	If the rate of increase of $x^3 - 2x^2 + 3x + 8$ is twice the rate of increase of x, then values of x are (A) (–1/3, –3) (B) (1/3, 1) (C) (–1/3, 3) (D) (1/3, –3)	(B)
101	2727	The point on the curve $x^2 = 2y$ which is nearest to the point (0, 5) is (A) (0, 0) (B) (2, 2) (C) $(2\sqrt{2}, 4)$ (D) $(2\sqrt{2}, 0)$	(C)
101	2728	$\lim_{x\to 0} \frac{a^x - b^x}{c^x - d^x}$ = (A) ∞ (B) 0 (C) $\log\frac{ab}{cd}$	(D)

		(D) $\log\frac{a/b}{c/d}$	
101	2729	The value of 'p', so that the lines $\frac{x-5}{7}=\frac{y+2}{-5}=\frac{z}{p}$ and $\frac{x}{p}=\frac{y}{2}=\frac{z}{3}$ are at right angles, is (A) 2 (B) 1 (C) 3 (D) 5	(B)
101	2730	The point of intersection of the lines $\frac{x-6}{-6}=\frac{y+4}{4}=\frac{z-4}{-8}$ and $\frac{x+1}{2}=\frac{y+2}{4}=\frac{z+3}{-2}$ is (A) (0, 0, – 4) (B) (1, 0, 0) (C) (0, 2, 0) (D) (1, 2, 2)	(A)
101	2731	The direction cosines of the line passing through the points $(-2, 4, -5)$ and $(1, 2, 3)$ are (A) $\frac{3}{\sqrt{87}}, \frac{-2}{\sqrt{87}}, \frac{8}{\sqrt{87}}$ (B) $\frac{3}{\sqrt{87}}, \frac{2}{\sqrt{87}}, \frac{5}{\sqrt{87}}$ (C) $\frac{3}{\sqrt{77}}, \frac{2}{\sqrt{77}}, \frac{5}{\sqrt{77}}$ (D) $\frac{3}{\sqrt{77}}, \frac{-2}{\sqrt{77}}, \frac{8}{\sqrt{77}}$	(D)
101	2732	The distance to the plane $2x - 3y + 4z - 6 = 0$ from the origin is (A) $\frac{3}{\sqrt{29}}$	(C)

		(B) $\frac{4}{\sqrt{29}}$ (C) $\frac{6}{\sqrt{29}}$ (D) $\frac{2}{\sqrt{29}}$	
101	2733	The planes $2x - y + 4z = 5$ and $5x - 2.5y + 10z = 6$ are (A) perpendicular (B) parallel (C) intersect on y-axis (D) passing through (0,0, 5/4)	(B)
101	2734	If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then (A) 3 a^2 –26 a +55 = 0 (B) 3 a^2 –32 a +84 = 0 (C) 3 a^2 –34 a +91 = 0 (D) 3 a^2 –23 a +44 = 0	(B)
101	2735	If the mean and variance of a binomial variate X are 2 and 1 respectively, then P($X \geq 1$) is (A) 1/16 (B) 9/16 (C) 3/4 (D) 15/16	(D)
101	2736	A family has two children. Given that at least one of them is a boy, the probability of both the children are boys, is (A) 3/4 (B) 1/3 (C) 1/4 (D) 1/2	(B)
101	2737		(D)

		The probability of obtaining an even prime number on each die, when a pair of dice is rolled, is (A) 0 (B) 1/3 (C) 1/12 (D) 1/36	
101	2738	The probability that a student is not a swimmer is 1/5. Then the probability that out of five students, four are swimmers is (A) $^5C_4\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$ (B) $^5C_4\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)$ (C) $^5C_1\left(\frac{4}{5}\right)^4\frac{1}{5}$ (D) $^5C_2\left(\frac{4}{5}\right)^2\left(\frac{1}{5}\right)^3$	(A)
101	2739	Given $E(X+c)=8$ and $E(X-c)=12$. Then the value of c is (A) 2 (B) –2 (C) 4 (D) –4	(B)
101	2740	The value of x for which $\frac{x-1}{x}\geq 2$ is (A) $(0,1)$ (B) $(-\infty,-1)$ (C) $(-\infty,0)$ (D) $[-1,0)$	(D)

101	2741	The value of x for which $12x-6<0,\ 12-3x<0$ is (A) ϕ (B) R (C) $R\setminus\{0\}$ (D) set of all non-negative integers	(A)
101	2742	The value of x for which $\lvert x+3\rvert > \lvert 2x-1\rvert$ is (A) $\left(-\frac{2}{3},4\right)$ (B) $\left(-\frac{2}{3},-\infty\right)$ (C) $(0,1)$ (D) $[0,1]$	(A)
101	2743	If $n^4<10^n$ for a fixed positive integer $n\geq 2$, then (A) $(n+1)^4<10^{n+1}$ (B) $(n+1)^4>10^{n+1}$ (C) $(n+1)^4<10^n$ (D) $(n+1)^4>10^n$	(A)
101	2744	If $x^2+6x-27>0$ and $x^2-3x-4<0$, then (A) $x>3$ (B) $x<4$ (C) $3<x<4$	(C)

		(D) $\frac{7}{2}$	
101	2745	Solution of $2x-1-\lvert x+7\rvert$ is (A) –2 (B) 8 (C) –2, 8 (D) 4	(B)
101	2746	If $x \in I$ (set of all integers) such that $x^2-3x<4$, then the number of possible values of x is (A) 3 (B) 4 (C) 6 (D) 2	(B)
101	2747	If $3^{x+1}=6^{\log_2 3}$, then x is (A) 3 (B) 2 (C) $\log_3 2$ (D) $\log_2 3$	(D)
101	2748	The value of $amp(i\omega)+amp(i\omega^2)$, where $i=\sqrt{-1}$ and $\omega=\sqrt[3]{1}=$non-real, is (A) 0 (B) $\frac{\pi}{2}$ (C) π (D) $\frac{\pi}{4}$	(C)
101	2749		(B)

		If the fourth roots of unity are z_1, z_2, z_3, z_4, then $z_1^2 + z_2^2 + z_3^2 + z_4^2$ is equal to (A) 1 (B) 0 (C) i (D) $-i$	
101	2750	If z is a complete number, then $z^2 + \omega z^2 = 2$ represents, where $\omega^3 = 1$, (A) a circle (B) a straight line (C) a hyperbola (D) an ellipse	(C)
101	2751	The value of $\left[i^{19} + \left(\frac{1}{i} \right)^{25} \right]^2$ is (A) 4 (B) –4 (C) 2 (D) –2	(B)
101	2752	The value of $\left\| \sqrt{2i} - \sqrt{-2i} \right\|$ is (A) 2 (B) $\sqrt{2}$ (C) 0 (D) $2\sqrt{2}$	(A)
101	2753	$\cos\left(i \log \frac{a - ib}{a + ib} \right)$ is equal to (A) ab (B)	(B)

		$\frac{a^2-b^2}{a^2+b^2}$ (C) $\frac{a^2-b^2}{2ab}$ (D) $\frac{2ab}{a^2+b^2}$	
101	2754	Locus of the point z satisfying the equation $\|iz-1\|+\|z-i\|=2$ is (A) a straight line (B) a circle (C) an ellipse (D) a pair of straight lines	(A)
101	2755	If the cube root of unity is $1, \omega, \omega^2$, then the roots of the equation $(x+1)^3+8=0$ are (A) $-1, 1+2\omega, 1+2\omega^2$ (B) $-3, -1-2\omega, -1-2\omega^2$ (C) $-1, -1, -1$ (D) $-2, -2\omega, -2\omega^2$	(B)
101	2756	If $x=a+b+c$, $y=a\alpha+b\beta+c$ and $z=a\beta+b\alpha+c$ where α, β are complex cube roots of unity and a, b, c are real, then xyz is equal to (A) $2\left(a^3+b^3+c^3\right)$ (B) $2\left(a^3-b^3-c^3\right)$ (C) $a^3+b^3+c^3-3abc$ (D) $a^3-b^3-c^3$	(C)
101	2757	If z_1, z_2, z_3 are vertices of an equilateral triangle inscribed in the circle $\|z\|=2$ *and if* $z_1=1+i\sqrt{3}$, then (A) $z_2=-2$ and $z_3=1-i\sqrt{3}$	(C)

		(B) $z_2 = 2$ and $z_3 = 1 - i\sqrt{3}$ (C) $z_2 = -2$ and $z_3 = -1 - i\sqrt{3}$ (D) $z_2 = 1 - i\sqrt{3}$ and $z_3 = -1 - i\sqrt{3}$	
101	2758	If $\frac{3}{2+\cos\theta+i\sin\theta} = a+ib,$ then $\left[(a-2)^2+b^2\right]$ is equal to (A) 0 (B) 1 (C) –1 (D) 2	(B)
101	2759	Let z_1 and z_2 be the roots of the equation $z^2 + pz + q = 0$ where p,q are real. The points represented by z_1, z_2 and the origin from an equilateral triangle, if (A) $p^2 = 3q$ (B) $p^2 > 3q$ (C) $p^2 < 3q$ (D) $p^2 = 2q$	(A)
101	2760	The value of sum $\sum_{n=1}^{13}\left(i^n + i^{n+1}\right)$, where $i = \sqrt{-1}$, equals (A) i (B) i–1 (C) – i (D) 0	(B)
101	2761	If $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ where a, b, c are in geometrical progression, then x, y, z are in (A) AP	(A)

		(B) GP (C) HP (D) None of the above	
101	2762	The difference between two numbers is 48 and the difference between their arithmetic mean and their geometric mean is 18. Then the greater of the two numbers is (A) 96 (B) 60 (C) 54 (D) 49	(D)
101	2763	The first two terms of a geometric progression add up to 12. The sum of the third and the fourth terms is 48. If the terms of the geometric progression are alternately positive and negative, then the first term is (A) – 4 (B) – 12 (C) 12 (D) 1	(B)
101	2764	If the first, second and last term of an arithmetic series are a, b, c respectively, then the number of terms is (A) $\frac{b+c-2a}{b-a}$ (B) $\frac{b+c+2a}{b-a}$ (C) $\frac{b+c-2a}{b+a}$ (D) $\frac{b+c+2a}{b+a}$	(A)
101	2765	Find the sum of the series $(1+2)+(1+2+2^2)+(1+2+2^2+2^3)+\ldots$ upto n terms (A) $2^{n+2}-n-4$	(A)

		(B) $2\left(2^n-1\right)-n$ (C) $2^{n+1}-n$ (D) $2^{n+1}-1$	
101	2766	If a, b, c are in arithmetic progression, then the value of $(a+2b-c)(2b+c-a)(a+2b+c)$ is (A) 16 *abc* (B) 4 *abc* (C) 8 *abc* (D) 3 *abc*	(A)
101	2767	The interior angles of a polygon are in AP. The smallest angle is 120° and the common difference is 5°. The number of sides of the polygon is (A) 9 (B) 10 (C) 16 (D) 5	(A)
101	2768	If $S_n=1^3+2^3+\ldots+n^3$ and $T_n=1+2+\ldots+n$, then (A) $S_n=T_{n^3}$ (B) $S_n=T_{n^2}$ (C) $S_n=T_n^2$ (D) $S_n=T_n^3$	(C)
101	2769	The number of real solutions of $x-\frac{1}{x^2-4}=2-\frac{1}{x^2-4}$ is (A) 3 (B) 1 (C) 0 (D) infinite	(C)
101	2770		(C)

		If $x+\lambda y-2$ and $x-\mu y+1$ are factors of the expression $6x^2-xy-y^2-6x+8y-12$, then (A) $\lambda=\frac{1}{3},\ \mu=\frac{1}{2}$ (B) $\lambda=2,\ \mu=3$ (C) $\lambda=\frac{1}{3},\ \mu=\frac{-1}{2}$ (D) $\lambda=2, \mu=-3$	
101	2771	If $x+\frac{1}{x}=5$, then $\left(x^3+\frac{1}{x^3}\right)-5\left(x^2+\frac{1}{x^2}\right)+\left(x+\frac{1}{x}\right)$ is equal to (A) 0 (B) 5 (C) – 5 (D) 10	(A)
101	2772	If $\frac{6x^2-5x-3}{x^2-2x+6}<4$, then the least and highest values of $4x^2$ are (A) 0, 81 (B) 0, 36 (C) – 10, 3 (D) 10, – 3	(A)
101	2773	For real a and b, the roots of the equation $(x-a)(x-b)=abx^2$ are always (A) real (B) purely imaginary (C) complex (D) one rational and other irrational	(A)
101	2774	If $f(x)=2x^3+mx^2-13x+n$ and 2, 3 are roots of the equation $f(x)=0$, then the values of m and n are (A) – 5, – 30 (B) – 5, 30 (C) 5, 30 (D) 5, –30	(B)

101	2775	If $\log_{10} x + \log_{10} y \geq 2$, then the smallest possible value of $x + y$ is (A) 10 (B) 30 (C) 20 (D) 5	(C)
101	2776	The number of real solutions of the equation $27^{\frac{1}{x}} + 12^{\frac{1}{x}} = 2 \times 8^{\frac{1}{x}}$ is (A) one (B) two (C) zero (D) infinite	(C)
101	2777	The roots of the equation $x^{\sqrt{x}} = \sqrt{x^x}$ are (A) 0 and 4 (B) 0 and 1 (C) 0.1 and 4 (D) 1 and 4	(D)
101	2778	How many 10 digit numbers can be written by using the digits 1 and 2? (A) $^{10}C_1 + ^9 C_2$ (B) 2^{10} (C) $^{10}C_2$ (D) $10!$	(B)
101	2779	The total number of 9 digit numbers which have all different digit is (A) $10!$ (B) $9!$ (C) $9.9!$ (D) $10.10!$	(C)

101	2780	The number of possible outcomes in a throw of n ordinary dice in which at least one of the dice shows an odd number is (A) $6^n - 1$ (B) $3^n - 1$ (C) $6^n - 3^n$ (D) 6^n	(C)
101	2781	The number of different garlands, that can be formed using 3 flowers of one kind and 3 flowers of other kind, is (A) 60 (B) 20 (C) 4 (D) 5	(D)
101	2782	The number of divisors of the form $4n+2(\geq 0)$ of the integer 240 is (A) 4 (B) 8 (C) 10 (D) 3	(A)
101	2783	If a, b, c are three natural numbers in AP and $a+b+c=21$, then the possible number of ordered triplet (a, b, c) is (A) 15 (B) 14 (C) 13 (D) 12	(C)
101	2784	The number of different ways of distributions of 10 marks among 3 questions, each question carrying at least 1 mark, is (A) 72 (B) 71 (C) 36 (D) 84	(C)
101	2785	Let A be the set of 4-digit numbers $a_1a_2a_3a_4$ where $a_1 < a_2 < a_3 < a_4$, then $n(A)$ is equal to (A) 126 (B) 84	(A)

		(C) 210 (D) 96	
101	2786	In the binomial expansion of $(a-b)^n$, $n \geq 5$ the sum of the 5th and 6th terms is zero. Then, $\frac{a}{b}$ equals (A) $\frac{n-5}{6}$ (B) $\frac{n-4}{5}$ (C) $\frac{5}{n-4}$ (D) $\frac{6}{n-5}$	(B)
101	2787	The largest coefficient in the expression of $(1+x)^{2n}$ is (A) ${}^{2n}C_n$ (B) ${}^{2n}C_{n+1}$ (C) ${}^{2n}C_{n-1}$ (D) ${}^{2n}C_{2n-1}$	(A)
101	2788	The remainder when $3^{100} \times 2^{50}$ is divided by 5 is (A) 1 (B) 2 (C) 3 (D) 4	(D)
101	2789	The digit at the unit place in the number $19^{2005} + 11^{2005} - 9^{2005}$ is (A) 2 (B) 1	(B)

		(C) 0 (D) 8	
101	2790	If $P(n): 2+4+6+...+(2n),\ n \in \mathbb{N}$, then $P(k)=k(k+1)+2$ implies $p(k+1)=(k+1)(k+2)+2$ is true for all $k \in \mathbb{N}$. So, the statement $P(n)=n(n+1)+2$ is true for (A) $n \geq 1$ (B) $n \geq 2$ (C) $n \geq 3$ (D) None of the above	(D)
101	2791	In the expression of $\left(x-\frac{1}{x}\right)^6$, the constant term is (A) –20 (B) 20 (C) 30 (D) – 30	(A)
101	2792	For $\lvert x\rvert<1$, the constant term in the expansion of $\frac{1}{(x-1)^2(x-1)}$ is (A) 2 (B) 1 (C) 0 (D) $\frac{-1}{2}$	(D)
101	2793	Let A and B be two non-zero square matrices. If the product AB is a zero matrix, then (A) A and B are non-singular (B) B is non-singular (C) A is non-singular (D) A and B are singular	(D)
101	2794	The solution set of the equation $\begin{vmatrix} 2 & 3 & x \\ 2 & 1 & x^2 \\ 6 & 7 & 3 \end{vmatrix} = 0$ is	(D)

		(A) ϕ (B) $\{0, 1\}$ (C) $\{-1, 1\}$ (D) $\{1, -3\}$	
101	2795	If ω is a complex cube root of unity, then the value of the determinant $\begin{vmatrix} 1 & \omega & \omega+1 \\ \omega+1 & 1 & \omega \\ \omega & \omega+1 & 1 \end{vmatrix}$ is (A) 0 (B) ω (C) 2 (D) 4	(D)
101	2796	If $A = \begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & -1 & 0 \end{vmatrix}$, then $A^3 + A$ is equal to (A) $\begin{vmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{vmatrix}$ (B) $\begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{vmatrix}$ (C) $\begin{vmatrix} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & -1 & 0 \end{vmatrix}$ (D) $\begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$	(D)
101	2797		(D)

		If $A=\begin{vmatrix}1&0&0\\x&1&0\\x&x&1\end{vmatrix}$ and $I=\begin{vmatrix}1&0&0\\0&1&0\\0&0&1\end{vmatrix}$ then A^3-3A^2+3A+I is equal to (A) 3 I (B) I (C) $-I$ (D) 2 I	
101	2798	If $A=\begin{bmatrix}3&3&3\\3&3&3\\3&3&3\end{bmatrix}$, then A^4 is equal to (A) 27 A (B) 81 A (C) 243 A (D) 729 A	(D)
101	2799	If $\begin{vmatrix}2i&-3i&1\\3&3i&-1\\4&3&i\end{vmatrix}=x+iy$, then (A) $x=3,\ y=1$ (B) $x=2,\ y=3$ (C) $x=0,\ y=0$ (D) $x=1,\ y=1$	(C)
101	2800	If $\begin{vmatrix}a&b&a-b\\b&c&b-c\\2&1&0\end{vmatrix}=0$, then a, b, c are in (A) AP (B) HP (C) GP (D) None of the above	(C)
101	2801	If $2^x.3^{x+4}=7x$, then x is equal to	(A)

		(A) $\frac{4\log_e 3}{\log_e 7-\log_e 6}$ (B) $\frac{4\log_e 3}{\log_e 6-\log_e 7}$ (C) $\frac{2\log_e 3}{\log_e 7-\log_e 6}$ (D) $\frac{3\log_e 3}{\log_e 6-\log_e 7}$	
101	2802	If $x=1+2+\frac{4}{2!}+\frac{8}{3!}+\frac{16}{4!}+\ldots$, then x^{-1} is equal to (A) e^{-2} (B) e^{2} (C) $e^{\frac{1}{2}}$ (D) e^{-1}	(A)
101	2803	Which of the following is not correct? (A) $A \subseteq A'$ if and only if $A=\phi$ (B) $A' \subseteq A$ if and only if $A=X,$ where X is the universal set (C) If $A \cup B = A \cup C$, then $B=C$ (D) $B=C$ if and only if $A \cup B = A \cup C$ and $A \cap B = A \cap C$	(D)
101	2804	A relation R is defined in the set $\mathbb{Z}$ of integers as follows $(x,y) \in R$ if and only if $x^2+y^2=9$. Which of the following is false? (A) $R=\{(0,3),(0,-3),(3,0),(-3,0)\}$ (B) Domain of $R=\{-3, 0, 3\}$	(D)

		(C) Range of $R = \{-3, 0, 3\}$ (D) At least one of the above is false	
101	2805	Two finite sets A and B have m and n elements respectively. If the total number of subsets of A is 112 more than the total number of subsets of B, then the value of m is (A) 7 (B) 9 (C) 10 (D) 12	(A)
101	2806	A pack of cards contains 4 aces, 4 kings, 4 queens and 4 jacks. Two cards are drawn in random from this pack without replacement. The probability, that at least one of them will be an ace, is (A) $\frac{1}{5}$ (B) $\frac{9}{20}$ (C) $\frac{1}{6}$ (D) $\frac{1}{9}$	(B)
101	2807	If $P(A) = 0.65$, $P(B) = 0.80$, then $P(A \cap B)$ lies in the interval (A) $[0.30, 0.80]$ (B) $[0.35, 0.75]$ (C) $[0.4, 0.70]$ (D) $[0.45, 0.65]$	(D)
101	2808	One hundred identical coins, each with probability p, of showing up a head, are tossed. If $0 < p < 1$, and if the probability of heads on exactly 50 coin is equal to that of heads on exactly 51 coins, then the value of p, is (A) $\frac{1}{2}$	(D)

		(B) $\frac{49}{101}$ (C) $\frac{50}{101}$ (D) $\frac{51}{101}$	
101	2809	The probability density function of X is $f(x)=\begin{cases}3e^{-3x} & x>0\\ 0 & \text{elsewhere .}\end{cases}$ The cumulative distribution function of X is (A) $F(x)=\begin{cases}0 & x\geq 0;\\ 1-e^{-3x} & x<0\end{cases}$ (B) $F(x)=\begin{cases}0 & x\leq 0;\\ 1+e^{-3x} & x>0\end{cases}$ (C) $F(x)=\begin{cases}0 & x\leq 0;\\ 1-e^{-3x} & x>0\end{cases}$ (D) None of the above	(C)
101	2810	There are 12 white and 12 red balls in a bag. Balls are drawn one by one with replacement from the bag. The probability that 7^{th} drawn ball is 4^{th} white is (A) $\frac{1}{4}$ (B) $\frac{1}{8}$ (C) $\frac{1}{2}$ (D) $\frac{1}{3}$	(C)

101	2811	A determinant of second order is made with the elements 0,1. What is the probability that the determinant is positive? (A) $\frac{7}{12}$ (B) $\frac{11}{12}$ (C) $\frac{3}{16}$ (D) $\frac{15}{16}$	(C)
101	2812	A box contains 3 red and 5 blue balls. The probability, that two balls are drawn in which 2nd ball drawn is blue without replacement, is (A) $\frac{5}{16}$ (B) $\frac{5}{36}$ (C) $\frac{5}{8}$ (D) $\frac{20}{56}$	(C)
101	2813	If $\frac{\sin(x+y)}{\sin(x-y)}=\frac{a+b}{a-b}$, then $\frac{\tan x}{\tan y}$ is equal to (A) 0 (B) ab (C) $\frac{b}{a}$ (D) $\frac{a}{b}$	(D)
101	2814		(D)

		If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, then $x^2 + y^2$ is (A) 2 (B) 0 (C) 3 (D) 1	
101	2815	If $\sin^{-1}x - \cos^{-1}x = \frac{\pi}{6}$, then x is (A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{-1}{2}$ (D) $\frac{-\sqrt{3}}{2}$	(B)
101	2816	If $\cos^{-1}\left(\frac{5}{13}\right) - \sin^{-1}\left(\frac{12}{13}\right) = \cos^{-1}x$, then x is equal to (A) 1 (B) $\frac{1}{\sqrt{2}}$ (C) 0 (D) $\frac{\sqrt{3}}{2}$	(A)
101	2817	If $-\frac{x}{2} < \sin^{-1}x < \frac{x}{2}$, then $\tan\left(\sin^{-1}x\right)$ is equal to (A) $\frac{x}{1-x^2}$ (B)	(C)

		$\frac{x}{1+x^2}$ (C) $\frac{x}{\sqrt{1-x^2}}$ (D) $\frac{1}{\sqrt{1-x^2}}$	
101	2818	If $y=f(x^3), z=g(x^5), f'(x)=\tan x$ *and* $g'(x)=\sec x$, then the value of $\frac{dy}{dx}$ is (A) $\frac{3}{5x^2}\cdot\frac{\tan x^3}{\sec x^5}$ (B) $\frac{5x^2}{3}\cdot\frac{\sec x^5}{\tan x^3}$ (C) $\frac{3x^2}{5}\cdot\frac{\tan x^3}{\sec x^5}$ (D) $\frac{5}{3x^2}\frac{\tan x^3}{\sec x^5}$	(A)
101	2819	If $\sqrt{x}+\sqrt{y}=4$, then $\frac{dx}{dy}$ at $y=1$ is (A) – 1 (B) – 3 (C) 3 (D) 1	(B)
101	2820	The derivative of $\sin x^3$ with respect to $\cos x^3$ is equal to (A) $-\tan x^3$ (B) $-\cot x^3$ (C) $\cot x^3$ (D) $\tan x^3$	(B)

101	2821	If $y=\sqrt{x+\sqrt{y+\sqrt{x+\sqrt{y+....\infty}}}}$, then $\frac{dy}{dx}$ is equal to (A) $\frac{y+x}{y^2-2x}$ (B) $\frac{y^2-x}{2y^2-2xy-1}$ (C) $\frac{y^3+x}{2y^2-x}$ (D) $\frac{y^2-x}{y^3-xy-1}$	(D)
101	2822	$\lim_{n\to\infty}\left(\frac{3x^2+2x+1}{x^2+x+2}\right)^{\frac{6x+1}{3x+2}}$ is equal to (A) 3 (B) 9 (C) 1 (D) 5	(B)
101	2823	The values of constants a and b so that $\lim_{n\to\infty}\left(\frac{x^2+1}{x+1}-ax-b\right)=0$ is (A) $a=0,\ b=0$ (B) $a=1,\ b=-1$ (C) $a=-1,\ b=1$ (D) $a=2,\ b=-1$	(B)
101	2824	If $[.]$ denotes the greatest integer function, then $\lim_{n\to\infty}\frac{[x]+[2x]+...+[nx]}{n^2}$ is (A) 0	(C)

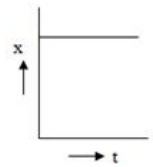
		(B) x (C) $\frac{x}{2}$ (D) $\frac{x^2}{2}$	
101	2825	The greatest value of $f(x)=(x+1)^{\frac{1}{3}}-(x-1)^{\frac{1}{3}}$ on $[0, 1]$ is (A) 1 (B) 2 (C) 3 (D) $\frac{1}{3}$	(B)
101	2826	A car starts from rest to cover a distance s. The coefficient of friction between the road and the tyres is μ. The minimum time in which the car can cover the distance is proportional to (A) μ (B) 1/ μ (C) $\sqrt{\mu}$ (D) $1/\sqrt{\mu}$	(D)
101	2827	The diameter of a circle is 2.486 m. Its area with due regard to significant figures is (Given π = 3.142) (A) 4.85454 m^2 (B) 4.8545 m^2 (C) 4.584 m^2 (D) 4.855 m^2	(D)
101	2828	An athlete completes one round of a circular track of radius R in 40 s. What will be his displacement at the end of 2 minutes 20 seconds? (A) 7R (B) 2R (C) 2πR (D) 7πR	(B)
101	2829	Vectors A and B have same magnitude. In addition, the magnitude of their resultant is also equal to the magnitude of either of them. Then A and B are at an angle (A) 120^o (B) 60^o (C) 90^o	(A)

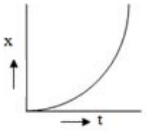
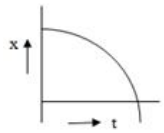
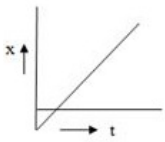
		(D) 45^o	
101	2830	In a tug of war contest, two men pull on a horizontal rope from opposite sides. The winner will be the man who (A) exerts greater force on the rope (B) exerts greater force on the ground (C) exerts force on the rope which is greater than the tension in the rope (D) makes a smaller angle with the vertical	(B)
101	2831	Which one of the following is not a conservative force? (A) gravitational force (B) electromagnetic force between two charges (C) magnetic force between two magnetic dipoles (D) frictional force	(D)
101	2832	The center of mass of a system of particles does not depend on (A) mass of the particles (B) position of particles (C) forces on the particles (D) relative distance between the particles	(C)
101	2833	If the separation between carbon and oxygen in CO molecule is 0.12 nm, then the distance of the center of mass from the carbon atom is (A) 0.03 nm (B) 0.068 nm (C) 0.05 nm (D) 0.06 nm	(B)
101	2834	Which one of the following is an evidence to show that there must be a force acting on earth and directed towards sun? (A) deviation of the falling bodies towards east (B) revolution of the earth round the sun (C) phenomenon of day and night (D) expanding universe	(B)
101	2835	Kepler's second law regarding constancy of aerial velocity of a planet is a consequence of conservation of (A) energy (B) distance (C) linear momentum (D) angular momentum	(D)
101	2836	Glass is a (A) Crystalline solid (B) Amorphous solid (C) Liquid crystalline material (D) Polymeric material	(B)

101	2837	A certain planet is at a distance d from the sun. Then the temperature of the planet is (A) proportional to d (B) inversely proportional to d (C) inversely proportional to $\sqrt{d}$ (D) inversely proportional to d^2	(D)
101	2838	The velocity of sound in air is independent of change in (A) temperature (B) density (C) pressure (D) humidity	(C)
101	2839	A parallel plate condenser is charged and isolated. When a sheet of glass is interposed between the plates (A) the charges on the plates will be reduced (B) the potential difference between the plates will be reduced (C) the potential difference between the plates will be increased (D) the charges on the plates will be increased	(C)
101	2840	Two wires carrying the same current in the same direction and placed 1 cm apart will experience (A) a mutually attractive force (B) a mutually repulsive force (C) no force at all (D) attractive as well as repulsive force	(A)
101	2841	Eddy currents developed on a conductor moving in a magnetic field will tend to (A) speed up the motion (B) slow down the motion (C) rotate the conductor (D) oscillate the conductor	(B)
101	2842	Two coils of inductances L_1 and L_2 are linked such that their mutual inductance is M. Then, (A) $M = L_1 - L_2$ (B) $M = L_1 + L_2$ (C) $M = (L_1 + L_2)/2$ (D) the maximum value of M is $\sqrt{(L_1L_2)}$	(D)
101	2843	Two monochromatic light beams of intensities *I* and *4I* are superposed. The maximum and minimum possible intensities in the resulting beam are (A) 5 *I* and *I* (B) 5 *I* and 3 *I* (C) 9 *I* and *I* (D) 9 *I* and 3 *I*	(D)

101	2844	The penetrating powers of a, b and g radiations, in decreasing order, are (A) α,β,γ (B) γ,α,β (C) β,γ,α (D) γ,β,α	(D)
101	2845	If orbits of *n* greater than 4 are not allowed, the maximum number of elements in nature would be (A) 78 (B) 60 (C) 106 (D) 32	(B)
101	2846	Fermi level in the case of intrinsic semiconductor lies (A) close to the conduction band (B) close to the valence band (C) in the middle of the forbidden energy gap (D) above the conduction band	(C)
101	2847	A certain *npn* transistor has a forward current gain β of 99. The current amplification factor α of the transistor is (A) 0.66 (B) 0.99 (C) 0.98 (D) 9.9	(B)
101	2848	The truth table of a certain logic circuit is shown below. A(input) | B (input) | Y(output) 0 | 0 | 0 0 | 1 | 1 1 | 0 | 1 1 | 1 | 0 The logic gate represented by the above truth table belongs to (A) NAND (B) OR (C) NOR (D) XOR	(D)
101	2849	Optical fibers transmit light signals from one place to another place by (A) internal conical refraction (B) double refraction (C) interference of light signals (D) total internal reflection	(D)
101	2850	Numerical aperture of an optical fiber is a measure of (A) attenuation of light signals in the fiber (B) difference between the refractive indices of core and the cladding	(C)

		(C) light gathering power of the fiber (D) signal distortion in the fiber	
101	2851	In a sample of radioactive material, what percentage of initial number of active nuclei will decay during one mean life? (A) 37% (B) 63% (C) 50% (D) 69.3%	(B)
101	2852	The frequency of radio waves from a certain radio station is 600 KHz. Its wavelength is (A) 5 m (B) 500 m (C) 0.6 m (D) 6 m	(B)
101	2853	Blue colour of the sky is due to (A) Raman scattering (B) Tyndall scattering (C) Raleigh scattering (D) Mie scattering	(C)
101	2854	In a parallel LCR circuit, the current at resonance will be (A) maximum (B) zero (C) minimum (D) infinity	(B)
101	2855	The time period of an earth-satellite in circular orbit is independent of (A) mass of the satellite (B) radius of the orbit (C) both of them (D) none of them	(A)
101	2856	The kinetic energy of a body of moment of inertia I and angular momentum L is (A) L^2/I (B) $L^2/2I$ (C) $L/2I$ (D) IL^2	(B)
101	2857	The phase difference between the displacement and velocity of a particle executing simple harmonic motion is (A) $\pi/2$ (B) π (C) $\pi/4$ (D) zero	(A)

101	2858	Which physical phenomenon is responsible for spherical shape of the rain drop? (A) Viscosity (B) Buoyancy (C) Friction (D) Surface tension	(D)
101	2859	Bernoulli's principle is a consequence of (A) conservation of energy alone (B) conservation of energy and momentum (C) conservation of momentum alone (D) conservation of angular momentum	(A)
101	2860	At what temperature do the Fahrenheit and Celcius scales of temperature coincide? (A) 0^o C (B) – 40^o C (C) – 273^o C (D) 32^oF	(B)
101	2861	When the source and the listener move in the same direction with a speed equal to the half of the speed of sound, the change in frequency of the sound is (A) Zero (B) 25% (C) 50% (D) 75%	(A)
101	2862	In Young's double slit experiment, the fringe width is β. If the entire arrangement is now placed inside a liquid of refractive index μ, the fringe width will become (A) μβ (B) (μ+1) β (C) β/μ (D) β/(μ+1)	(C)
101	2863	Formation of rainbow involves (A) dispersion of sunlight (B) interference of sunlight (C) diffraction of sunlight (D) polarization of sunlight	(A)
101	2864	Which one of the following distance-time graphs represent one dimensional uniform motion? (A)  (B)	(D)

		 (C)  (D) 	
101	2865	At the top of the trajectory of a projectile, the acceleration is (A) Zero (B) g (C) Maximum (D) Minimum	(B)
101	2866	In a uniform circular motion $\vec{r}, \vec{V}$ and $\vec{\omega}$ stands for radius vector, linear velocity and angular velocity respectively. Then which of the following is true? (A) $\vec{V} = \vec{r} \times \vec{\omega}$ (B) $\vec{V} = \vec{\omega} \times \vec{r}$ (C) $\vec{V} = \vec{r} . \vec{\omega}$ (D) None of the above	(B)
101	2867	Two balls of masses 2 g and 6 g are moving with a kinetic energy in the ratio 3:1. What is the ratio of their linear momentum? (A) 1:1 (B) 2:1 (C) 1:2 (D) None of the above	(A)
101	2868	Which of the following surfaces in contact has maximum coefficient of friction (μ)? (A) wood on wood (B) rubber tyre on dry concrete (C) steel on steel (D) rubber tyre on wet concrete	(B)

101	2869	If two electrons are forced to come closer to each other, the potential energy of the system of 2 electrons will (A) Becomes zero (B) Increases (C) Decreases (D) Becomes ∞	(B)
101	2870	If $\vec{P}\times\vec{Q}=\vec{Q}\times\vec{P}$, then the angle between $\vec{P}$ and $\vec{Q}$ is (A) π (B) $\pi/2$ (C) $\pi/4$ (D) None of the above	(A)
101	2871	The total energy of the particle executing Simple Harmonic Motion is (A) proportional to x (B) proportional to x^2 (C) independent of x (D) proportional to x^3	(C)
101	2872	Young's modulus of a perfectly rigid body is (A) zero (B) unity (C) infinity (D) more than zero but less than infinity	(C)
101	2873	A wire fixed at the upper end stretches by length Δl by applying a force F. The work done in stretching is (A) $F/2\Delta l$ (B) $F\Delta l$ (C) $2F\Delta l$ (D) $F\Delta l/2$	(D)
101	2874	A hole is drilled along the diameter of the earth and a stone is dropped into it. Then the stone (A) reaches the centre of the earth and stops (B) reaches the opposite end and stops (C) executes simple harmonic motion about the centre of the earth	(C)

		(D) reaches the opposite side and escapes earth	
101	2875	A car and a bus are moving with the same kinetic energy. They are brought to rest by applying brakes which provide equal retarding forces. The distances covered by them before coming to rest will be (A) Inversely proportional to the square of their masses (B) Inversely proportional to their masses (C) Directly proportional to their masses (D) Equal	(D)
101	2876	A ring of radius r and mass m rotates about its central axis. The kinetic energy is (A) $mr\omega^2$ (B) $mr^2\omega^2$ (C) $\frac{1}{2}mr\omega^2$ (D) $\frac{1}{2}mr^2\omega^2$	(D)
101	2877	Which waves are used in sonography? (A) Microwaves (B) Infra-red waves (C) Sound waves (D) Ultrasonic waves	(D)
101	2878	$[M^{-1}L^{-2}T^2Q^2]$ is dimensional formula of (A) capacitance (B) resistance (C) inductance (D) magnetic field	(A)
101	2879	The value of gravitational constant G depends upon (A) nature and size of bodies (B) the medium between two masses (C) the temperature of bodies (D) None of the above	(D)
101	2880	If 22 g of CO_2 at 27^oC is mixed with16 g of O_2 at 37^oC, the temperature of the mixture is (A) 32^oC (B) 27^oC (C) 37^oC (D) 30.5^oC	(A)
101	2881	A black body at high temperature emits radiations of	(D)

		(A) longer wavelength (B) shorter wavelength (C) one fixed wavelength (D) all wavelength	
101	2882	Cloudy nights are usually warmer than clear ones, because clouds (A) do not radiate heat (B) do not absorb heat (C) have low thermal conductivity (D) have high thermal conductivity	(C)
101	2883	In a container having water filled up to a height h, a hole is made in the bottom. The velocity of water flowing out of the hole is (A) proportional to h (B) proportional to h^2 (C) proportional to $h^{1/2}$ (D) independent of h	(C)
101	2884	If $x = a\sin(\omega t + \pi/6)$ and $x = a\cos\omega t$, then the phase difference between the two waves is (A) $\pi/3$ (B) $\pi/6$ (C) $\pi/2$ (D) π	(A)
101	2885	Two heater coils separately take 10 min and 5 min to boil a certain amount of water. If both the coils are connected in series, the time taken to boil water is (A) 2.5 min (B) 3.33 min (C) 7.5 min (D) 15 min	(D)
101	2886	If a star emitting orange light moves away from the earth, its colour (A) will appear red (B) will appear yellow (C) remain the same (D) turns gradually blue	(A)
101	2887	A stretched string fixed at both ends has n nodes then the length of the string in terms of wavelength is (A) $n\frac{\lambda}{2}$ (B)	(C)

		$(n+1)\frac{\lambda}{2}$ (C) $(n-1)\frac{\lambda}{2}$ (D) $\left(n+\frac{1}{2}\right)\frac{\lambda}{2}$	
101	2888	Which of the following properties has low value for ferrites? (A) Conductivity (B) Permeability (C) Magnetic susceptibility (D) None of the above	(C)
101	2889	In Carnot's engine at the end of the cycle, the temperature of the working substance is (A) less than initial temperature (B) greater than initial temperature (C) equal to initial temperature (D) None of the above	(C)
101	2890	Compressed air coming out of punctured football becomes cooler because of (A) adiabatic expansion (B) Joule Thomson effect (C) isothermal expansion (D) energy dissipation	(A)
101	2891	Two identical samples of gas are allowed to expand (i) isothermally and (ii) adiabatically. The amount of work done is then (A) equal in both the cases (B) more for adiabatic expansion (C) more for isothermal expansion (D) None of the above	(C)
101	2892	The thermodynamic process in which the pressure of the system remains constant is called (A) Isochoric (B) Adiabatic (C) Isothermal (D) Isobaric	(D)
101	2893	The internal energy of a perfect gas does not change during (A) adiabatic process (B) isothermal process (C) isobaric process (D) isochoric process	(B)

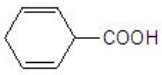
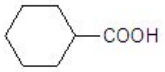
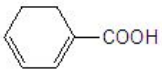
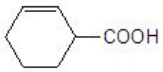
101	2894	The process of superimposing a signal frequency on the carrier wave is known as (A) transmission (B) reception (C) modulation (D) detection	(B)
101	2895	Which one of the following statements is wrong? (A) Ultra-violet rays have a wavelength longer than infra red rays (B) infra red rays travel with the same velocity as visible light (C) infra red ray can be focused by a lens and can be reflected by a mirror just as visible light (D) Infra red rays have more heating power than visible light rays	(A)
101	2896	When a diamagnetic substance is brought near the north or south pole of a bar magnet, it is (A) attracted by the poles (B) repelled by the poles (C) attracted by north pole and repelled by south pole (D) repelled by north pole and attracted by south pole	(B)
101	2897	How will an image produced by a lens change if half the lens is wrapped in black paper? (A) there will be no effect (B) the size of image will be reduced to one half (C) the image will disappear (D) the brightness of the image will be reduced	(D)
101	2898	The diode is used as (A) an amplifier (B) an oscillator (C) a rectifier (D) a modulator	(C)
101	2899	Which of the following interactions is the weakest? (A) Gravitational (B) Electrostatic (C) Nuclear (D) Electromagnetic	(A)
101	2900	In the following nuclear reaction ${}_6C^{11} \rightarrow {}_5B^{11} + \beta^+ + X$, X stands for (A) a neutron (B) a neutrino (C) an electron (D) a proton	(B)
101	2901	Total number of electrons in sub shells is calculated by (A) 2(21+1)	(A)

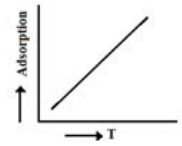
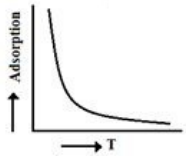
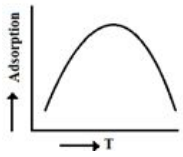
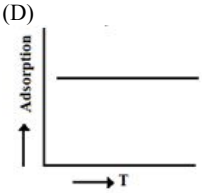
		(B) $2n^2$ (C) 3(21+1) (D) 2(2n+1)	
101	2902	The order of ionization energy (A) s < p < d < f (B) s > p > d > f (C) s > d > p > f (D) s < d < p < f	(B)
101	2903	Sulphuric acid is (A) an oxidizing agent (B) a dehydrating agent (C) Both (A) and (B) (D) Neither (A) nor (B)	(C)
101	2904	Which is reduced in the following reaction (a) 2 KI (aq) + (b) Cl_2 (aq) → 2KCl + I_2(aq) (A) (a) and (b) (B) (a) (C) (b) (D) None of the above	(C)
101	2905	The common isotopes of carbon are ^{12}C and ^{13}C. The average mass of carbon is 12.01115 amu. What is the abundance of the ^{13}C isotope? (A) 1.115% (B) 98.885% (C) 0.480% (D) 99.52%	(A)
101	2906	Which of the following sets of ions represent the collection of isoelectronic species? (A) K^+, Ca^{2+}, Sc^{3+}, Cl^- (B) Na^+, Mg^{2+}, Al^{3+}, Cl^- (C) K^+, Cl^-, Mg^{2+}, Sc^{3+} (D) Na^+, Ca^{2+}, Sc^{3+}, F^-	(A)
101	2907	Which of the following molecule does not have a net dipole moment? (A) H_2O (B) NH_3 (C) BF_3 (D) BrF_5	(C)
101	2908	Which of the following ions has a magnetic moment of 5.93 BM? (At.no. V = 23, Cr = 24, Mn = 25, Fe = 26) (A) Mn^2 (B) Fe^{2+}	(A)

		(C) Cr^{2+} (D) V^{3+}	
101	2909	The purple colour of permanganate ion is due to (A) L to M charge transfer (B) M to L charge transfer (C) d-d transition (D) f-f transition	(A)
101	2910	Among the following, shortest bond length is found in (A) C_2 (B) N_2 (C) O_2 (D) F_2	(B)
101	2911	The acid which has peroxy linkage is (A) Dithonic acid (B) Sulphurous acid (C) Caro's acid (D) Pyrosulphuric acid	(C)
101	2912	Bond angle of NH_3, PH_3, AsH_3 and SbH_3 is in the order (A) $PH_3 > AsH_3 > SbH_3 > NH_3$ (B) $SbH_3 > AsH_3 > PH_3 > NH_3$ (C) $SbH_3 > AsH_3 > NH_3 > PH_3$ (D) $NH_3 > PH_3 > AsH_3 > SbH_3$	(D)
101	2913	Which one of the following octahedral complexes does not show geometrical isomerism? (A and B are monodentate ligands) (A) $[MA_2B_4]$ (B) $[MA_3B_3]$ (C) $[MA_4B_2]$ (D) $[MA_5B]$	(D)
101	2914	Among the following which are ambidentate ligands 1) NO_2^- 2) $C_2O_4^{2-}$ 3) $EDTA^{4-}$ 4) SCN^- (A) (1) and (2) (B) (1) and (4) (C) (2) and (4) (D) (1) and (3)	(B)
101	2915	Among the noble gases, which is used for cancer treatment? (A) He	(D)

		(B) Ne (C) Ar (D) Rn	
101	2916	Zone refining is used for the purification of (A) Au (B) Ge (C) Ag (D) Cu	(B)
101	2917	Sulphide ores are generally concentrated by (A) Froth flotation (B) Roasting (C) Magnetic separation (D) Carbon reduction	(A)
101	2918	0.177g of a monobasic acid required 30ml of N/10 NaOH solution for complete neutralization. Its molecular weight will be (A) 49 (B) 59 (C) 69 (D) 79	(B)
101	2919	Which statement is true? (A) Resonance hybrids are inherently unstable (B) Resonance hybrids are more stable than any individual resonance form (C) Resonance hybrids are averages of all resonance forms resembling the less stable forms (D) Resonance hybrids are averages of all resonance forms resembling the more stable forms	(D)
101	2920	A meso compound (A) is an achiral molecule which contains chiral carbons (B) contains a plane of symmetry or a center of symmetry (C) is optically inactive (D) is characterized by all of the above	(D)
101	2921	Ethers are kept in brown bottles because (A) Brown bottles are cheaper than colorless clear bottles (B) Ethers absorb moisture (C) Ethers evaporate readily (D) Ethers are oxidized to explosive peroxides	(D)
101	2922	Acetone undergoes reduction with hydrazine in the presence of NaOH to form propane. This reaction is known as, (A) Clemmensen reduction (B) Wolf-Kishner reduction	(B)

		(C) Rosenmund reduction (D) Reformatsky reaction	
101	2923	The self-condensation reaction of one molecule of 5-hydroxyhexanoic acid gives (A) an anhydride (B) a lactone (C) a ketone (D) a lactam	(B)
101	2924	The Zwitter ion structure is shown by (A) Sulphanilic acid (B) Acetanilide (C) Sulphanilamide (D) *p*-phenylene diamine	(A)
101	2925	The IUPAC name of $C_2(CN)_4$ is (A) 2,3-Dicyano butanedinitrile (B) 2,3-Dicyano-2-butenedinitrile (C) 1,1,2,2- Tetracyanoethane (D) 1,1,2,2-Tetracyanoethene	(B)
101	2926	Which effect best explains that *o*-nitrophenol is insoluble in water? (A) Inductive effect (B) Intermolecular H-bonding (C) Intramolecular H-bonding (D) Resonance effect	(C)
101	2927	Cannizzaro reaction involves migration of which species (A) Proton (B) Carbene (C) Hydride ion (D) Carbanion	(C)
101	2928	Bromination of 2-methyl propane gives preferentially (A) 2-Bromo-2-methyl propane (B) 1-Bromo-2-methyl propane (C) 2-Bromobutane (D) 1-Bromobutane	(A)
101	2929	Which of the following method may be used to distinguish between primary, secondary and tertiary alcohols? (A) Lucas test (B) Oxidation test (C) Victor-Meyer test (D) All of the above	(D)

101	2930	Reaction of benzaldehyde with acetic anhydride in the presence of base is known as……. and the product is ……. (A) Claisen reaction, Cinnamaldehyde (B) Perkin reaction, Cinnamaldehyde (C) Knovenagel reaction, Cinnamic acid (D) Perkin reaction, Cinnamic acid	(D)
101	2931	Which of the following is not a true aromatic compound? (A) Acetophenone (B) Hydroquinone (C) *p*-Benzoquinone (D) Phenyl acetaldehyde	(C)
101	2932	Which one of the following are called pseudo acids? (A) Alkyl nitrites (B) Primary nitro compounds (C) Tertiary nitro compounds (D) Alkyl sulphonic acids	(B)
101	2933	Rapid inter conversion of α-D-Glucose and β-D-Glucose in solution is known as (A) Racemization (B) Asymmetric induction (C) Fluxional isomerisation (D) Mutarotation	(D)
101	2934	The Birch reduction of benzoic acid gives (A)  (B)  (C)  (D) 	(A)
101	2935	The hydrogen ion concentration of a solution with pH value 3.69 is given by (A) 2.042×10^{-4} M (B) 3.69×10^{-2} M (C) 4.31×10^{-4} M	(A)

		(D) 0.369 M	
101	2936	The variation of physical adsorption with temperature is shown by (A)  (B)  (C)  (D)  	(B)
101	2937	A molecule of SO_2 is two times heavier than a O_2 molecule. At 298 K the average kinetic energy of SO_2 molecule is (A) two times that of O2 molecules (B) half that of O_2 molecules (C) four times that of O_2 molecules (D) same as that of O_2 molecules	(D)
101	2938	For the reaction, $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$; $\Delta H = -99.4$ kJ and $\Delta S = -198.3\ JK^{-1}$. The temperature at which the system is in equilibrium is (A) 500 K (B) 279 K (C) 198.8 K (D) 99.4 K	(A)
101	2939	The thermodynamic condition for the process of adsorption is (A) $\Delta G < 0; \Delta S > 0; \Delta H < 0$ (B) $\Delta G < 0; \Delta S < 0; \Delta H < 0$ (C) $\Delta G > 0; \Delta S > 0; \Delta H < 0$ (D) $\Delta G < 0; \Delta S < 0; \Delta H > 0$	(A)
101	2940	For a linear plot of log (x/m) versus log p in a Freundlich adsorption isotherm, the correct statement is (k and n are constants)	(C)

		(A) Both k and 1/n appear in the slope term (B) 1/n appears as the intercept (C) Only 1/n appears as the slope (D) log (1/n) appears as the intercept	
101	2941	In diamond, the coordination number of carbon is (A) 4 and its unit cell has 8 carbon atoms (B) 4 and its unit cell has 6 carbon atoms (C) 6 and its unit cell has 4 carbon atoms (D) 4 and its unit cell has 4 carbon atoms	(A)
101	2942	The Miller indices of a crystal plane which cuts through the crystal axes at (2a, 3b, c) are (A) 2, 3, 1 (B) 4, 6, 2 (C) 3, 2, 6 (D) 1/2, 1/3, 1	(C)
101	2943	If the radius of metal atom is 1.0 Å and its crystal structure is simple cubic, the volume of the unit cell is (A) 8 x10^{-28} cc (B) 4x10^{-30} m^3 (C) 8 x 10^{-30} m^3 (D) 2 x 10^{-24} cc	(C)
101	2944	0.5 M glucose solution has density 1.21 g cm^{-3}. The molality of the solution is (A) 0.246 (B) 0.346 (C) 0.446 (D) 0.0546	(C)
101	2945	The boiling point of an azeotropic mixture of water-ethanol is less than that of both water and ethanol. This means that the mixture (A) shows negative deviation from Raoult's law (B) shows positive deviation from Raoult's law (C) shows no deviation from Raoult's law (D) is not a true solution	(B)
101	2946	The molar conductances at infinite dilution for sodium formate, hydrochloric acid and sodium chloride are 91.0, 426.2 and 126.5 S cm2 mol-1 respectively at 298 K. The molar conductance of acetic acid at infinite dilution would be (A) 335.2 cm^2 mol^{-1} (B) 461.7 cm^2 mol^{-1} (C) 217.5 cm^2 mol^{-1} (D) 390.7 S cm^2 mol^{-1}	(D)
101	2947	The position of some metals in the electrochemical series in decreasing electropositive character is Mg > Al >	(D)

		Zn > Cu > Ag. The change expected on stirring the solution of aluminium nitrate with copper spoon is (A) the spoon gets coated with aluminium (B) any alloy of aluminium and copper is formed (C) the solution starts turning blue (D) no reaction occurs	
101	2948	The EMF of the following Daniell cell at 298 K is E_1: Zn|$ZnSO_4$ (0.01 M) ‖ $CuSO_4$ (1.0 M)| Cu. When the concentration of $ZnSO_4$ is 1.0 M and that of $CuSO_4$ is 0.01 M, the EMF changes to E_2. The relationship between E_1 and E_2 is (A) $E_1 > E_2$ (B) $E_1 < E_2$ (C) $E_1 = E_2$ (D) $E_1 = 0 \neq E_2$	(A)
101	2949	For a reaction ½ A $\rightarrow$ 2B, rate of disappearance of A is related to rate of appearance of B by the expression (A) $\frac{-d[A]}{dt} = 4\frac{d[B]}{dt}$ (B) $\frac{-d[A]}{dt} = \frac{1}{2}\frac{d[B]}{dt}$ (C) $\frac{-d[A]}{dt} = \frac{1}{4}\frac{d[B]}{dt}$ (D) $\frac{-d[A]}{dt} = \frac{d[B]}{dt}$	(C)
101	2950	The half life of a first order reaction is 12 min. Fraction of the reactant left behind after 1 hr from the beginning is (A) 1/8 (B) 1/32 (C) 1/64 (D) 1/128	(B)