OBJECTIVE TYPE QUESTIONS

Choose the correct or most suitable answer :

(1) The rank of the matrix $\begin{bmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{bmatrix}$ is

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

(2) The rank of the diagonal matrix $\begin{bmatrix} -1 & & & & \\ & 2 & & & \\ & & 0 & & \\ & & & -4 & \\ & & & & 0 \end{bmatrix}$

(1) 0 (2) 2 (3) 3 (4) 5

(3) If $A = [2 \;\; 0 \;\; 1]$, then rank of AA^T is

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

(4) If $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, then the rank of AA^T is

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

(5) If the rank of the matrix $\begin{bmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{bmatrix}$ is 2, then λ is

(1) 1 (2) 2 (3) 3 (4) any real number

(6) If A is a scalar matrix with scalar $k \neq 0$, of order 3, then A^{-1} is

(1) $\frac{1}{k^2}$ I (2) $\frac{1}{k^3}$ I (3) $\frac{1}{k}$ I (4) kI

(7) If the matrix $\begin{bmatrix} -1 & 3 & 2 \\ 1 & k & -3 \\ 1 & 4 & 5 \end{bmatrix}$ has an inverse then the values of k

(1) k is any real number (2) $k = -4$ (3) $k \neq -4$ (4) $k \neq 4$

(8) If $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, then (adj A) A =

(1) $\begin{bmatrix} \frac{1}{5} & 0 \\ 0 & \frac{1}{5} \end{bmatrix}$ (2) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (3) $\begin{bmatrix} 5 & 0 \\ 0 & -5 \end{bmatrix}$ (4) $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$

(9) If A is a square matrix of order n then $|\operatorname{adj} A|$ is

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

(10) The inverse of the matrix $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ is

(1) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (2) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$ (3) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ (4) $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(11) If A is a matrix of order 3, then det (kA)

(1) $k^3 \det(A)$ (2) $k^2 \det(A)$ (3) $k \det(A)$ (4) $\det(A)$

(12) If I is the unit matrix of order n, where $k \neq 0$ is a constant, then $\operatorname{adj}(kI) =$

(1) $k^n (\operatorname{adj} I)$ (2) $k (\operatorname{adj} I)$ (3) $k^2 (\operatorname{adj} (I))$ (4) $k^{n-1} (\operatorname{adj} I)$

(13) If A and B are any two matrices such that $AB = O$ and A is non-singular, then

(1) $B = O$ (2) B is singular (3) B is non-singular (4) $B = A$

(14) If $A = \begin{bmatrix} 0 & 0 \\ 0 & 5 \end{bmatrix}$, then A^{12} is

(1) $\begin{bmatrix} 0 & 0 \\ 0 & 60 \end{bmatrix}$ (2) $\begin{bmatrix} 0 & 0 \\ 0 & 5^{12} \end{bmatrix}$ (3) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (4) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

(15) Inverse of $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$ is

(1) $\begin{bmatrix} 2 & -1 \\ -5 & 3 \end{bmatrix}$ (2) $\begin{bmatrix} -2 & 5 \\ 1 & -3 \end{bmatrix}$ (3) $\begin{bmatrix} 3 & -1 \\ -5 & -3 \end{bmatrix}$ (4) $\begin{bmatrix} -3 & 5 \\ 1 & -2 \end{bmatrix}$

(16) In a system of 3 linear non-homogeneous equation with three unknowns, if $\Delta = 0$ and $\Delta_x = 0$, $\Delta_y \neq 0$ and $\Delta_z = 0$ then the system has

(1) unique solution (2) two solutions

(3) infinitely many solutions (4) no solutions

(17) The system of equations $ax + y + z = 0$; $x + by + z = 0$; $x + y + cz = 0$ has a non-trivial solution then $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

(1) 1 (2) 2 (3) -1 (4) 0

(18) If $ae^x + be^y = c$; $pe^x + qe^y = d$ and $\Delta_1 = \begin{vmatrix} a & b \\ p & q \end{vmatrix}$; $\Delta_2 = \begin{vmatrix} c & b \\ d & q \end{vmatrix}$, $\Delta_3 = \begin{vmatrix} a & c \\ p & d \end{vmatrix}$ then the value of (x, y) is

(1) $\left(\frac{\Delta_2}{\Delta_1}, \frac{\Delta_3}{\Delta_1}\right)$ (2) $\left(\log \frac{\Delta_2}{\Delta_1}, \log \frac{\Delta_3}{\Delta_1}\right)$

(3) $\left(\log \frac{\Delta_1}{\Delta_3}, \log \frac{\Delta_1}{\Delta_2}\right)$ (4) $\left(\log \frac{\Delta_1}{\Delta_2}, \log \frac{\Delta_1}{\Delta_3}\right)$

(19) If the equation

$$-2x + y + z = l$$
$$x - 2y + z = m$$
$$x + y - 2z = n$$

such that $l + m + n = 0$, then the system has

(1) a non-zero unique solution (2) trivial solution

(3) Infinitely many solution (4) No Solution

(20) If $\vec{a}$ is a non-zero vector and m is a non-zero scalar then $m\vec{a}$ is a unit vector if

(1) $m = \pm 1$ (2) $a = |m|$ (3) $a = \frac{1}{|m|}$ (4) $a = 1$

(21) If $\vec{a}$ and $\vec{b}$ are two unit vectors and θ is the angle between them, then $(\vec{a} + \vec{b})$ is a unit vector if

(1) $\theta = \frac{\pi}{3}$ (2) $\theta = \frac{\pi}{4}$ (3) $\theta = \frac{\pi}{2}$ (4) $\theta = \frac{2\pi}{3}$

(22) If $\vec{a}$ and $\vec{b}$ include an angle 120° and their magnitude are 2 and $\sqrt{3}$ then $\vec{a} \cdot \vec{b}$ is equal to

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

(23) If $\vec{u} = \vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b})$, then

(1) u is a unit vector (2) $\vec{u} = \vec{a} + \vec{b} + \vec{c}$

(3) $\vec{u} = \vec{0}$ (4) $\vec{u} \neq \vec{0}$

(24) If $\vec{a} + \vec{b} + \vec{c} = 0$, $|\vec{a}| = 3$, $|\vec{b}| = 4$, $|\vec{c}| = 5$ then the angle between $\vec{a}$ and $\vec{b}$ is

(1) $\frac{\pi}{6}$ (2) $\frac{2\pi}{3}$ (3) $\frac{5\pi}{3}$ (4) $\frac{\pi}{2}$

(25) The vectors $2\vec{i} + 3\vec{j} + 4\vec{k}$ and $a\vec{i} + b\vec{j} + c\vec{k}$ are perpendicular when

(1) $a = 2,\ b = 3,\ c = -4$ (2) $a = 4,\ b = 4,\ c = 5$

(3) $a = 4,\ b = 4,\ c = -5$ (4) $a = -2,\ b = 3,\ c = 4$

(26) The area of the parallelogram having a diagonal $3\vec{i} + \vec{j} - \vec{k}$ and a side $\vec{i} - 3\vec{j} + 4\vec{k}$ is

(1) $10\sqrt{3}$ (2) $6\sqrt{30}$ (3) $\frac{3}{2}\sqrt{30}$ (4) $3\sqrt{30}$

(27) If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ then

(1) $\vec{a}$ is parallel to $\vec{b}$

(2) $\vec{a}$ is perpendicular to $\vec{b}$

(3) $|\vec{a}| = |\vec{b}|$

(4) $\vec{a}$ and $\vec{b}$ are unit vectors

(28) If $\vec{p}$, $\vec{q}$ and $\vec{p} + \vec{q}$ are vectors of magnitude λ then the magnitude of $|\vec{p} - \vec{q}|$ is

(1) 2λ (2) $\sqrt{3}\lambda$ (3) $\sqrt{2}\lambda$ (4) 1

(29) If $\vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b}) = \vec{x} \times \vec{y}$ then

(1) $\vec{x} = \vec{0}$ (2) $\vec{y} = \vec{0}$

(3) $\vec{x}$ and $\vec{y}$ are parallel (4) $\vec{x} = \vec{0}$ or $\vec{y} = \vec{0}$ or $\vec{x}$ and $\vec{y}$ are parallel

(30) If $\vec{PR} = 2\vec{i} + \vec{j} + \vec{k}$, $\vec{QS} = -\vec{i} + 3\vec{j} + 2\vec{k}$ then the area of the quadrilateral $PQRS$ is

(1) $5\sqrt{3}$ (2) $10\sqrt{3}$ (3) $\frac{5\sqrt{3}}{2}$ (4) $\frac{3}{2}$

(31) The projection of $\overrightarrow{OP}$ on a unit vector $\overrightarrow{OQ}$ equals thrice the area of parallelogram $OPRQ$. Then $\underline{|POQ}$ is

(1) $\tan^{-1}\frac{1}{3}$ (2) $\cos^{-1}\left(\frac{3}{10}\right)$ (3) $\sin^{-1}\left(\frac{3}{\sqrt{10}}\right)$ (4) $\sin^{-1}\left(\frac{1}{3}\right)$

(32) If the projection of $\vec{a}$ on $\vec{b}$ and projection of $\vec{b}$ on $\vec{a}$ are equal then the angle between $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ is

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

(33) If $\vec{a}\times\left(\vec{b}\times\vec{c}\right)=\left(\vec{a}\times\vec{b}\right)\times\vec{c}$ for non-coplanar vectors $\vec{a}$, $\vec{b}$, $\vec{c}$ then

(1) $\vec{a}$ parallel to $\vec{b}$ (2) $\vec{b}$ parallel to $\vec{c}$

(3) $\vec{c}$ parallel to $\vec{a}$ (4) $\vec{a}+\vec{b}+\vec{c}=\vec{0}$

(34) If a line makes 45°, 60° with positive direction of axes x and y then the angle it makes with the z axis is

(1) 30° (2) 90′ (3) 45° (4) 60°

(35) If $\left[\vec{a}\times\vec{b},\ \vec{b}\times\vec{c},\ \vec{c}\times\vec{a}\right]=64$ then $\left[\vec{a},\ \vec{b},\ \vec{c}\right]$ is

(1) 32 (2) 8 (3) 128 (4) 0

(36) If $\left[\vec{a}+\vec{b},\ \vec{b}+\vec{c},\ \vec{c}+\vec{a}\right]=8$ then $\left[\vec{a},\ \vec{b},\ \vec{c}\right]$ is

(1) 4 (2) 16 (3) 32 (4) – 4

(37) The value of $\left[\vec{i}+\vec{j},\ \vec{j}+\vec{k},\ \vec{k}+\vec{i}\right]$ is equal to

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

(38) The shortest distance of the point (2, 10, 1) from the plane

$\vec{r}\cdot\left(3\vec{i}-\vec{j}+4\vec{k}\right)=2\sqrt{26}$ is

(1) $2\sqrt{26}$ (2) $\sqrt{26}$ (3) 2 (4) $\frac{1}{\sqrt{26}}$

(39) The vector $\left(\vec{a} \times \vec{b}\right) \times \left(\vec{c} \times \vec{d}\right)$ is

(1) perpendicular to $\vec{a}, \vec{b}, \vec{c}$ and $\vec{d}$

(2) parallel to the vectors $\left(\vec{a} \times \vec{b}\right)$ and $\left(\vec{c} \times \vec{d}\right)$

(3) parallel to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

(4) perpendicular to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

(40) If $\vec{a}, \vec{b}, \vec{c}$ are a right handed triad of mutually perpendicular vectors of magnitude a, b, c then the value of $\left[\vec{a}\ \vec{b}\ \vec{c}\right]$ is

(1) $a^2 b^2 c^2$ (2) 0 (3) $\frac{1}{2} abc$ (4) abc

(41) If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar and
$\left[\vec{a} \times \vec{b},\ \vec{b} \times \vec{c},\ \vec{c} \times \vec{a}\right] = \left[\vec{a} + \vec{b},\ \vec{b} + \vec{c},\ \vec{c} + \vec{a}\right]$ then $\left[\vec{a},\ \vec{b},\ \vec{c}\right]$ is

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

(42) $\vec{r} = s\,\vec{i} + t\,\vec{j}$ is the equation of

(1) a straight line joining the points $\vec{i}$ and $\vec{j}$

(2) *xoy* plane (3) *yoz* plane (4) *zox* plane

(43) If the magnitude of moment about the point $\vec{j} + \vec{k}$ of a force $\vec{i} + a\vec{j} - \vec{k}$ acting through the point $\vec{i} + \vec{j}$ is $\sqrt{8}$ then the value of a is

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

(44) The equation of the line parallel to $\frac{x-3}{1} = \frac{y+3}{5} = \frac{2z-5}{3}$ and passing through the point (1, 3, 5) in vector form is

(1) $\vec{r} = (\vec{i} + 5\vec{j} + 3\vec{k}) + t(\vec{i} + 3\vec{j} + 5\vec{k})$

(2) $\vec{r} = \vec{i} + 3\vec{j} + 5\vec{k} + t(\vec{i} + 5\vec{j} + 3\vec{k})$

(3) $\vec{r} = \left(\vec{i} + 5\vec{j} + \frac{3}{2}\vec{k}\right) + t(\vec{i} + 3\vec{j} + 5\vec{k})$

(4) $\vec{r} = \vec{i} + 3\vec{j} + 5\vec{k} + t\left(\vec{i} + 5\vec{j} + \frac{3}{2}\vec{k}\right)$

(45) The point of intersection of the line $\vec{r} = (\vec{i} - \vec{k}) + t(3\vec{i} + 2\vec{j} + 7\vec{k})$ and the plane $\vec{r} \cdot (\vec{i} + \vec{j} - \vec{k}) = 8$ is

(1) (8, 6, 22) (2) (– 8, – 6, – 22) (3) (4, 3, 11) (4) (– 4, – 3, – 11)

(46) The equation of the plane passing through the point (2, 1, – 1) and the line of intersection of the planes $\vec{r} \cdot (\vec{i} + 3\vec{j} - \vec{k}) = 0$ and $\vec{r} \cdot (\vec{j} + 2\vec{k}) = 0$ is

(1) $x + 4y - z = 0$ (2) $x + 9y + 11z = 0$

(3) $2x + y - z + 5 = 0$ (4) $2x - y + z = 0$

(47) The work done by the force $\vec{F} = \vec{i} + \vec{j} + \vec{k}$ acting on a particle, if the particle is displaced from $A(3, 3, 3)$ to the point $B(4, 4, 4)$ is

(1) 2 units (2) 3 units (3) 4 units (4) 7 units

(48) If $\vec{a} = \vec{i} - 2\vec{j} + 3\vec{k}$ and $\vec{b} = 3\vec{i} + \vec{j} + 2\vec{k}$ then a unit vector perpendicular to $\vec{a}$ and $\vec{b}$ is

(1) $\frac{\vec{i} + \vec{j} + \vec{k}}{\sqrt{3}}$ (2) $\frac{\vec{i} - \vec{j} + \vec{k}}{\sqrt{3}}$

(3) $\frac{-\vec{i} + \vec{j} + 2\vec{k}}{\sqrt{3}}$ (4) $\frac{\vec{i} - \vec{j} - \vec{k}}{\sqrt{3}}$

(49) 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

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

(50) The point of intersection of the lines

$\vec{r} = \left(-\vec{i} + 2\vec{j} + 3\vec{k}\right) + t\left(-2\vec{i} + \vec{j} + \vec{k}\right)$ and

$\vec{r} = \left(2\vec{i} + 3\vec{j} + 5\vec{k}\right) + s\left(\vec{i} + 2\vec{j} + 3\vec{k}\right)$ is

(1) (2, 1, 1) (2) (1, 2, 1) (3) (1, 1, 2) (4) (1, 1, 1)

(51) The shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ is

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

(52) The shortest distance between the parallel lines

$\frac{x-3}{4} = \frac{y-1}{2} = \frac{z-5}{-3}$ and $\frac{x-1}{4} = \frac{y-2}{2} = \frac{z-3}{3}$ is

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

(53) The following two lines are $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z}{1}$ and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z-1}{2}$

(1) parallel (2) intersecting (3) skew (4) perpendicular

(54) The centre and radius of the sphere given by

$x^2 + y^2 + z^2 - 6x + 8y - 10z + 1 = 0$ is

(1) (– 3, 4, – 5), 49(2) (– 6, 8, – 10), 1

(3) (3, – 4, 5), 7 (4) (6, – 8, 10), 7

(55) The value of $\left[\frac{-1+i\sqrt{3}}{2}\right]^{100} + \left[\frac{-1-i\sqrt{3}}{2}\right]^{100}$ is

(1) 2(2) 0 (3) – 1 (4) 1

(56) The modulus and amplititude of the complex number $\left[e^{3-i\pi/4}\right]^3$ are respectively

(1) $e^9, \frac{\pi}{2}$ (2) $e^9, \frac{-\pi}{2}$ (3) $e^6, \frac{-3\pi}{4}$ (4) $e^9, \frac{-3\pi}{4}$

(57) If $(m-5) + i(n+4)$ is the complex conjugate of $(2m+3) + i(3n-2)$ then (n, m) are

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

(58) If $x^2 + y^2 = 1$ then the value of $\frac{1 + x + iy}{1 + x - iy}$ is

(1) $x - iy$ (2) $2x$ (3) $-2iy$ (4) $x + iy$

(59) The modulus of the complex number $2 + i\sqrt{3}$ is

(1) $\sqrt{3}$ (2) $\sqrt{13}$ (3) $\sqrt{7}$ (4) 7

(60) If $A + iB = (a_1 + ib_1)(a_2 + ib_2)(a_3 + ib_3)$ then $A^2 + B^2$ is

(1) $a_1^2 + b_1^2 + a_2^2 + b_2^2 + a_3^2 + b_3^2$

(2) $(a_1 + a_2 + a_3)^2 + (b_1 + b_2 + b_3)^2$

(3) $(a_1^2 + b_1^2)(a_2^2 + b_2^2)(a_3^2 + b_3^2)$

(4) $(a_1^2 + a_2^2 + a_3^2)(b_1^2 + b_2^2 + b_3^2)$

(61) If $a = 3 + i$ and $z = 2 - 3i$ then the points on the Argand diagram representing az, $3az$ and $-az$ are

(1) Vertices of a right angled triangle
(2) Vertices of an equilateral triangle
(3) Vertices of an isosceles triangle
(4) Collinear

(62) The points z_1, z_2, z_3, z_4 in the complex plane are the vertices of a parallelogram taken in order if and only if

(1) $z_1 + z_4 = z_2 + z_3$ (2) $z_1 + z_3 = z_2 + z_4$

(3) $z_1 + z_2 = z_3 + z_4$ (iv) $z_1 - z_2 = z_3 - z_4$

(63) If z represents a complex number then $\arg(z) + \arg(\bar{z})$ is

(1) $\pi/4$ (2) $\pi/2$ (3) 0 (4) $\pi/4$

(64) If the amplitude of a complex number is $\pi/2$ then the number is

(1) purely imaginary (2) purely real

(3) 0 (4) neither real nor imaginary

(65) If the point represented by the complex number iz is rotated about the origin through the angle $\frac{\pi}{2}$ in the counter clockwise direction then the complex number representing the new position is

(1) iz (2) $-iz$ (3) $-z$ (4) z

(66) The polar form of the complex number $(i^{25})^3$ is

(1) $\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$ (2) $\cos\pi + i\sin\pi$

(3) $\cos\pi - i\sin\pi$ (4) $\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$

(67) If P represents the variable complex number z and if $|2z - 1| = 2|z|$ then the locus of P is

(1) the straight line $x = \frac{1}{4}$ (2) the straight line $y = \frac{1}{4}$

(3) the straight line $z = \frac{1}{2}$ (4) the circle $x^2 + y^2 - 4x - 1 = 0$

(68) $\frac{1 + e^{-i\theta}}{1 + e^{i\theta}} =$

(1) $\cos\theta + i\sin\theta$ (2) $\cos\theta - i\sin\theta$

(3) $\sin\theta - i\cos\theta$ (4) $\sin\theta + i\cos\theta$

(69) If $z_n = \cos\frac{n\pi}{3} + i\sin\frac{n\pi}{3}$ then $z_1 z_2 \ldots z_6$ is

(1) 1 (2) -1 (3) i (4) $-i$

(70) If $-\overline{z}$ lies in the third quadrant then z lies in the

(1) first quadrant (2) second quadrant

(3) third quadrant (4) fourth quadrant

(71) If $x = \cos\theta + i\sin\theta$ the value of $x^n + \frac{1}{x^n}$ is

(1) $2\cos n\theta$ (2) $2i\sin n\theta$ (3) $2\sin n\theta$ (4) $2i\cos n\theta$

(72) If $a = \cos\alpha - i\sin\alpha$, $b = \cos\beta - i\sin\beta$
$c = \cos\gamma - i\sin\gamma$ then $(a^2c^2 - b^2)/abc$ is

(1) $\cos 2(\alpha - \beta + \gamma) + i\sin 2(\alpha - \beta + \gamma)$

(2) $-2\cos(\alpha - \beta + \gamma)$

(3) $-2i\sin(\alpha - \beta + \gamma)$

(4) $2\cos(\alpha - \beta + \gamma)$

(73) $z_1 = 4 + 5i$, $z_2 = -3 + 2i$ then $\frac{z_1}{z_2}$ is

(1) $\frac{2}{13} - \frac{22}{13}i$ (2) $-\frac{2}{13} + \frac{22}{13}i$

(3) $\frac{-2}{13} - \frac{23}{13}i$ (4) $\frac{2}{13} + \frac{22}{13}i$

(74) The value of $i + i^{22} + i^{23} + i^{24} + i^{25}$ is

(1) i (2) $-i$ (3) 1 (4) -1

(75) The conjugate of $i^{13} + i^{14} + i^{15} + i^{16}$ is

(1) 1(2) -1 (3) 0 (4) $-i$

(76) If $-i+2$ is one root of the equation $ax^2 - bx + c = 0$, then the other root is

(1) $-i-2$ (2) $i-2$ (3) $2+i$ (4) $2i+i$

(77) The quadratic equation whose roots are $\pm i\sqrt{7}$ is

(1) $x^2 + 7 = 0$ (2) $x^2 - 7 = 0$

(3) $x^2 + x + 7 = 0$ (4) $x^2 - x - 7 = 0$

(78) The equation having $4 - 3i$ and $4 + 3i$ as roots is

(1) $x^2 + 8x + 25 = 0$ (2) $x^2 + 8x - 25 = 0$

(3) $x^2 - 8x + 25 = 0$ (4) $x^2 - 8x - 25 = 0$

(79) If $\frac{1-i}{1+i}$ is a root of the equation $ax^2 + bx + 1 = 0$, where a, b are real then (a, b) is

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

(80) If $-i+3$ is a root of $x^2 - 6x + k = 0$ then the value of k is

(1) 5 (2) $\sqrt{5}$ (3) $\sqrt{10}$ (4) 10

(81) If ω is a cube root of unity then the value of

$(1 - \omega + \omega^2)^4 + (1 + \omega - \omega^2)^4$ is

(1) 0 (2) 32 (3) – 16 (4) – 32

(82) If ω is the nth root of unity then

(1) $1 + \omega^2 + \omega^4 + \ldots = \omega + \omega^3 + \omega^5 + \ldots$

(2) $\omega^n = 0$ (3) $\omega^n = 1$ (4) $\omega = \omega^{n-1}$

(83) If ω is the cube root of unity then the value of

$(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)$ is

(1) 9 (2) – 9 (3) 16 (4) 32

(84) The axis of the parabola $y^2 - 2y + 8x - 23 = 0$ is

(1) $y = -1$ (2) $x = -3$ (3) $x = 3$ (4) $y = 1$

(85) $16x^2 - 3y^2 - 32x - 12y - 44 = 0$ represents

(1) an ellipse (2) a circle (3) a parabola (4) a hyperbola

(86) The line $4x + 2y = c$ is a tangent to the parabola $y^2 = 16x$ then c is

(1) – 1 (2) – 2 (3) 4 (4) – 4

(87) The point of intersection of the tangents at $t_1 = t$ and $t_2 = 3t$ to the parabola $y^2 = 8x$ is

(1) $(6t^2, 8t)$ (2) $(8t, 6t^2)$ (3) $(t^2, 4t)$ (4) $(4t, t^2)$

(88) The length of the latus rectum of the parabola $y^2 - 4x + 4y + 8 = 0$ is

(1) 8 (2) 6 (3) 4 (4) 2

(89) The diretrix of the parabola $y^2 = x + 4$ is

(1) $x = \frac{15}{4}$ (2) $x = -\frac{15}{4}$ (3) $x = -\frac{17}{4}$ (4) $x = \frac{17}{4}$

(90) The length of the latus rectum of the parabola whose vertex is (2, – 3) and the directrix $x = 4$ is

(1) 2 (2) 4 (3) 6 (4) 8

(91) The focus of the parabola $x^2 = 16y$ is

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

(92) The vertex of the parabola $x^2 = 8y - 1$ is

(1) $\left(-\frac{1}{8}, 0\right)$ (2) $\left(\frac{1}{8}, 0\right)$ (3) $\left(0, \frac{1}{8}\right)$ (4) $\left(0, -\frac{1}{8}\right)$

(93) The line $2x + 3y + 9 = 0$ touches the parabola $y^2 = 8x$ at the point

(1) (0, – 3) (2) (2, 4) (3) $\left(-6, \frac{9}{2}\right)$ (4) $\left(\frac{9}{2}, -6\right)$

(94) The tangents at the end of any focal chord to the parabola $y^2 = 12x$ intersect on the line

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

(95) The angle between the two tangents drawn from the point (– 4, 4) to $y^2 = 16x$ is

(1) 45° (2) 30° (3) 60° (4) 90°

(96) The eccentricity of the conic $9x^2 + 5y^2 - 54x - 40y + 116 = 0$ is

(1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{4}{9}$ (4) $\frac{2}{\sqrt{5}}$

(97) The length of the semi-major and the length of semi minor axis of the ellipse $\frac{x^2}{144} + \frac{y^2}{169} = 1$ are

(1) 26, 12 (2) 13, 24 (3) 12, 26 (4) 13, 12

(98) The distance between the foci of the ellipse $9x^2 + 5y^2 = 180$ is

(1) 4 (2) 6 (3) 8 (4) 2

(99) If the length of major and semi-minor axes of an ellipse are 8, 2 and their corresponding equations are $y - 6 = 0$ and $x + 4 = 0$ then the equations of the ellipse is

(1) $\frac{(x+4)^2}{4} + \frac{(y-6)^2}{16} = 1$ (2) $\frac{(x+4)^2}{16} + \frac{(y-6)^2}{4} = 1$

(3) $\frac{(x+4)^2}{16} - \frac{(y-6)^2}{4} = 1$ (4) $\frac{(x+4)^2}{4} - \frac{(y-6)^2}{16} = 1$

(100) The straight line $2x - y + c = 0$ is a tangent to the ellipse $4x^2 + 8y^2 = 32$ if c is

(1) $\pm 2\sqrt{3}$ (2) ± 6 (3) 36 (4) ± 4

(101) The sum of the distance of any point on the ellipse $4x^2 + 9y^2 = 36$ from $(\sqrt{5},\ 0)$ and $(-\sqrt{5},\ 0)$ is

(1) 4 (2) 8 (3) 6 (4) 18

(102) The radius of the director circle of the conic $9x^2 + 16y^2 = 144$ is

(1) $\sqrt{7}$ (2) 4 (3) 3 (4) 5

(103) The locus of foot of perpendicular from the focus to a tangent of the curve $16x^2 + 25y^2 = 400$ is

(1) $x^2 + y^2 = 4$ (2) $x^2 + y^2 = 25$ (3) $x^2 + y^2 = 16$ (4) $x^2 + y^2 = 9$

(104) The eccentricity of the hyperbola $12y^2 - 4x^2 - 24x + 48y - 127 = 0$ is

(1) 4 (2) 3 (3) 2 (4) 6

(105) The eccentricity of the hyperbola whose latus rectum is equal to half of its conjugate axis is

(1) $\frac{\sqrt{3}}{2}$ (2) $\frac{5}{3}$ (3) $\frac{3}{2}$ (4) $\frac{\sqrt{5}}{2}$

(106) The difference between the focal distances of any point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is 24 and the eccentricity is 2. Then the equation of the hyperbola is

(1) $\frac{x^2}{144} - \frac{y^2}{432} = 1$ (2) $\frac{x^2}{432} - \frac{y^2}{144} = 1$

(3) $\frac{x^2}{12} - \frac{y^2}{12\sqrt{3}} = 1$ (4) $\frac{x^2}{12\sqrt{3}} - \frac{y^2}{12} = 1$

(107) The directrices of the hyperbola $x^2 - 4(y-3)^2 = 16$ are

(1) $y = \pm \frac{8}{\sqrt{5}}$ (2) $x = \pm \frac{8}{\sqrt{5}}$ (3) $y = \pm \frac{\sqrt{5}}{8}$ (4) $x = \pm \frac{\sqrt{5}}{8}$

(108) The line $5x - 2y + 4k = 0$ is a tangent to $4x^2 - y^2 = 36$ then k is

(1) $\frac{4}{9}$ (2) $\frac{2}{3}$ (3) $\frac{9}{4}$ (4) $\frac{81}{16}$

(109) The equation of the chord of contact of tangents from (2, 1) to the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ is

(1) $9x - 8y - 72 = 0$ (2) $9x + 8y + 72 = 0$

(3) $8x - 9y - 72 = 0$ (4) $8x + 9y + 72 = 0$

(110) The angle between the asymptotes to the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ is

(1) $\pi - 2\tan^{-1}\left(\frac{3}{4}\right)$ (2) $\pi - 2\tan^{-1}\left(\frac{4}{3}\right)$

(3) $2\tan^{-1}\frac{3}{4}$ (4) $2\tan^{-1}\left(\frac{4}{3}\right)$

(111) The asymptotes of the hyperbola $36y^2 - 25x^2 + 900 = 0$ are

(1) $y = \pm\frac{6}{5}x$ (2) $y = \pm\frac{5}{6}x$ (3) $y = \pm\frac{36}{25}x$ (4) $y = \pm\frac{25}{36}x$

(112) The product of the perpendiculars drawn from the point (8, 0) on the hyperbola to its asymptotes is $\frac{x^2}{64} - \frac{y^2}{36} = 1$ is

(1) $\frac{25}{576}$ (2) $\frac{576}{25}$ (3) $\frac{6}{25}$ (4) $\frac{25}{6}$

(113) The locus of the point of intersection of perpendicular tangents to the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ is

(1) $x^2 + y^2 = 25$ (2) $x^2 + y^2 = 4$ (3) $x^2 + y^2 = 3$ (4) $x^2 + y^2 = 7$

(114) The eccentricity of the hyperbola with asymptotes $x + 2y - 5 = 0$, $2x - y + 5 = 0$ is

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

(115) Length of the semi-transverse axis of the rectangular hyperbola $xy = 8$ is

(1) 2 (2) 4 (3) 16 (4) 8

(116) The asymptotes of the rectangular hyperbola $xy = c^2$ are

(1) $x = c, y = c$ (2) $x = 0, y = c$ (3) $x = c, y = 0$ (4) $x = 0, y = 0$

(117) The co-ordinate of the vertices of the rectangular hyperbola $xy = 16$ are

(1) (4, 4), (– 4, – 4) (2) (2, 8), (– 2, – 8)

(3) (4, 0), (– 4, 0) (4) (8, 0), (– 8, 0)

(118) One of the foci of the rectangular hyperbola $xy = 18$ is

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

(119) The length of the latus rectum of the rectangular hyperbola $xy = 32$ is

(1) $8\sqrt{2}$ (2) 32 (3) 8 (4) 16

(120) The area of the triangle formed by the tangent at any point on the rectangular hyperbola $xy = 72$ and its asymptotes is

(1) 36 (2) 18 (3) 72 (4) 144

(121) The normal to the rectangular hyperbola $xy = 9$ at $\left(6, \frac{3}{2}\right)$ meets the curve again at

(1) $\left(\frac{3}{8}, 24\right)$ (2) $\left(-24, \frac{-3}{8}\right)$ (3) $\left(\frac{-3}{8}, -24\right)$ (4) $\left(24, \frac{3}{8}\right)$

OBJECTIVE TYPE QUESTIONS

Choose the correct or most suitable answer :

(1) The gradient of the curve $y = -2x^3 + 3x + 5$ at $x = 2$ is

(1) -20 (2) 27 (3) -16 (4) -21

(2) The rate of change of area A of a circle of radius r is

(1) $2\pi r$ (2) $2\pi r \frac{dr}{dt}$ (3) $\pi r^2 \frac{dr}{dt}$ (4) $\pi \frac{dr}{dt}$

(3) The velocity v of a particle moving along a straight line when at a distance x from the origin is given by $a + bv^2 = x^2$ where a and b are constants. Then the acceleration is

(1) $\frac{b}{x}$ (2) $\frac{a}{x}$ (3) $\frac{x}{b}$ (4) $\frac{x}{a}$

(4) A spherical snowball is melting in such a way that its volume is decreasing at a rate of 1 cm^3 / min. The rate at which the diameter is decreasing when the diameter is 10 cms is

(1) $\frac{-1}{50\pi}$ cm / min (2) $\frac{1}{50\pi}$ cm / min

(3) $\frac{-11}{75\pi}$ cm / min (4) $\frac{-2}{75\pi}$ cm / min.

(5) The slope of the tangent to the curve $y = 3x^2 + 3\sin x$ at $x = 0$ is

(1) 3 (2) 2 (3) 1 (4) -1

(6) The slope of the normal to the curve $y = 3x^2$ at the point whose x coordinate is 2 is

(1) $\frac{1}{13}$ (2) $\frac{1}{14}$ (3) $\frac{-1}{12}$ (4) $\frac{1}{12}$

(7) The point on the curve $y = 2x^2 - 6x - 4$ at which the tangent is parallel to the x – axis is

(1) $\left(\frac{5}{2}, \frac{-17}{2}\right)$ (2) $\left(\frac{-5}{2}, \frac{-17}{2}\right)$ (3) $\left(\frac{-5}{2}, \frac{17}{2}\right)$ (4) $\left(\frac{3}{2}, \frac{-17}{2}\right)$

(8) The equation of the tangent to the curve $y = \frac{x^3}{5}$ at the point $(-1, {}^{-1}/_{5})$ is

(1) $5y + 3x = 2$ (2) $5y - 3x = 2$ (3) $3x - 5y = 2$ (4) $3x + 3y = 2$

(9) The equation of the normal to the curve $\theta = \frac{1}{t}$ at the point $(-3, -{}^{1}/_{3})$ is

(1) $3\theta = 27t - 80$ (2) $5\theta = 27t - 80$

(3) $3\theta = 27t + 80$ (4) $\theta = \frac{1}{t}$

(10) The angle between the curves $\frac{x^2}{25} + \frac{y^2}{9} = 1$ and $\frac{x^2}{8} - \frac{y^2}{8} = 1$ is

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

(11) The angle between the curve $y = e^{mx}$ and $y = e^{-mx}$ for $m > 1$ is

(1) $\tan^{-1}\left(\frac{2m}{m^2-1}\right)$ (2) $\tan^{-1}\left(\frac{2m}{1-m^2}\right)$

(3) $\tan^{-1}\left(\frac{-2m}{1+m^2}\right)$ (4) $\tan^{-1}\left(\frac{2m}{m^2+1}\right)$

(12) The parametric equations of the curve $x^{2/3} + y^{2/3} = a^{2/3}$ are

(1) $x = a\sin^3\theta$; $y = a\cos^3\theta$ (2) $x = a\cos^3\theta$; $y = a\sin^3\theta$

(3) $x = a^3\sin\theta$; $y = a^3\cos\theta$ (4) $x = a^3\cos\theta$; $y = a^3\sin\theta$

(13) If the normal to the curve $x^{2/3} + y^{2/3} = a^{2/3}$ makes an angle θ with the x – axis then the slope of the normal is

(1) $-\cot\theta$ (2) $\tan\theta$ (3) $-\tan\theta$ (4) $\cot\theta$

(14) If the length of the diagonal of a square is increasing at the rate of 0.1 cm / sec. What is the rate of increase of its area when the side is $\frac{15}{\sqrt{2}}$ cm?

(1) 1.5 cm^2/sec (2) 3 cm^2/sec (3) $3\sqrt{2}$ cm^2/sec (4) 0.15 cm^2/sec

(15) What is the surface area of a sphere when the volume is increasing at the same rate as its radius?

(1) 1 (2) $\frac{1}{2\pi}$ (3) 4π (4) $\frac{4\pi}{3}$

(16) For what values of x is the rate of increase of $x^3 - 2x^2 + 3x + 8$ is twice the rate of increase of x

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

(17) The radius of a cylinder is increasing at the rate of 2cm / sec and its altitude is decreasing at the rate of 3cm / sec. The rate of change of volume when the radius is 3cm and the altitude is 5cm is

(1) 23π (2) 33π (3) 43π (4) 53π

(18) If $y = 6x - x^3$ and x increases at the rate of 5 units per second, the rate of change of slope when $x = 3$ is

(1) – 90 units / sec (2) 90 units / sec

(3) 180 units / sec (4) – 180 units / sec

(19) If the volume of an expanding cube is increasing at the rate of $4 cm^3$ / sec then the rate of change of surface area when the volume of the cube is 8 cubic cm is

(1) $8 cm^2$/sec (2) $16 cm^2$ / sec (3) $2 cm^2$ / sec (4) $4 cm^2$ / sec

(20) The gradient of the tangent to the curve $y = 8 + 4x - 2x^2$ at the point where the curve cuts the y-axis is

(1) 8 (2) 4 (3) 0 (4) – 4

(21) The Angle between the parabolas $y^2 = x$ and $x^2 = y$ at the origin is

(1) $2 \tan^{-1}\left(\frac{3}{4}\right)$ (2) $\tan^{-1}\left(\frac{4}{3}\right)$ (3) $\frac{\pi}{2}$ (4) $\frac{\pi}{4}$

(22) For the curve $x = e^t \cos t$; $y = e^t \sin t$ the tangent line is parallel to the x-axis when t is equal to

(1) $-\frac{\pi}{4}$ (2) $\frac{\pi}{4}$ (3) 0 (4) $\frac{\pi}{2}$

(23) If a normal makes an angle θ with positive x-axis then the slope of the curve at the point where the normal is drawn is

(1) $-\cot\theta$ (2) $\tan\theta$ (3) $-\tan\theta$ (4) $\cot\theta$

(24) The value of 'a' so that the curves $y = 3e^x$ and $y = \frac{a}{3} e^{-x}$ intersect orthogonally is

(1) – 1 (2) 1 (3) $\frac{1}{3}$ (4) 3

(25) If $s = t^3 - 4t^2 + 7$, the velocity when the acceleration is zero is

(1) $\frac{32}{3}$ m/sec (2) $\frac{-16}{3}$ m/sec (3) $\frac{16}{3}$ m/sec (4) $\frac{-32}{3}$ m/sec

(26) If the velocity of a particle moving along a straight line is directly proportional to the square of its distance from a fixed point on the line. Then its acceleration is proportional to

(1) s (2) s^2 (3) s^3 (4) s^4

(27) The Rolle's constant for the function $y = x^2$ on $[-2, 2]$ is

(1) $\frac{2\sqrt{3}}{3}$ (2) 0 (3) 2 (4) – 2

(28) The 'c' of Lagranges Mean Value Theorem for the function

$f(x) = x^2 + 2x - 1$; $a = 0$, $b = 1$ is

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

(29) The value of c in Rolle's Theorem for the function $f(x) = \cos \frac{x}{2}$ on $[\pi, 3\pi]$ is

(1) 0 2) 2π (3) $\frac{\pi}{2}$ (4) $\frac{3\pi}{2}$

(30) The value of 'c' of Lagranges Mean Value Theorem for $f(x) = \sqrt{x}$ when $a = 1$ and $b = 4$ is

(1) $\frac{9}{4}$ (2) $\frac{3}{2}$ (3) $\frac{1}{2}$ (4) $\frac{1}{4}$

(31) $\lim\limits_{x \to \infty} \frac{x^2}{e^x}$ is =

(1) 2 (2) 0 (3) ∞ (4) 1

(32) $\lim\limits_{x \to 0} \frac{a^x - b^x}{c^x - d^x}$

(1) ∞ (2) 0 (3) $\log \frac{ab}{cd}$ (4) $\frac{\log (a/b)}{\log (c/d)}$

(33) If $f(a) = 2$; $f'(a) = 1$; $g(a) = -1$; $g'(a) = 2$ then the value of $\lim\limits_{x \to a} \frac{g(x) f(a) - g(a) f(x)}{x - a}$ is

(1) 5 (2) -5 (3) 3 (4) -3

(34) Which of the following function is increasing in $(0, \infty)$

(1) e^x (2) $\frac{1}{x}$ (3) $-x^2$ (4) x^{-2}

(35) The function $f(x) = x^2 - 5x + 4$ is increasing in

(1) $(-\infty, 1)$ (2) $(1, 4)$ (3) $(4, \infty)$ (4) everywhere

(36) The function $f(x) = x^2$ is decreasing in

(1) $(-\infty, \infty)$ (2) $(-\infty, 0)$ (3) $(0, \infty)$ (4) $(-2, \infty)$

(37) The function $y = \tan x - x$ is

(1) an increasing function in $\left(0, \frac{\pi}{2}\right)$

(2) a decreasing function in $\left(0, \frac{\pi}{2}\right)$

(3) increasing in $\left(0, \frac{\pi}{4}\right)$ and decreasing in $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

(4) decreasing in $\left(0, \frac{\pi}{4}\right)$ and increasing in $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

(38) In a given semi circle of diameter 4 cm a rectangle is to be inscribed. The maximum area of the rectangle is

(1) 2 (2) 4 (3) 8 (4) 16

(39) The least possible perimeter of a rectangle of area $100m^2$ is

(1) 10 (2) 20 (3) 40 (4) 60

(40) If $f(x) = x^2 - 4x + 5$ on [0, 3] then the absolute maximum value is

(1) 2 (2) 3 (3) 4 (4) 5

(41) The curve $y = -e^{-x}$ is

(1) concave upward for $x > 0$ (2) concave downward for $x > 0$

(2) everywhere concave upward (4) everywhere concave downward

(42) Which of the following curves is concave down?

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

(43) The point of inflexion of the curve $y = x^4$ is at

(1) $x = 0$ (2) $x = 3$ (3) $x = 12$ (4) nowhere

(44) The curve $y = ax^3 + bx^2 + cx + d$ has a point of inflexion at $x = 1$ then

(1) $a + b = 0$ (2) $a + 3b = 0$ (3) $3a + b = 0$ (4) $3a + b = 1$

(45) If $u = x^y$ then $\frac{\partial u}{\partial x}$ is equal to

(1) yx^{y-1} (2) $u \log x$ (3) $u \log y$ (4) xy^{x-1}

(46) If $u = \sin^{-1}\left(\frac{x^4 + y^4}{x^2 + y^2}\right)$ and f = sin u then f is a homogeneous function of degree

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

(47) If $u = \frac{1}{\sqrt{x^2 + y^2}}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

(1) $\frac{1}{2}u$ (2) u (3) $\frac{3}{2}u$ (4) $-u$

(48) The curve $y^2 (x - 2) = x^2 (1 + x)$ has

(1) an asymptote parallel to x-axis (2) an asymptote parallel to y-axis

(3) asymptotes parallel to both axes (4) no asymptotes

(49) If $x = r \cos \theta$, $y = r \sin \theta$, then $\frac{\partial r}{\partial x}$ is equal to

(1) $\sec \theta$ (2) $\sin \theta$ (3) $\cos \theta$ (4) $\operatorname{cosec} \theta$

(50) Identify the true statements in the following :

(i) If a curve is symmetrical about the origin, then it is symmetrical about both axes.

(ii) If a curve is symmetrical about both the axes, then it is symmetrical about the origin.

(iii) A curve $f(x, y) = 0$ is symmetrical about the line $y = x$ if $f(x, y) = f(y, x)$.

(iv) For the curve $f(x, y) = 0$, if $f(x, y) = f(-y, -x)$, then it is symmetrical about the origin.

(1) (ii), (iii) (2) (i), (iv) (3) (i), (iii) (4) (ii), (iv)

(51) If $u = \log \left(\frac{x^2 + y^2}{xy} \right)$ then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ is

(1) 0 (2) u (3) $2u$ (4) u^{-1}

(52) The percentage error in the 11th root of the number 28 is approximately ______ times the percentage error in 28.

(1) $\frac{1}{28}$ (2) $\frac{1}{11}$ (3) 11 (4) 28

(53) The curve $a^2 y^2 = x^2 (a^2 - x^2)$ has

(1) only one loop between $x = 0$ and $x = a$

(2) two loops between $x = 0$ and $x = a$

(3) two loops between $x = -a$ and $x = a$

(4) no loop

(54) An asymptote to the curve $y^2 (a + 2x) = x^2 (3a - x)$ is

(1) $x = 3a$ (2) $x = -a/2$ (3) $x = a/2$ (4) $x = 0$

(55) In which region the curve $y^2 (a + x) = x^2 (3a - x)$ does not lie?

(1) $x > 0$ (2) $0 < x < 3a$ (3) $x \leq -a$ and $x > 3a$ (4) $-a < x < 3a$

(56) If $u = y \sin x$, then $\frac{\partial^2 u}{\partial x \, \partial y}$ is equal to

(1) $\cos x$ (2) $\cos y$ (3) $\sin x$ 4) 0

(57) If $u = f\left(\frac{y}{x}\right)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

(1) 0 (2) 1 (3) $2u$ (4) u

(58) The curve $9y^2 = x^2(4 - x^2)$ is symmetrical about

(1) y-axis (2) x-axis (3) $y = x$ (4) both the axes

(59) The curve $ay^2 = x^2(3a - x)$ cuts the y-axis at

(1) $x = -3a, x = 0$ (2) $x = 0, x = 3a$ (3) $x = 0, x = a$ (4) $x = 0$

(60) The value of $\int_0^{\pi/2} \frac{\cos^{5/3}x}{\cos^{5/3}x + \sin^{5/3}x}\, dx$ is

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{4}$ (3) 0 (4) π

(61) The value of $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x}\, dx$ is

(1) $\frac{\pi}{2}$ (2) 0 (3) $\frac{\pi}{4}$ (4) π

(62) The value of $\int_0^1 x(1 - x)^4\, dx$ is

(1) $\frac{1}{12}$ (2) $\frac{1}{30}$ (3) $\frac{1}{24}$ (4) $\frac{1}{20}$

(63) The value of $\int_{-\pi/2}^{\pi/2} \left(\frac{\sin x}{2 + \cos x}\right) dx$ is

(1) 0 (2) 2 (3) log 2 (4) log 4

(64) The value of $\int_0^{\pi} \sin^4 x\, dx$ is

(1) $3\pi/16$ (2) $3/16$ (3) 0 (4) $3\pi/8$

(65) The value of $\int_0^{\pi/4} \cos^3 2x\, dx$ is

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

(66) The value of $\int_0^{\pi} \sin^2 x \cos^3 x \, dx$ is

(1) π (2) $\pi/2$ (3) $\pi/4$ (4) 0

(67) The area bounded by the line $y = x$, the x-axis, the ordinates $x = 1$, $x = 2$ is

(1) $\frac{3}{2}$ (2) $\frac{5}{2}$ (3) $\frac{1}{2}$ (4) $\frac{7}{2}$

(68) The area of the region bounded by the graph of $y = \sin x$ and $y = \cos x$ between $x = 0$ and $x = \frac{\pi}{4}$ is

(1) $\sqrt{2} + 1$ (2) $\sqrt{2} - 1$ (3) $2\sqrt{2} - 2$ (4) $2\sqrt{2} + 2$

(69) The area between the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and its auxillary circle is

(1) $\pi b(a - b)$ (2) $2\pi a\,(a - b)$ (3) $\pi a\,(a - b)$ (4) $2\pi b\,(a - b)$

(70) The area bounded by the parabola $y^2 = x$ and its latus rectum is

(1) $\frac{4}{3}$ (2) $\frac{1}{6}$ (3) $\frac{2}{3}$ (4) $\frac{8}{3}$

(71) The volume of the solid obtained by revolving $\frac{x^2}{9} + \frac{y^2}{16} = 1$ about the minor axis is

(1) 48π (2) 64π (3) 32π (4) $128\,\pi$

(72) The volume, when the curve $y = \sqrt{3 + x^2}$ from $x = 0$ to $x = 4$ is rotated about x-axis is

(1) $100\,\pi$ (2) $\frac{100}{9}\,\pi$ (3) $\frac{100}{3}\,\pi$ (4) $\frac{100}{3}$

(73) The volume generated when the region bounded by $y = x$, $y = 1$, $x = 0$ is rotated about y-axis is

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

(74) Volume of solid obtained by revolving the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about major and minor axes are in the ratio

(1) $b^2 : a^2$ (2) $a^2 : b^2$ (3) $a : b$ (4) $b : a$

(75) The volume generated by rotating the triangle with vertices at (0, 0), (3, 0) and (3, 3) about x-axis is

(1) 18π (2) 2π (3) 36π (4) 9π

(76) The length of the arc of the curve $x^{2/3} + y^{2/3} = 4$ is

(1) 48 (2) 24

(3) 12 (4) 96

(77) The surface area of the solid of revolution of the region bounded by $y = 2x$, $x = 0$ and $x = 2$ about x-axis is

(1) $8\sqrt{5}\,\pi$ (2) $2\sqrt{5}\,\pi$ (3) $\sqrt{5}\pi$ (4) $4\sqrt{5}\pi$

(78) The curved surface area of a sphere of radius 5, intercepted between two parallel planes of distance 2 and 4 from the centre is

(1) 20π (2) 40π (3) 10π (4) 30π

(79) The integrating factor of $\frac{dy}{dx} + 2\frac{y}{x} = e^{4x}$ is

(1) $\log x$ (2) x^2 (3) e^x (4) x

(80) If $\cos x$ is an integrating factor of the differential equation $\frac{dy}{dx} + Py = Q$ then $P =$

(1) $-\cot x$ (2) $\cot x$ (3) $\tan x$ (4) $-\tan x$

(81) The integrating factor of $dx + xdy = e^{-y}\sec^2 y\, dy$ is

(1) e^x (2) e^{-x} (3) e^y (4) e^{-y}

(82) Integrating factor of $\frac{dy}{dx} + \frac{1}{x\log x}\cdot y = \frac{2}{x^2}$ is

(1) e^x (2) $\log x$ (3) $\frac{1}{x}$ (4) e^{-x}

(83) Solution of $\frac{dx}{dy} + mx = 0$, where $m < 0$ is

(1) $x = ce^{my}$ (2) $x = ce^{-my}$ (3) $x = my + c$ (4) $x = c$

(84) $y = cx - c^2$ is the general solution of the differential equation

(1) $(y')^2 - xy' + y = 0$ (2) $y'' = 0$

(3) $y' = c$ (4) $(y')^2 + xy' + y = 0$

(85) The differential equation $\left(\frac{dx}{dy}\right)^2 + 5y^{1/3} = x$ is

(1) of order 2 and degree 1

(2) of order 1 and degree 2

(3) of order 1 and degree 6

(4) of order 1 and degree 3

(86) The differential equation of all non-vertical lines in a plane is

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

(87) The differential equation of all circles with centre at the origin is

(1) $x\,dy + y\,dx = 0$ (2) $x\,dy - y\,dx = 0$

(3) $x\,dx + y\,dy = 0$ (4) $x\,dx - y\,dy = 0$

(88) The integrating factor of the differential equation $\frac{dy}{dx} + py = Q$ is

(1) $\int p dx$ (2) $\int Q\,dx$ (3) $e^{\int Q\,dx}$ (4) $e^{\int p dx}$

(89) The complementary function of $(D^2 + 1)y = e^{2x}$ is

(1) $(Ax + B)e^x$ (2) $A \cos x + B \sin x$ (3) $(Ax + B)e^{2x}$ (4) $(Ax + B)e^{-x}$

(90) A particular integral of $(D^2 - 4D + 4)y = e^{2x}$ is

(1) $\frac{x^2}{2} e^{2x}$ (2) xe^{2x} (3) xe^{-2x} (4) $\frac{x}{2} e^{-2x}$

(91) The differential equation of the family of lines $y = mx$ is

(1) $\frac{dy}{dx} = m$ (2) $ydx - xdy = 0$

(3) $\frac{d^2y}{dx^2} = 0$ (4) $ydx + x\,dy = 0$

(92) The degree of the differential equation $\sqrt{1 + \left(\frac{dy}{dx}\right)^{1/3}} = \frac{d^2y}{dx^2}$

(1) 1 (2) 2 (3) 3 (4) 6

(93) The degree of the differential equation $c = \frac{\left[1 + \left(\frac{dy}{dx}\right)^3\right]^{2/3}}{\frac{d^3y}{dx^3}}$ where c is a constant is

(1) 1 (2) 3 (3) -2 (4) 2

(94) The amount present in a radio active element disintegrates at a rate proportional to its amount. The differential equation corresponding to the above statement is (k is negative)

(1) $\frac{dp}{dt} = \frac{k}{p}$ (2) $\frac{dp}{dt} = kt$ (3) $\frac{dp}{dt} = kp$ (4) $\frac{dp}{dt} = -kt$

(95) The differential equation satisfied by all the straight lines in xy plane is

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

(96) If $y = ke^{\lambda x}$ then its differential equation is

(1) $\frac{dy}{dx} = \lambda y$ (2) $\frac{dy}{dx} = ky$ (3) $\frac{dy}{dx} + ky = 0$ (4) $\frac{dy}{dx} = e^{\lambda x}$

(97) The differential equation obtained by eliminating a and b from $y = ae^{3x} + be^{-3x}$ is

(1) $\frac{d^2y}{dx^2} + ay = 0$ (2) $\frac{d^2y}{dx^2} - 9y = 0$ (3) $\frac{d^2y}{dx^2} - 9\frac{dy}{dx} = 0$ (4) $\frac{d^2y}{dx^2} + 9x = 0$

(98) The differential equation formed by eliminating A and B from the relation $y = e^x (A \cos x + B \sin x)$ is

(1) $y_2 + y_1 = 0$ (2) $y_2 - y_1 = 0$

(3) $y_2 - 2y_1 + 2y = 0$ (4) $y_2 - 2y_1 - 2y = 0$

(99) If $\frac{dy}{dx} = \frac{x-y}{x+y}$ then

(1) $2xy + y^2 + x^2 = c$ (2) $x^2 + y^2 - x + y = c$

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

(100) If $f'(x) = \sqrt{x}$ and $f(1) = 2$ then $f(x)$ is

(1) $-\frac{2}{3}(x\sqrt{x} + 2)$ (2) $\frac{3}{2}(x\sqrt{x} + 2)$

(3) $\frac{2}{3}(x\sqrt{x} + 2)$ (4) $\frac{2}{3}x(\sqrt{x} + 2)$

(101) On putting $y = vx$, the homogeneous differential equation $x^2dy + y(x + y)dx = 0$ becomes

(1) $xdv + (2v + v^2)dx = 0$ (2) $vdx + (2x + x^2)dv = 0$

(3) $v^2dx - (x + x^2)dv = 0$ (4) $vdv + (2x + x^2)dx = 0$

(102) The integrating factor of the differential equation $\frac{dy}{dx} - y \tan x = \cos x$ is

(1) $\sec x$ (2) $\cos x$ (3) $e^{\tan x}$ (4) $\cot x$

(103) The P.I. of $(3D^2 + D - 14)y = 13e^{2x}$ is

(1) $26x\, e^{2x}$ (2) $13x\, e^{2x}$ (3) $x\, e^{2x}$ (4) $x^2/2\, e^{2x}$

(104) The particular integral of the differential equation $f(D)y = e^{ax}$ where $f(D) = (D - a)\, g(D)$, $g(a) \neq 0$ is

(1) me^{ax} (2) $\frac{e^{ax}}{g(a)}$ (3) $g(a)e^{ax}$ (4) $\frac{xe^{ax}}{g(a)}$

(105) Which of the following are statements?

(i) May God bless you. (ii) Rose is a flower

(iii) Milk is white. (iv) 1 is a prime number

(1) (i), (ii), (iii) (2) (i), (ii), (iv) (3) (i), (iii), (iv) (4) (ii), (iii), (iv)

(106) If a compound statement is made up of three simple statements, then the number of rows in the truth table is

(1) 8 (2) 6 (3) 4 (4) 2

(107) If p is T and q is F, then which of the following have the truth value T ?

(i) $p \vee q$ (ii) $\sim p \vee q$ (iii) $p \vee \sim q$ (iv) $p \wedge \sim q$

(1) (i), (ii), (iii) (2) (i), (ii), (iv)

(3) (i), (iii), (iv) (4) (ii), (iii), (iv)

(108) The number of rows in the truth table of $\sim [p \wedge (\sim q)]$ is

(1) 2 (2) 4 (3) 6 (4) 8

(109) The conditional statement $p \to q$ is equivalent to

(1) $p \vee q$ (2) $p \vee \sim q$ (3) $\sim p \vee q$ (4) $p \wedge q$

(110) Which of the following is a tautology?

(1) $p \vee q$ (2) $p \wedge q$ (3) $p \vee \sim p$ (4) $p \wedge \sim p$

(111) Which of the following is a contradiction?

(1) $p \vee q$ (2) $p \wedge q$ (3) $p \vee \sim p$ (4) $p \wedge \sim p$

(112) $p \leftrightarrow q$ is equivalent to

(1) $p \to q$ (2) $q \to p$ (3) $(p \to q) \vee (q \to p)$ (4) $(p \to q) \wedge (q \to p)$

(113) Which of the following is not a binary operation on R

(1) $a * b = ab$ (2) $a * b = a - b$

(3) $a * b = \sqrt{ab}$ (4) $a * b = \sqrt{a^2 + b^2}$

(114) A monoid becomes a group if it also satisfies the

(1) closure axiom (2) associative axiom

(3) identity axiom (4) inverse axiom

(115) Which of the following is not a group?

(1) $(Z_n , +_n)$ (2) $(Z, +)$ (3) $(Z, \cdot)$ (4) $(R, +)$

(116) In the set of integers with operation * defined by $a * b = a + b - ab$, the value of $3 * (4 * 5)$ is

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

(117) The order of [7] in $(Z_9 , +_9)$ is

(1) 9 (2) 6 (3) 3 (4) 1

(118) In the multiplicative group of cube root of unity, the order of w^2 is

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

(119) The value of $[3] +_{11} ([5] +_{11} [6])$ is

(1) [0] (2) [1] (3) [2] (4) [3]

(120) In the set of real numbers R, an operation * is defined by

$a * b = \sqrt{a^2 + b^2}$. Then the value of (3 * 4) * 5 is

(1) 5 (2) $5\sqrt{2}$ (3) 25 (4) 50

(121) Which of the following is correct?

(1) An element of a group can have more than one inverse.

(2) If every element of a group is its own inverse, then the group is abelian.

(3) The set of all 2 × 2 real matrices forms a group under matrix multiplication.

(4) $(a * b)^{-1} = a^{-1} * b^{-1}$ for all $a, b \in G$

(122) The order of $-i$ in the multiplicative group of 4th roots of unity is

(1) 4 (ii) 3 (3) 2 (4) 1

(123) In the multiplicative group of nth roots of unity, the inverse of ω^k is $(k < n)$

(1) $\omega^{1/k}$ (2) ω^{-1} (3) ω^{n-k} (4) $\omega^{n/k}$

(124) In the set of integers under the operation * defined by $a * b = a + b - 1$, the identity element is

(1) 0 (2) 1 (3) a (4) b

(125) If $f(x) = \begin{cases} k x^2, & 0 < x < 3 \\ 0 & ,\text{elsewhere} \end{cases}$ is a probability density function then the value of k is

(1) $\frac{1}{3}$ (2) $\frac{1}{6}$ (3) $\frac{1}{9}$ (4) $\frac{1}{12}$

(126) If $f(x) = \frac{A}{\pi} \frac{1}{16 + x^2}, -\infty < x < \infty$

is a p.d.f of a continuous random variable X, then the value of A is

(1) 16 (2) 8 (3) 4 (4) 1

(127) A random variable X has the following probability distribution

X	0	1	2	3	4	5
$P(X = x)$	1/4	$2a$	$3a$	$4a$	$5a$	1/4

Then $P(1 \le x \le 4)$ is

(1) $\frac{10}{21}$ (2) $\frac{2}{7}$ (3) $\frac{1}{14}$ (4) $\frac{1}{2}$

(128) A random variable X has the following probability mass function as follows :

X	−2	3	1
$P(X = x)$	$\frac{\lambda}{6}$	$\frac{\lambda}{4}$	$\frac{\lambda}{12}$

Then the value of λ is

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

(129) X is a discrete random variable which takes the values 0, 1, 2 and $P(X = 0) = \frac{144}{169}$, $P(X = 1) = \frac{1}{169}$ then the value of $P(X = 2)$ is

(1) $\frac{145}{169}$ (2) $\frac{24}{169}$ (3) $\frac{2}{169}$ (4) $\frac{143}{169}$

(130) A random variable X has the following p.d.f

X	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

The value of k is

(1) $\frac{1}{8}$ (2) $\frac{1}{10}$ (3) 0 (4) -1 or $\frac{1}{10}$

(131) Given $E(X + c) = 8$ and $E(X - c) = 12$ then the value of c is

(1) −2 (2) 4 (3) −4 (4) 2

(132) X is a random variable taking the values 3, 4 and 12 with probabilities $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{5}{12}$. Then $E(X)$ is

(1) 5 (2) 7 (3) 6 (4) 3

(133) Variance of the random variable X is 4. Its mean is 2. Then $E(X^2)$ is

(1) 2 (2) 4 (3) 6 (4) 8

(134) $\mu_2 = 20$, $\mu_2' = 276$ for a discrete random variable X. Then the mean of the random variable X is

(1) 16 (2) 5 (3) 2 (4) 1

(135) Var $(4X + 3)$ is

(1) 7 (2) 16 Var (X) (3) 19 (4) 0

(136) In 5 throws of a die, getting 1 or 2 is a success. The mean number of successes is

(1) $\frac{5}{3}$ (2) $\frac{3}{5}$ (3) $\frac{5}{9}$ (4) $\frac{9}{5}$

(137) The mean of a binomial distribution is 5 and its standard deviation is 2. Then the value of n and p are

(1) $\left(\frac{4}{5}, 25\right)$ (2) $\left(25, \frac{4}{5}\right)$ (3) $\left(\frac{1}{5}, 25\right)$ (4) $\left(25, \frac{1}{5}\right)$

(138) If the mean and standard deviation of a binomial distribution are 12 and 2 respectively. Then the value of its parameter p is

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

(139) In 16 throws of a die getting an even number is considered a success. Then the variance of the successes is

(1) 4 (2) 6 (3) 2 (4) 256

(140) A box contains 6 red and 4 white balls. If 3 balls are drawn at random, the probability of getting 2 white balls without replacement, is

(1) $\frac{1}{20}$ (2) $\frac{18}{125}$ (3) $\frac{4}{25}$ (4) $\frac{3}{10}$

(141) If 2 cards are drawn from a well shuffled pack of 52 cards, the probability that they are of the same colours without replacement, is

(1) $\frac{1}{2}$ (2) $\frac{26}{51}$ (3) $\frac{25}{51}$ (4) $\frac{25}{102}$

(142) If in a Poisson distribution $P(X = 0) = k$ then the variance is

(1) $\log \frac{1}{k}$ (2) $\log k$ (3) e^{λ} (4) $\frac{1}{k}$

(143) If a random variable X follows Poisson distribution such that $E(X^2) = 30$ then the variance of the distribution is

(1) 6 (2) 5 (3) 30 (4) 25

(144) The distribution function $F(X)$ of a random variable X is

(1) a decreasing function

(2) a non-decreasing function

(3) a constant function

(4) increasing first and then decreasing

(145) For a Poisson distribution with parameter $\lambda = 0.25$ the value of the 2^{nd} moment about the origin is

(1) 0.25 (2) 0.3125 (3) 0.0625 (4) 0.025

(146) In a Poisson distribution if $P(X = 2) = P(X = 3)$ then the value of its parameter λ is

(1) 6 (2) 2 (3) 3 (4) 0

(147) If $f(x)$ is a p.d.f of a normal distribution with mean μ then $\int_{-\infty}^{\infty} f(x)\, dx$ is

(1) 1 (2) 0.5 (3) 0 (4) 0.25

(148) The random variable X follows normal distribution

$f(x) = ce^{\frac{-1/2\,(x-100)^2}{25}}$ Then the value of c is

(1) $\sqrt{2\pi}$ (2) $\frac{1}{\sqrt{2\pi}}$ (3) $5\sqrt{2\pi}$ (4) $\frac{1}{5\sqrt{2\pi}}$

(149) If $f(x)$ is a *p.d.f.* of a normal variate X and $X \sim N(\mu, \sigma^2)$ then $\int_{-\infty}^{\mu} f(x)\, dx$ is

(1) undefined (2) 1 (3) .5 (4) – .5

(150) The marks secured by 400 students in a Mathematics test were normally distributed with mean 65. If 120 students got more marks above 85, the number of students securing marks between 45 and 65 is

(1) 120 (2) 20 (3) 80 (4) 160

KEY TO OBJECTIVE TYPE QUESTIONS

Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key
1	1	26	4	51	2	76	3	101	3
2	3	27	2	52	1	77	1	102	4
3	1	28	2	53	3	78	3	103	2
4	3	29	4	54	3	79	4	104	3
5	1	30	3	55	3	80	4	105	4
6	3	31	1	56	4	81	3	106	1
7	3	32	1	57	1	82	3	107	2
8	4	33	3	58	4	83	1	108	3
9	3	34	4	59	3	84	4	109	1
10	3	35	2	60	3	85	4	110	3
11	1	36	1	61	4	86	4	111	2
12	4	37	3	62	2	87	1	112	2
13	1	38	3	63	3	88	3	113	1
14	2	39	3	64	1	89	3	114	2
15	1	40	4	65	3	90	4	115	2
16	4	41	1	66	4	91	2	116	4
17	1	42	2	67	1	92	3	117	1
18	2	43	2	68	2	93	4	118	1
19	3	44	4	69	2	94	2	119	4
20	3	45	2	70	4	95	4	120	4
21	4	46	2	71	1	96	2	121	3
22	2	47	2	72	3	97	4		
23	3	48	4	73	3	98	3		
24	4	49	1	74	1	99	2		
25	3	50	3	75	3	100	2		

KEY TO OBJECTIVE TYPE QUESTIONS

Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key	Q.No	Key
1	4	31	2	61	2	91	2	121	2
2	2	32	4	62	2	92	4	122	1
3	3	33	1	63	1	93	2	123	3
4	2	34	1	64	4	94	3	124	2
5	1	35	3	65	2	95	2	125	3
6	3	36	2	66	4	96	1	126	3
7	4	37	1	67	1	97	2	127	4
8	2	38	2	68	2	98	3	128	2
9	3	39	3	69	3	99	4	129	2
10	4	40	4	70	2	100	3	130	2
11	1	41	4	71	2	101	1	131	1
12	2	42	1	72	3	102	2	132	2
13	2	43	4	73	3	103	3	133	4
14	1	44	3	74	4	104	4	134	1
15	1	45	1	75	4	105	4	135	2
16	4	46	3	76	1	106	1	136	1
17	2	47	4	77	1	107	3	137	4
18	1	48	2	78	1	108	2	138	3
19	1	49	3	79	2	109	3	139	1
20	2	50	1	80	4	110	3	140	4
21	3	51	1	81	3	111	4	141	3
22	1	52	2	82	2	112	4	142	1
23	1	53	3	83	2	113	3	143	2
24	2	54	2	84	1	114	4	144	2
25	2	55	3	85	2	115	3	145	2
26	3	56	1	86	2	116	1	146	3
27	2	57	1	87	3	117	1	147	1
28	4	58	4	88	4	118	2	148	4
29	2	59	4	89	2	119	4	149	3
30	1	60	2	90	1	120	2	150	3