# Kalaimagal Academy

## Nettapakkam

# +2 Maths

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# ONE MARK



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## CHAPTER – I
## ( MATRICES AND DETERMINANTS)

01. The rank of the matrix $\begin{pmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{pmatrix}$ is,

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

02. The rank of the diagonal matrix $\begin{pmatrix} -1 & & & & \\ & 2 & & & \\ & & 0 & & \\ & & & -4 & \\ & & & & 0 \end{pmatrix}$ v

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

03. If $A = (2 \quad 0 \quad 1)$, then the rank of $AA^T$ is,

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

04. If $A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$, then the rank of $AA^T$ is,

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

05. If the rank of the matrix $\begin{pmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{pmatrix}$ is 2 , then $\lambda$ is,

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

06. 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)k I

07. If the matrix $\begin{pmatrix} -1 & 3 & 2 \\ 1 & k & -3 \\ 1 & 4 & 5 \end{pmatrix}$ has an inverse then the values of k

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

08. If $A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$, then ( adjA ) A =

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

09. If A is a square matrix of order n then $|\text{adj } A|$ is

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

10. The inverse of the matrix $\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$ is

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

11. If A is a matrix of order 3, then det(k1)is,
1) $k^3\det(A)$ 2) $k^2\det(A)$ 3) $k\ \det(A)$ 4) det (1)

12. If I is the unit matrix of order n, where $k\neq0$ is a constant, then adj(kI) is
1) $k^n adj(I)$ 2) $k\ adj(I)$ 3) $k^2 adj(I)$ 4) $k^{n-1}adj(I)$

13. If A and B are any two matrices such that AB = 0 and A is non-singular, then
1)B = 0 2)B is singular 3) B is non-singular 4) B = A

14. If A = $\begin{pmatrix}0&0\\0&5\end{pmatrix}$, then $A^{12}$ is,
1) $\begin{pmatrix}0&0\\0&60\end{pmatrix}$ 2) $\begin{pmatrix}0&0\\0&5^{12}\end{pmatrix}$ 3) $\begin{pmatrix}0&0\\0&0\end{pmatrix}$ 4) $\begin{pmatrix}1&0\\0&1\end{pmatrix}$

15. Inverse of $\begin{pmatrix}3&1\\5&2\end{pmatrix}$ is ,
1) $\begin{pmatrix}2&-1\\-5&3\end{pmatrix}$ 2) $\begin{pmatrix}-2&5\\1&-3\end{pmatrix}$ 3) $\begin{pmatrix}3&-1\\-5&-3\end{pmatrix}$ 4) $\begin{pmatrix}-3&5\\1&-2\end{pmatrix}$

16. In a system of 3 linear non-homogeneous equation with three unknowns, if $\Delta=0$ and $\Delta_x=0$, $\Delta_y\neq0$ ,$\Delta_z=0$ then the system has
1) unique solution 2) two solutions 3) infinitely many solution 4)no solution.

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 equations –2x+y+z=l ; x-2y+z=m ; x+y-2z=n such that l+m+n = 0, then the system has
1)non-zero unique solution 2)trivial solution
3)infinitely many solutions 4)no solution

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20. The rank of the matrix $\begin{pmatrix}2&-4\\-1&2\end{pmatrix}$ is
1)1 2) 2 3)0 4) 8

21. The rank of the matrix $\begin{pmatrix}7&-1\\2&1\end{pmatrix}$ is
1)9 2) 2 3) 1 4) 5

22. If A and B are matrices conformable to multiplication then $(AB)^T$ is
1) $A^T B^T$ 2) $B^T A^T$ 3) AB 4) BA

23. $(A^T)^{-1}$ is equal to 1) $A^{-1}$ 2) $A^T$ 3) A 4) $(A^{-1})^T$

24. If $\rho(A)=r$ then which of the following is correct ?
1) all the minors of order r which does not vanish
2) A has atleast one minor of order r which does not vanish
3) A has atleast one (r+1) order minor which vanishes
4) all (r+1) and higher order minors should not vanish

25. Which of the following is not elementary transformation ?
1) $R_i \leftrightarrow R_j$ 2) $R_i \to 2R_i + R_j$ 3) $C_i \to C_j + C_i$ 4) $R_i \to R_i + C_j$

26. Equivalent matrices are obtained by
1) taking inverses 2) taking transposes
3) taking ad joints 4) taking finite number of elementary transformations

27. In echelon form, which of the following is incorrect ?
1) Every row of A which has all its entries 0 occurs below every row which has a non-zero entry 2) The first non-zero entry in each non-zero row is 1
3) The number of zeroes before the first non-zero element in a row is less than the number of such zeroes in the next row
4) Two rows can have same number of zeroes before the first non-zero entry

28. If $\Delta \neq 0$ then the system is
1) Consistent and has unique solution 2)Consistent and infinitely many solutions
3) Inconsistent 4) Either consistent or inconsistent

29. In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and one of $\Delta_x$, $\Delta_y$ or $\Delta_z$ is non-zero then the system is
1) consistent 2) inconsistent 3) consistent and the system reduces to two equations 4) consistent and the system reduces to a single equation

30. In the system of 3 linear equations with three unknowns, if $\Delta = 0, \Delta_x = 0, \Delta_y = 0, \Delta_z = 0$ and atleast one 2 x 2 minor of $\Delta \neq 0$ then the system is
1) consistent 2) inconsistent 3) consistent and the system reduces to two equations 4) consistent and the system reduces to a single equation

31. In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and all 2 x 2 minors of $\Delta = 0$ and atleast one 2 x 2 minor of $\Delta_x$ or $\Delta_y$ or $\Delta_z$ is non-zero then the system is
1) consistent 2) inconsistent 3) consistent and the system reduces to two equations 4) consistent and the system reduces to a single equation

32. In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and all 2 x 2 minors of $\Delta, \Delta_x, \Delta_y, \Delta_z$ are zeroes and atleast one non-zero element is in $\Delta$ then the system is
1) consistent 2) inconsistent 3) consistent and the system reduces to two equations 4)consistent and the system reduces to a single equation

33. Every homogeneous system
1) is always consistent 2) has only trivial solution
3) has infinitely many solutions 4) need not be consistent

34. If $\rho(A) = \rho[A, B]$ then the system is

1) consistent and has infinitely many solutions 2) consistent and has a unique solution 3) consistent 4) inconsistent

35. If $\rho(A) = \rho[A,B]$= the number of unknowns then the system is

1) consistent and has infinitely many solutions 2) consistent and has a unique solution 3) consistent 4) inconsistent

36. $\rho(A) \neq \rho(A,B)$ then the system is

1) consistent and has infinitely many solutions 2) consistent and has a unique solution 3) consistent 4) inconsistent

37. In the system of 3 linear equations with three unknowns $\rho(A)= \rho(A,B) = 1$ then the system

1) has unique solution
2) reduces to 2 equations and has infinitely many solution
3) reduces to a single equation and has infinitely many solution
4) is inconsistent

38. In the homogeneous system with three unknowns, $\rho(A)$ = number of unknowns then the system has

1) only trivial solution
2) reduces to 2 equations and has infinitely many solution
3) reduces to a single equation and has infinitely many solution
4) is inconsistent

39. In the system of 3 linear equations with three unknowns, in the non-homogeneous system $\rho(A)= \rho(A,B) = 2$ then the system

1) has unique solution
2) reduces to 2 equations and has infinitely many solution
3) reduces to a single equation and has infinitely many solution
4) is inconsistent

40. In the homogeneous system $\rho(A) <$ the number of unknowns then the system has

1) only trivial solution 2) trivial solution and infinitely many non-trivial solutions
3) only non-trivial solutions 4) no solution

41. Cramer's rule is applicable only ( with three unknowns ) when

1) $\Delta \neq 0$ 2) $\Delta = 0$ 3) $\Delta = 0,\ \Delta_x \neq 0$ 4) $\Delta_x = \Delta_y = \Delta_z = 0$

42. Which of the following statement is correct regarding homogeneous system

1) always inconsistent
2) has only trivial solution
3) has only non-trivial solutions
4) has only trivial solution only if rank of the coefficient matrix is equal to the number of unknowns

# CHAPTER – II
## ( VECTOR ALGEBRA )

01. 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

02. If $\vec{a}$ and $\vec{b}$ are unit vectors and $\theta$ 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) $\theta = \frac{2\pi}{3}$

03. 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) $\frac{-\sqrt{3}}{2}$

04. 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) $\vec{u}$ is a unit vector 2) $\vec{u} = \vec{a}+\vec{b}+\vec{c}$ 3) $\vec{u} = \vec{0}$ 4) $\vec{u} \neq \vec{0}$

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

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

06. 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

07. 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) $3\sqrt{30}$

08. 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

09. If $\vec{p}$ and $\vec{q}$ and $\vec{p}+\vec{q}$ are vectors of magnitude $\lambda$ then the magnitude of $|\vec{p}-\vec{q}|$ is

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

10. 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) or $\vec{x} = \vec{0}$ or $\vec{y} = \vec{0}$ or $\vec{x}$ and $\vec{y}$ are parallel

11. 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) $\frac{3}{2}$

12. The projection of $\vec{OP}$ on a unit vector $\vec{OQ}$ equals thrice the area of parallelogram OPRQ. Then $\angle POQ$ is, 1) $\tan^{-1}\frac{1}{3}$ 2) $\cos^{-1}\left(\frac{3}{\sqrt{10}}\right)$ 3) $\sin^{-1}\left(\frac{3}{\sqrt{10}}\right)$ 4) $\sin^{-1}\left(\frac{1}{3}\right)$

13. If the projection of $\vec{a}$ on $\vec{b}$ and the projection of $\vec{b}$ on $\vec{a}$ are equal then the angle between $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ is, 1) $\theta = \frac{\pi}{2}$ 2) $\theta = \frac{\pi}{3}$ 3) $\theta = \frac{\pi}{4}$ 4) $\theta = \frac{2\pi}{3}$

14. If $\vec{a}\times(\vec{b}\times\vec{c}) = (\vec{a}\times\vec{b})\times\vec{c}$ for non coplanar vectors $\vec{a},\vec{b},\vec{c}$ then
   1) $\vec{a}$ is parallel to $\vec{b}$ 2) $\vec{b}$ is parallel to $\vec{c}$
   3) $\vec{c}$ is parallel to $\vec{a}$ 4) $\vec{a}+\vec{b}+\vec{c}=\vec{0}$

15. If a line makes $45^\circ$, $60^\circ$ with positive direction of axes x and y then the angle it makes with the z axis is
   1) $30^\circ$ 2) $90^\circ$ 3) $45^\circ$ 4) $60^\circ$

16. If $[\vec{a}\times\vec{b},\ \vec{b}\times\vec{c},\ \vec{c}\times\vec{a}] = 64$ then $[\vec{a},\vec{b},\vec{c}]$ is
   1) 32 2) 8 3) 128 4) 0

17. If $[\vec{a}+\vec{b},\ \vec{b}+\vec{c},\ \vec{c}+\vec{a}] = 8$ then $[\vec{a},\vec{b},\vec{c}]$ is
   1) 4 2) 16 3) 32 4) -4

18. The value of $[\vec{i}+\vec{j},\ \vec{j}+\vec{k},\ \vec{k}+\vec{i}]$ is equal to
   1) 0 2) 1 3) 2 4) 4

19. The shortest distance of the point (2, 10, 1) from the plane $\vec{r}\cdot(3\vec{i}-\vec{j}+4\vec{k})=2\sqrt{26}$ is
   1) $2\sqrt{26}$ 2) $\sqrt{26}$ 3) 2 4) $\frac{1}{\sqrt{26}}$

20. The vector $(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{d})$ is
   1) perpendicular to $\vec{a}$, $\vec{b}$, $\vec{c}$ and $\vec{d}$
   2) parallel to the vectors $(\vec{a}\times\vec{b})$ and $(\vec{c}\times\vec{d})$
   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 $\vec{d}$

21. 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 $[\vec{a},\vec{b},\vec{c}]$ is
   1) $a^2b^2c^2$ 2) 0 3) $\frac{1}{2}abc$ 4) abc

22. If $\vec{a}$, $\vec{b}$, $\vec{c}$ are non-coplanar and $[\vec{a}\times\vec{b},\ \vec{b}\times\vec{c},\ \vec{c}\times\vec{a}] = [\vec{a}+\vec{b},\ \vec{b}+\vec{c},\ \vec{c}+\vec{a}]$ then the value of $[\vec{a},\vec{b},\vec{c}]$ is,
   1) 2 2) 3 3) 1 4) 0

23. $\vec{r}=s\vec{i}+t\vec{j}$ 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

24. 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

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

26. 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)

27. 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)2 x+y-z+5=0 4) 2x-y+z=0

28. 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

29. 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) $\frac{\vec{i} - \vec{j} - \vec{k}}{\sqrt{3}}$

30. 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)

31. The point of intersection of the lines $\vec{r} = (-\vec{i} + 2\vec{j} + 3\vec{k}) + t(-2\vec{i} + \vec{j} + \vec{k})$ and $\vec{r} = (2\vec{i} + 3\vec{j} + 5\vec{k}) + s(\vec{i} + 2\vec{j} + 3\vec{k})$ is,
1)(2, 1, 1) 2) (1, 2, 1) 3) (1, 1, 2) 4) (1, 1, 1)

32. 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) $\frac{1}{2\sqrt{6}}$

33. The shortest distance between the parallel lines $\frac{x-3}{4} = \frac{y-1}{2} = \frac{z-5}{-3}$ and $\frac{x-1}{4} = \frac{y-2}{2} = \frac{z-3}{-3}$
1) 3 2)2 3) 1 4) 0

34. The following two lines $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z}{1}$ and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z-1}{2}$ are,
1) parallel 2) intersecting 3) skew 4) perpendicular

35. The centre and radius of the sphere given by $x^2 + y^2 + z^2 - 6x + 8y - 10z + 1 = 0$
1) (-3, 4, -5) , 49 2) (-6, 8, -10) , 1 3) (3, -4, 5) , 7 4) (6, -8, 10) , 7

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36. The value of $\vec{a} \cdot \vec{b}$ when $\vec{a} = \vec{i} - 2\vec{j} + \vec{k}$ and $\vec{b} = 4\vec{i} - 4\vec{j} + 7\vec{k}$ is
1) 19 2) 3 3) -19 4) 14

37. The value of $\vec{a} \cdot \vec{b}$ when $\vec{a} = \vec{j} + 2\vec{k}$ and $\vec{b} = 2\vec{i} + \vec{k}$ is
1) 2 2) -2 3) 3 4) 4

38. The value of $\vec{a} \cdot \vec{b}$ when $\vec{a} = \vec{j} - 2\vec{k}$ and $\vec{b} = 2\vec{i} + 3\vec{j} - 2\vec{k}$ is
1) 7 2) -7 3) 5 4) 6

39. If $m\vec{i} + 2\vec{j} + \vec{k}$ and $4\vec{i} - 9\vec{j} + 2\vec{k}$ are perpendicular then m is

1) -4 2) 8 3) 4 4) 12

40. If $5\vec{i}-9\vec{j}+2\vec{k}$ and $m\vec{i}+2\vec{j}+\vec{k}$ are perpendicular then m is

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

41. If $\vec{a}$ and $\vec{b}$ are two vectors such that $|\vec{a}|=4$ , $|\vec{b}|=3$ and $\vec{a}\cdot\vec{b}=6$ then the angle between $\vec{a}$ and $\vec{b}$ is

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

42. The angle between the vectors $3\vec{i}-2\vec{j}-6\vec{k}$ and $4\vec{i}-\vec{j}+8\vec{k}$ is

1) $\cos^{-1}\left(\frac{34}{63}\right)$ 2) $\sin^{-1}\left(\frac{-34}{63}\right)$ 3) $\sin^{-1}\left(\frac{34}{63}\right)$ 4) $\cos^{-1}\left(\frac{-34}{63}\right)$

43. The angle between the vectors $\vec{i}-\vec{j}$ and $\vec{j}-\vec{k}$ is

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

44. The projection of the vector $7\vec{i}+\vec{j}-4\vec{k}$ on $2\vec{i}+6\vec{j}+3\vec{k}$ is

1) $\frac{7}{8}$ 2) $\frac{8}{\sqrt{66}}$ 3) $\frac{8}{7}$ 4) $\frac{\sqrt{66}}{8}$

45. $\vec{a}\cdot\vec{b}$ , when $\vec{a}=2\vec{i}+2\vec{j}-\vec{k}$ and $\vec{b}=6\vec{i}-3\vec{j}+2\vec{k}$ is

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

46. If the vectors $2\vec{i}+\lambda\vec{j}+\vec{k}$ and $\vec{i}-2\vec{j}+\vec{k}$ are perpendicular to each other, then $\lambda$ is

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

47. If the vectors $\vec{a}=3\vec{i}+2\vec{j}+9\vec{k}$ and $\vec{b}=\vec{i}+m\vec{j}+3\vec{k}$ are perpendicular then m is

1) -15 2) 15 3) 30 4) -30

48. If the vectors $\vec{a}=3\vec{i}+2\vec{j}+9\vec{k}$ and $\vec{b}=\vec{i}+m\vec{j}+3\vec{k}$ are parallel then m is

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

49. If $\vec{a},\vec{b},\vec{c}$ are three mutually perpendicular unit vectors, then $|\vec{a}+\vec{b}+\vec{c}|=$

1) 3 2) 9 3) $3\sqrt{3}$ 4) $\sqrt{3}$

50. If $|\vec{a}+\vec{b}|=60$, and $|\vec{a}-\vec{b}|=40$ and $|\vec{b}|=46$ then $|\vec{a}|$ is

1) 22 2)21 3)18 4)11

51. Let $\vec{u}$ , $\vec{v}$ and $\vec{w}$ be vector such that $\vec{u}+\vec{v}+\vec{w}=\vec{0}$

If $|\vec{u}|=3$, $|\vec{v}|=4$ and $|\vec{w}|=5$ then $\vec{u}\cdot\vec{v}+\vec{v}\cdot\vec{w}+\vec{w}\cdot\vec{u}$ is

1)25 2)-25 3)5 4)5

52. The projection of $\vec{i}-\vec{j}$ on z –axis is

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

53. The projection of $\vec{i}+2\vec{j}-2\vec{k}$ on $2\vec{i}-\vec{j}+5\vec{k}$ is

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

54. The projection of $3\vec{i}+\vec{j}-\vec{k}$ on $4\vec{i}-\vec{j}+2\vec{k}$ is

1) $\frac{9}{\sqrt{21}}$  2) $\frac{-9}{\sqrt{21}}$  3) $\frac{81}{\sqrt{21}}$  4) $\frac{-81}{\sqrt{21}}$

55. The work done in moving a particle from the point A, with position vector $2\vec{i}-6\vec{j}+7\vec{k}$, to the point B , with position vector $3\vec{i}-\vec{j}-5\vec{k}$, by a force $\vec{F}=\vec{i}+3\vec{j}-\vec{k}$ is

1)25  2)26  3)27  4)28

56. The work done by the force $\vec{F}=a\vec{i}+\vec{j}+\vec{k}$ in moving the point of application from (1,1,1) to (2,2,2) along a straightline is given to be 5 units. The value of a is

1)-3  2)3  3)8  4)-8

57. If $|\vec{u}|=3, |\vec{v}|=4$ and $\vec{a}\cdot\vec{b}=9$ then $|\vec{a}\times\vec{b}|$ is

1) $3\sqrt{7}$  2)63  3)69  4) $\sqrt{69}$

58. The angle between two vectors $\vec{a}$ and $\vec{b}$ if $|\vec{a}\times\vec{b}|=\vec{a}\cdot\vec{b}$ is

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

59. If $|\vec{a}|=2, |\vec{b}|=7$ and $\vec{a}\times\vec{b}=3\vec{i}-2\vec{j}+6\vec{k}$ then the angle between $\vec{a}$ and $\vec{b}$ is

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

60. The d.c.s of a vector whose direction ratios are 2,-3, -6 are

1) $\left(\frac{2}{7},\frac{-3}{7},\frac{-6}{7}\right)$  2) $\left(\frac{2}{49},\frac{3}{49},\frac{-6}{49}\right)$  3) $\left(\frac{\sqrt{2}}{7},\frac{\sqrt{3}}{7},\frac{-\sqrt{6}}{7}\right)$  4) $\left(\frac{2}{7},\frac{3}{7},\frac{6}{7}\right)$

61. The unit normal vectors to the plane $2x-y+2z=5$ are

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

3) $-\frac{1}{3}\left(2\vec{i}-\vec{j}+2\vec{k}\right)$  4) $\pm\frac{1}{3}\left(2\vec{i}-\vec{j}+2\vec{k}\right)$

62. The length of the perpendicular from the origin to the plane $\vec{r}\cdot\left(3\vec{i}+4\vec{j}+12\vec{k}\right)=26$ is

1)26  2)26 / 169  3)2  4)1 / 2

63. The distance from the origin to the plane $\vec{r}\cdot\left(2\vec{i}-\vec{j}+5\vec{k}\right)=7$ is

1) $\frac{7}{\sqrt{30}}$  2) $\frac{\sqrt{30}}{7}$  3) $\frac{30}{7}$  4) $\frac{7}{30}$

64. Chord AB is a diameter of the sphere $\left|\vec{r}-\left(2\vec{i}+\vec{j}-6\vec{k}\right)\right|=\sqrt{18}$ with coordinate of A as (3,2,-2) The coordinates of B is

1)(1,0,10)  2)(-1,0,-10)  3)(-1,0,10)  4)(1,0,-10)

65. The centre and radius of the sphere $\left|\vec{r}-\left(2\vec{i}-\vec{j}+4\vec{k}\right)\right|=5$ are

1)( 2 , -1 , 4 ) and 5  2)( 2 , 1 , 4 ) and 5

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

66. The centre and radius of the sphere $\left|2\vec{r}+\left(3\vec{i}-\vec{j}+4\vec{k}\right)\right|=4$ are

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

67. The vector equation of a plane passing through a point where P, V is $\vec{a}$ and perpendicular to a vector $\vec{n}$ is

1) $\vec{r}\cdot\vec{n}=\vec{a}\cdot\vec{n}$ 2) $\vec{r}\times\vec{n}=\vec{a}\times\vec{n}$ 3) $\vec{r}+\vec{n}=\vec{a}+\vec{n}$ 4) $\vec{r}-\vec{n}=\vec{a}-\vec{n}$

68. The vectors equation of a plane whose distance from the origin is p and perpendicular to a vector $\vec{n}$ is

1) $\vec{r}\cdot\vec{n}=p$ 2) $\vec{r}\cdot\hat{n}=q$ 3) $\vec{r}\times\vec{n}=p$ 4) $\vec{r}\cdot\hat{n}=p$

69. The non-parametric vector equation of a plane passing through a point whose P. V is $\vec{a}$ and parallel to $\vec{u}$ and $\vec{v}$ is

1) $\left[\vec{r}-\vec{a},\vec{u},\vec{v}\right]=0$ 2) $\left[\vec{r},\vec{u},\vec{v}\right]=0$ 3) $\left[\vec{r},\vec{a},\vec{u}\times\vec{v}\right]=0$ 4) $\left[\vec{a},\vec{u},\vec{v}\right]=0$

70. The non parametric vector equation of a plane passing through the point whose P. V s are $\vec{a}$, $\vec{b}$ and parallel to $\vec{v}$, is

1) $\left[\vec{r}-\vec{a}\ \ \vec{b}-\vec{a}\ \ \vec{v}\right]=0$ 2) $\left[\vec{r}\ \ \vec{b}-\vec{a}\ \ \vec{v}\right]=0$ 3) $\left[\vec{a}\ \ \vec{b}\ \ \vec{v}\right]=0$ 4) $\left[\vec{r}\ \ \vec{a}\ \ \vec{b}\right]=0$

71. The non-parametric vector equation of a plane passing through three points whose P. Vs are $\vec{a}$, $\vec{b}$, $\vec{c}$ is

1) $\left[\vec{r}-\vec{a}\ \ \vec{b}-\vec{a}\ \ \vec{c}-\vec{a}\right]=0$ 2) $\left[\vec{r}\ \ \vec{a}\ \ \vec{b}\right]=0$

3) $\left[\vec{r}\ \ \vec{b}\ \ \vec{c}\right]=0$ 4) $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]=0$

72. The vector equation of a plane passing through the line of intersection the planes $\overline{r}\cdot\overline{n_1}=q_1$ and $\overline{r}\cdot\overline{n_2}=q_2$ is

1) $\left(\vec{r}\cdot\vec{n_1}-q_1\right)+\lambda\left(\vec{r}\cdot\vec{n_2}-q_2\right)=0$ 2) $\vec{r}\cdot\vec{n_1}+\vec{r}\cdot\vec{n_2}=q_1+\lambda q_2$

3) $\vec{r}\times\vec{n_1}+\vec{r}\times\vec{n_2}=q_1+q_2$ 4) $\vec{r}\times\vec{n_1}-\vec{r}\times\vec{n_2}=q_1+q_2$

73. The angle between the line $\overline{r}=\overline{a}+t\,\overline{b}$ and the plane $\overline{r}\cdot\overline{n}=q$ is connected by the relation.

1) $\cos\theta=\frac{\vec{a}\cdot\vec{n}}{q}$ 2) $\cos\theta=\frac{\vec{b}\cdot\vec{n}}{\left|\vec{b}\right|\left|\vec{n}\right|}$ 3) $\sin\theta=\frac{\vec{a}\cdot\vec{b}}{\left|\vec{n}\right|}$ 4) $\sin\theta=\frac{\vec{b}\cdot\vec{n}}{\left|\vec{b}\right|\left|\vec{n}\right|}$

74. The vector equation of a sphere whose centre is origin and radius 'a' is

1) $r=\vec{a}$ 2) $\vec{r}-\vec{c}=\vec{a}$ 3) $\left|\vec{r}\right|=\left|\vec{a}\right|$ 4) $\vec{r}=a$

## CHAPTER - III
## COMPLEX NUMBERS

01. 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

02. The modulus and amplitude of the complex number $\left[e^{3-i\pi/4}\right]^{3}$ are respectively

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

03. 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) $\left(\frac{1}{2},8\right)$

04. 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) $x+iy$

05. he modulus of the complex number $2+i\sqrt{3}$ is

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

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

07. 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

08. 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) $z_1+z_2=z_3+z_4$ 4) $z_1-z_2=z_3-z_4$

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

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

10. If the amplitude of a complex number is $\frac{\pi}{2}$ then the number is

1) purely imaginary 2) purely real 3) 0 4) neither real nor imaginary

11. If the point represented by the complex number iz is rotated about the origin through the angle in the counter clockwise direction then the complex number representing the new position is 1) iz 2) -iz 3) -z 4) z

12. 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) $\cos\frac{\pi}{2}-i\sin\frac{\pi}{2}$

13. 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 $x^2+y^2-4x-1=0$

14. The value of $\frac{1+e^{-i\theta}}{1+e^{i\theta}}$ is
1) $\cos\theta+i\sin\theta$ 2) $\cos\theta-i\sin\theta$ 3) $\sin\theta-i\cos\theta$ 4) $\sin\theta+i\cos\theta$

15. If $z_n=\cos\frac{n\pi}{3}+i\sin\frac{n\pi}{3}$ then $z_1z_2z_3 .........z_6$ is
1) 1 2) -1 3) i 4) -i

16. If $-\bar{z}$ lies in the third quadrant then z lies in the quadrant
1) first quadrant 2) second quadrant 3) third quadrant 4) fourth quadrant

17. If $X=\cos\theta+i\sin\theta$ then 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) $2i\cos n\theta$

18. If $a=\cos\alpha-i\sin\alpha$, $b=\cos\beta-i\sin\beta$ and $c=\cos\gamma-i\sin\gamma$ then $\frac{a^2c^2-b^2}{abc}$ is
1) $\cos 2(\alpha-\beta+\gamma)+i\sin(\alpha-\beta+\gamma)$ 2) $-2\cos(\alpha-\beta+\gamma)$
3) $-2i\sin(\alpha-\beta+\gamma)$ 4) $2\cos(\alpha-\beta+\gamma)$

19. $z_1=4+5i$, $z_2=-3+2i$ then $\frac{z_1}{z_2}$ is
1) $\frac{2}{13}-\frac{22}{13}i$ 2) $-\frac{2}{13}+\frac{22}{13}i$ 3) $-\frac{2}{13}-\frac{22}{13}i$ 4) $\frac{2}{13}+\frac{22}{13}i$

20. The value of $i+i^{22}+i^{23}+i^{24}+i^{25}$ is
1) i 2) -i 3) 1 4) -1

21. The conjugate of $i^{13}+i^{14}+i^{15}+i^{16}$
1) 1 2) -1 3) 0 4) -i

22. If $-i+2$ is one is one root equation $ax^2-bx+c=0$, then the other root is
1) $-i-2$ 2) $i-2$ 3) $2+i$ 4) $2i+i$

23. 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) $x^2-x-7=0$

24. 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) $x^2-8x-25=0$

25. If $\frac{1-i}{1+i}$ is a root of $ax^2+bx+1=0$, where a, b are real then (a,2)is
1) (1,1) 2) (1,-1) 3) (0,1) 4) (1,0)

26. 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

27. If $\omega$ 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

28. If $\omega$ is the nth root of unity then
1) $1+\omega^2+\omega^4+......... =\omega+\omega^3+\omega^5+.........$ 2) $\omega^n=0$

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

29. If $\omega$ is a 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

COME BOOK

30. The complex number form of $\sqrt{-35}$ is
1) $i\sqrt{35}$ 2) $-i\sqrt{35}$ 3) $i\sqrt{-35}$ 4) $35i$
31. The complex number form of $3-\sqrt{-7}$ is
1) $-3+i\sqrt{7}$ 2) $3-i\sqrt{7}$ 3) $3-i7$ 4) $3+i7$
32. Real and imaginary parts of $4-i\sqrt{3}$ are
1) 4, $\sqrt{3}$ 2) 4, $-\sqrt{3}$ 3) $-\sqrt{3}$, 4 4) $\sqrt{3}$, 4
33. Real and imaginary parts of $\frac{3}{2}i$ are
1) 0, 3/2 2) 3/2, 0 3) 2, 3 4) 3, 2
34. The complex conjugate of $2+i\sqrt{7}$ is
1) $-2+i\sqrt{7}$ 2) $-2-i\sqrt{7}$ 3) $2-i\sqrt{7}$ 4) $2+i\sqrt{7}$
35. The complex conjugate of $-4-i9$
1) $-4+i9$ 2) $4+i9$ 3) $4-i9$ 4) $-4-i9$
36. The complex conjugate of $\sqrt{5}$ is
1) $\sqrt{5}$ 2) $-\sqrt{5}$ 3) $i\sqrt{5}$ 4) $-i\sqrt{5}$
37. The standard form $(a+ib)$ of $3+2i+(-7-i)$ is
1) $4-i$ 2) $-4+i$ 3) $4+i$ 4) $4+4i$
38. If $a+ib=(8-6i)-(2i-7)$ then the values of a and b are
1) 8, -15 2) 8, 15 3) 15, 9 4) 15, -8
39. If $p+iq=(2-3i)(4+2i)$ then q is
1) 14 2) -14 3) -8 4) 8
40. The conjugate of $(2+i)(3-2i)$ is
1) $8-i$ 2) $-8-i$ 3) $-8+i$ 4) $8+i$
41. The real and imaginary parts of $(2+i)(3-2i)$ are
1) -1, 8 2) -8, 1 3) 8, -1 4) -8, -1
42. The modulus values of $-2-2i$ and $2-3i$
1) $\sqrt{5}, 5$ 2) $2\sqrt{5}, \sqrt{15}$ 3) $2\sqrt{2}, \sqrt{13}$ 4) -4, 1
43. The modulus values of $-3-2i$ and $2-3i$
1) 5, 5 2) $\sqrt{5}, 7$ 3) $\sqrt{6}, 1$ 4) $\sqrt{13}, 5$
44. The cube roots of unity are
1) in G.P. with common ratio $\omega$ 2) in G.P. with common difference $\omega^2$
3) in A.P. with common difference $\omega$ 4) in A.P. with common difference $\omega^2$
45. The arguments of nth roots of a complex number differ by
1) $\frac{2\pi}{n}$ 2) $\frac{\pi}{n}$ 3) $\frac{3\pi}{n}$ 4) $\frac{4\pi}{n}$
46. Which of the following statements is correct?

1) negative complex numbers exist 2) order relation does not exist in real numbers
3) order relation exist in complex numbers 4) $(1+i)>(3-2i)$ is meaningless

47. Which of the following are correct ?
i) $\text{Re}(Z) \le |Z|$ ii) $\text{Im}(Z) \ge |Z|$ iii) $|\overline{Z}| = |Z|$ iv) $\overline{(Z^n)} = (\overline{Z})^n$
1) (i) , (ii) 2) (ii), (iii) 3) (ii),(iii) and (iv) 4) (i),(iii) and (iv)

48. The values of $\overline{\overline{Z}} + \overline{Z}$ is
1) $2\text{Re}(Z)$ 2) $\text{Re}(Z)$ 3) $\text{Im}(Z)$ 4) $2\text{Im}(Z)$

49. The value of $Z - \overline{Z}$ is
1) $2\text{Im}(Z)$ 2) $2i\,\text{Im}(Z)$ 3) $\text{Im}(Z)$ 4) $i\,\text{Im}(Z)$

50. The value of $Z\overline{Z}$ is
1) $|Z|$ 2) $|Z|^2$ 3) $2|Z|$ 4) $2|Z|^2$

51. If $|Z - Z_1| = |Z - Z_2|$ then the locus of Z is
1) a circle with centre at the origin
2) a circle with centre at $Z_1$
3) a straight line passing through the origin
4) is a perpendicular bisector of the line joining $Z_1$ and $Z_2$

52. If $\omega$ is a cube root of unity then
1) $\omega^2 = 1$ 2) $1+\omega=0$ 3) $1+\omega+\omega^2=0$ 4) $1-\omega+\omega^2=0$

53. The principal value of argZ lies in the interval
1) $\left[0, \frac{\pi}{2}\right]$ 2) $(-\pi, \pi]$ 3) $[0, \pi]$ 4) $(-\pi, 0]$

54. If $Z_1$ and $Z_2$ are any two complex numbers then which one of the following is false
1) $\text{Re}(Z_1+Z_2) = \text{Re}(Z_1)+\text{Re}(Z_2)$ 2) $\text{Im}(Z_1+Z_2) = \text{Im}(Z_1)+\text{Im}(Z_2)$
3) $\arg(Z_1+Z_2) = \arg(Z_1)+\arg(Z_2)$ 4) $|Z_1Z_2| = |Z_1|+|Z_2|$

55. The fourth roots of unity are
1) $1 \pm i, -1 \pm i$ 2) $\pm i, 1 \pm i$ 3) $\pm 1, \pm i$ 4) $1, -1$

56. The fourth roots of unity form the vertices of
1) an equilateral triangle 2) a square 3) a hexagon 4) a rectangle

57. Cube roots of unity are
1) $1, \frac{-1 \pm i\sqrt{3}}{2}$ 2) $i, -1 \pm \frac{i\sqrt{3}}{2}$ 3) $1, \frac{1 \pm i\sqrt{3}}{2}$ 4) $i, \frac{1 \pm i\sqrt{3}}{2}$

58. The number distinct values of $(\cos\theta + i\sin\theta)^{p/q}$ where p and q are non-zero integers prime to each other is
1) p 2) q 3) p+q 4) p-q

59. The value of $e^{i\theta} + e^{-i\theta}$ is
1) $2\cos\theta$ 2) $\cos\theta$ 3) $2\sin\theta$ 4) $\sin\theta$

60. The value of $e^{i\theta} - e^{-i\theta}$ is
1) $\sin\theta$ 2) $2\sin\theta$ 3) $i\sin\theta$ 4) $2i\sin\theta$

61. Geometrical interpretation of $\overline{Z}$ is
1) reflection of Z on real axis
2) reflection of Z on imaginary axis

3) rotation of Z about origin

4) rotation of Z about origin through $\pi/2$ in clockwise direction

62. If $Z_1 = a + ib$, $Z_2 = -a + ib$ then $Z_1 + Z_2$ lies on

1) real axis  2) imaginary axis  3) the line y = x  4) the line y = -x

63. Which one of the following is incorrect ?

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

3) $(\sin\theta + i\cos\theta)^n = \sin n\theta + i\cos n\theta$  4) $\dfrac{1}{\cos\theta + i\sin\theta} = \cos\theta - i\sin\theta$

64. Polynomial equation P(x)=0 admits conjugate pairs of roots only if the coefficients are

1) imaginary  2) complex  3) real  4)either real or complex

65. Identify the correct statement

1)Sum of the moduli of two complex numbers is equal to their modulus of the sum

2)Modulus of the product of the complex numbers is equal to sum of the moduli

3)Arguments of the product of two complex numbers is the product of their arguments

4)Arguments of the product of two complex numbers is equal to the sum of their arguments

66. Which of the following is not true ?

1) $\overline{z_1 + z_2} = \overline{z_1} + \overline{z_2}$  2) $\overline{z_1 z_2} = \overline{z_1}\ \overline{z_2}$  3) $\text{Re}(z) = \dfrac{\overline{z} + z}{2}$  4) $\text{Im}(z) = \dfrac{\overline{z} - z}{2i}$

67. If $Z_1$ and $Z_2$ are complex numbers then which of the following is meaningful ?

1) $Z_1 < Z_2$  2) $Z_1 > Z_2$  3) $Z_1 \geq Z_2$  4) $Z_1 \neq Z_2$

68. Which of the following is incorrect ?

1) $\text{Re}(Z) \leq |Z|$  2) $\text{Im}(Z) \leq |Z|$  3) $Z\overline{Z} = |Z|^2$  4) $\text{Re}(Z) \geq |Z|$

69. Which of the following is incorrect ?

1) $|Z_1 + Z_2| \leq |Z_1| + |Z_2|$  2) $|Z_1 - Z_2| \leq |Z_1| + |Z_2|$

3) $|Z_1 - Z_2| \geq |Z_1| - |Z_2|$  4) $|Z_1 + Z_2| \geq |Z_1| + |Z_2|$

70. Which of the following is incorrect ?

1) $\overline{Z}$ is the mirror image of $Z$ on the real axis

2) The polar form of $\overline{Z}$ is $(r, -\theta)$

3) $-Z$ is the point symmetrical to $Z$ about the origin

4) The polar form of $-Z$ is $(-r, -\theta)$

71. Which of the following is incorrect ?

1)Multiplying a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle of $90^\circ$

2) Multiplying a complex number by -i is equivalent to rotating the number clockwise about the origin through an angle of $90^\circ$

3) Dividing a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle of $90^\circ$

4)Dividing a complex number by i is equivalent to rotating the number clockwise about the origin through an angle of $90^\circ$

72. Which of the following is incorrect regarding nth roots of unity ?

1)the number of distinct roots is n

2) the roots are in G.P. with common ratio $cis\frac{2\pi}{n}$

3) the arguments are in A.P. with common difference $\frac{2\pi}{n}$

4) product of the roots is 0 and the sum of the roots is $\pm 1$

73. Which of the following are true?

i) If n is a positive integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$

ii) If n is a negative integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta - i\sin n\theta$

iii) If n is a fraction then $\cos n\theta + i\sin n\theta$ is one of the values of $(\cos\theta + i\sin\theta)^n$

iv) If n is a negative integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$

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

74. If $O(0,0)$, $A(z_1)$, $B(Z_2)$, $B'(-z_2)$ are the complex numbers in a argand plane then which of the following are correct?

i) In the parallelogram OACB, C represents $z_1 + z_2$

ii) In the argand plane E represents $z_1 z_2$ where OE = OA.OB and OE makes an angle $\arg(z_1) + \arg(z_2)$ with positive real axis.

iii) In the argand parallelogram OB'DA, D represents $z_1 - z_2$

iv) In the argand plane F represents $\frac{z_1}{z_2}$ where $OF = \frac{OA}{OB}$ and OF makes an angle $\arg(z_1) - \arg(z_2)$ with positive real axis.

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

75. If Z = 0 then the $\arg(Z)$ is

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

## CHAPTER IV

01. The axis of the parabola $y^2 - 2y + 8x - 23 = 0$ is

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

02. $16x^2 - 3y^2 - 32x - 44 = 0$ represents

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

03. 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

04. The point of intersection of the tangents $t_1 = t$ and $t_2 = 3t$ to the parabola $y^2 = 8x$ is.

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

05. The length of the latus rectum of the parabola $y^2 - 4x + 4y + 8 = 0$ is

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

06. The directrix of the parabola $y^2 = x + 4$ is

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

07. The length of the latus rectum of the parabola whose vertex (2,-3) and the directrix x = 4 is. 1)2 2)4 3)6 4)8

08. The focus of the parabola $x^2 = 16y$ is.

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

09. 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)$\left(0, -\frac{1}{8}\right)$

10. 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)$\left(\frac{9}{2}, -6\right)$

11. 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

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

1)$45^\circ$ 2)$30^\circ$ 3)$60^\circ$ 4)$90^\circ$

13. 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)$\frac{2}{\sqrt{5}}$

14. The length of the semi –major and semi minor axis of the ellipse $\frac{x^2}{144} + \frac{y^2}{169} = 1$ is.

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

15. The distance between the foci of the ellipse $9x^2 + 5y^2 = 180$ is.

1)4 2)6 3)8 4)2.

16. If the length of major and semi-minor axes of an ellipse are 8,2 and their corresponding equations 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)$\frac{(x+4)^2}{4} - \frac{(y-6)^2}{16} = 1$

17. 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)$\pm 6$ 3)36 4) $\pm 4$

18. 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

19. The radius of the director circle of the conic $9x^2 + 16y^2 = 144$ is

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

20. 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) $x^2 + y^2 = 9$

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

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

22. 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) $\frac{\sqrt{5}}{2}$

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

24. The directrix of the hyperbola $x^2-4(y-3)^2=16$ is
1) $y=\pm\frac{8}{\sqrt{5}}$ 2) $x=\pm\frac{8}{\sqrt{5}}$ 3) $y=\pm\frac{\sqrt{5}}{8}$ 4) $x=\pm\frac{\sqrt{5}}{8}$

25. 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) $\frac{81}{16}$

26. 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) $8x+9y+72=0$

27. 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) $2\tan^{-1}\left(\frac{4}{3}\right)$

28. 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) $y=\pm\frac{25}{36}x$

29. The product of the perpendiculars drawn the point (8,0) on the hyperbola $\frac{x^2}{64}-\frac{y^2}{36}=1$ to its asymptotes is 1) $\frac{25}{576}$ 2) $\frac{576}{25}$ 3) $\frac{6}{25}$ 4) $\frac{25}{6}$

30. 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) $x^2+y^2=7$

31. The eccentricity of the hyperbola with asymptotes x+2y – 5 =0 , 2 x – y + 5 =0 is.
1)3 2) $\sqrt{2}$ 3) $\sqrt{3}$ 4)2

32. Length of the semi transverse axis of the rectangular hyperbola xy = 8 is.
1)2 2)4 3)16 4)8

33. The asymptotes to the rectangular hyperbola $xy=c^2$ are.
1) $x=c,\ y=c$ 2) $x=0,\ y=c$ 3) $x=c,\ y=0$ 4) $x=0,\ y=0$

34. 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).

35. One of the foci of the rectangular hyperbola xy = 32 is.
1)(6,6) 2)(3,3) 3)(4,4) 4)(5,5)

36. The length of the latus rectum of the rectangular hyperbola xy = 32 is.
1)$8\sqrt{2}$ 2)32 3)8 4)16

37. 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

38. 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)$\left(24, \frac{3}{8}\right)$

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39. The axis of the parabola $y^2 = 4x$ is
1)x = 0 2)y = 0 3)x = 1 4)y = 1

40. The vertex of the parabola $y^2 = 4x$ is
1)(1,0) 2)(0,1) 3)(0,0) 4)(0,-1)

41. The focus of the parabola $y^2 = 4x$ is
1)(0,1) 2)(1,1) 3)(0,0) 4)(1,0)

42. The directrix of the parabola $y^2 = 4x$ is
1)y = -1 2)x = -1 3)y = 1 4)x = 1

43. The equation of the latus rectum of $y^2 = 4x$ is
1)x = 1 2)y = 1 3)x = 4 4)y = -1

44. The length of the L.R. of $y^2 = 4x$ is
1)2 2)3 3)1 4)4

45. The axis of the parabola $x^2 = -4y$ is
1)y = 1 2)x = 0 3)y = 0 4)x = 1

46. The vertex of the parabola $x^2 = -4y$ is
1)(0,1) 2)(0,-1) 3)(1,0) 4)(0,0)

47. The focus of the parabola $x^2 = -4y$ is
1)(0,0) 2)(0,-1) 3)(0,1) 4)(1,0)

48. The directrix of the parabola $x^2 = -4y$ is
1)x = 1 2)x = 0 3)y = 1 4)y = 0

49. The equation of the L.R. of $x^2 = -4y$ is
1)x = -1 2)y = -1 3)x =1 4)y = 1

50. The length of the L.R. of $x^2 = -4y$ is
1)1 2)2 3)3 4)4

51. The axis of the parabola $y^2 = -8x$ is
1)x = 0 2)x = 2 3)y = 2 4)y = 0

52. The vertex of the parabola $y^2 = -8x$ is
1)(0,0) 2)(2,0) 3)(0,-2) 4)(2,-2)

53. The focus of the parabola $y^2 = -8x$ is
1)(0,-2) 2)(0,2) 3)(-2,0) 4)(2,0)

54. The equation of the directrix of the parabola $y^2 = -8x$ is

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

55. The equation of the latus rectum of $y^2 = -8x$ is

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

56. The length of the latus rectum $y^2 = -8x$ is

1)8 2)6 3)4 4)-8

57. The axis of the parabola $x^2 = 20y$ is

1)y = 5 2)x = 5 3)x = 0 4)y = 0

58. The vertex of the parabola $x^2 = 20y$ is

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

59. The focus of the parabola $x^2 = 20y$ is

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

60. The equation of the directrix of the parabola $x^2 = 20y$ is

1)y-5 =0 2)x+5 = 0 3)x-5 = 0 4)y+5 = 0

61. The equation of the latus rectum of the parabola $x^2 = 20y$ is

1)x-5 = 0 2)y-5 = 0 3)y+5 = 0 4)x+5 = 0

62. The length of the latus rectum of the parabola $x^2 = 20y$ is

1)20 2)10 3)5 4)4

63. If the centre of the ellipse is (2,3) one of the foci is (3,3) then the other focus is

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

64. The equations of the major and minor axes $\frac{x^2}{9}+\frac{y^2}{4}=1$ are

1)x = 3 , y = 2 2)x = -3 , y = -2 3)x = 0, y = 0 4)y = 0, x = 0

65. The equations of the major and minor axes of $4x^2+3y^2=12$ are

1) $x=\sqrt{3}$ , $y=2$ 2)x = 0 , y = 0 3) $x=-\sqrt{3}$ , $y=-2$ 4)y =0 , x = 0

66. The lengths of minor and major axes of $\frac{x^2}{9}+\frac{y^2}{4}=1$ are

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

67. The lengths of major and minor axes of $4x^2+3y^2=12$ are

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

68. The equation of the directrices of $\frac{x^2}{16}+\frac{y^2}{9}=1$ are

1) $y=\pm\frac{4}{\sqrt{7}}$ 2) $x=\pm\frac{16}{\sqrt{7}}$ 3) $x=\pm\frac{16}{7}$ 4) $y=\pm\frac{16}{\sqrt{7}}$

69. The equation of the directrices of $25x^2+9y^2=225$ are

1) $x=\pm\frac{4}{25}$ 2) $x=\pm\frac{25}{4}$ 3) $y=\pm\frac{4}{25}$ 4) $y=\pm\frac{25}{4}$

70. The equation of the latus rectum of $\frac{x^2}{16}+\frac{y^2}{9}=1$ are

1) $y=\pm\sqrt{7}$ 2) $x=\pm\sqrt{7}$ 3) $x=\pm 7$ 4) $y=\pm 7$

71. The equation of the L.R. of $25x^2+9y^2=225$ are

1) $y=\pm 5$ 2) $x=\pm 5$ 3) $y=\pm 4$ 4) $x=\pm 4$

72. The length of the L.R. of $\frac{x^2}{16}+\frac{y^2}{9}=1$ is
1)9 / 2 2)2 / 9 3)9 / 16 4)16 / 9

73. The length of the L.R. of $25x^2+9y^2=225$ is
1)9 / 5 2)18 / 5 3)25 / 9 4)5 / 18

74. The eccentricity of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ is
1)1 / 5 2)3 / 5 3)2 / 5 4)4 / 5

75. The eccentricity of the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ is
1) $\sqrt{5}/3$ 2) $\sqrt{3}/5$ 3)3 / 5 4)2 / 3

76. The eccentricity of the ellipse $16x^2+25y^2=400$ is
1)4 / 5 2)3 / 5 3)3 / 4 4)2 / 5

77. Centre of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ is
1)(0,0) 2)(5,0) 3)(3,5) 4)(0,5)

78. The centre of the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ is
1)(0,3) 2)(2,3) 3)(0,0) 4)(3,0)

79. The foci the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ are
1) $(0,\pm 5)$ 2) $(0,\pm 4)$ 3) $(\pm 5, 0)$ 4) $(\pm 4, 0)$

80. The foci of the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ are
1) $(\pm 5, 0)$ 2) $(0,\pm\sqrt{5})$ 3) $(0,\pm 5)$ 4) $(\pm\sqrt{5}, 0)$

81. The foci of the ellipse $16x^2+25y^2=400$ are
1) $(\pm 3, 0)$ 2) $(0,\pm 3)$ 3) $(0,\pm 5)$ 4) $(\pm 5, 0)$

82. The vertices of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ are
1) $(0,\pm 5)$ 2) $(0,\pm 3)$ 3) $(\pm 5, 0)$ 4) $(\pm 3, 0)$

83. The vertices of the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ are
1) $(0,\pm 3)$ 2) $(\pm 2, 0)$ 3) $(\pm 3, 0)$ 4) $(0,\pm 2)$

84. The vertices of the ellipse $16x^2+25y^2=400$ are
1) $(0,\pm 4)$ 2) $(\pm 5, 0)$ 3) $(\pm 4, 0)$ 4) $(0,\pm 5)$

85. If the centre of the ellipse is (4,-2) and one of the foci is (4,2) then the other focus is
1)(4,6) 2)(6,-4) 3)(4,-6) 4)(6,4)

86. The equations of transverse and conjugage axes of the hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ are
1)x = 2 ; y = 3 2)y = 0 ; x = 0 3)x = 3 ; y = 2 4)x = 0; y = 0

87. The equations of transverse and conjugate axes of the hyperbola $16y^2-9x^2=144$ are
1)y = 0 ; x = 0 2)x = 3 ; y = 4 3)x = 0 ; y = 0 4)y = 3 ; x = 4

88. The equations of transverse and conjugate axes of the hyperbola $144x^2 - 25y^2 = 3600$ are 1)y = 0 ; x = 0 2)x = 12 ; y = 5 3)x = 0 ; y = 0 4)x = 5 ; y = 12

89. The equation of transverse and conjugate axes of the hyperbola $8y^2 - 2x^2 = 16$ are
1) $x = 2\sqrt{2}$ ; $y = \sqrt{2}$ 2) $x = \sqrt{2}$ ; $y = 2\sqrt{2}$ 3)x = 0 ; y = 0 4) y = 0 ; x = 0

90. The equations of the directrices of the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ are
1) $y = \pm \frac{9}{\sqrt{13}}$ 2) $x = \pm \frac{13}{9}$ 3) $y = \pm \frac{\sqrt{13}}{9}$ 4) $x = \pm \frac{9}{\sqrt{13}}$

91. The equations of the directrices of the hyperbola $16y^2 - 9x^2 = 144$ are
1) $x = \pm \frac{5}{9}$ 2) $y = \pm \frac{9}{5}$ 3) $x = \pm \frac{9}{5}$ 4) $y = \pm \frac{5}{9}$

92. The equation of the L.R's of the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ are
1) $y = \pm 13$ 2) $y = \pm \sqrt{13}$ 3) $x = \pm 13$ 4) $x = \pm \sqrt{13}$

93. The equations of the L.R's of the hyperbola $16y^2 - 9x^2 = 144$ are
1) $y = \pm 5$ 2) $x = \pm 5$ 3) $y = \pm \sqrt{5}$ 4) $x = \pm \sqrt{5}$

94. The length of the L.R. of $\frac{x^2}{9} - \frac{y^2}{4} = 1$ is
1)4 / 3 2)8 / 3 3)3 / 2 4)9 / 4

95. The eccentricity of the hyperbola $\frac{y^2}{9} - \frac{x^2}{25} = 1$ is
1)34 / 3 2)5 / 3 3) $\sqrt{34}/3$ 4) $\sqrt{34}/5$

96. The centre of the hyperbola $25x^2 - 16y^2 = 400$ is
1)(0,4) 2)(0,5) 3)(4,5) 4)(0,0)

97. The foci of the hyperbola $\frac{y^2}{9} - \frac{x^2}{25} = 1$ are
1) $(0, \pm\sqrt{34})$ 2) $(\pm 34, 0)$ 3) $(0, \pm 34)$ 4) $(\pm\sqrt{34}, 0)$

98. The vertices of the hyperbola $25x^2 - 16y^2 = 400$ are
1) $(0, \pm 4)$ 2) $(\pm 4, 0)$ 3) $(0, \pm 5)$ 4) $(\pm 5, 0)$

99. The equation of the tangent at (3,-6) to the parabola $y^2 = 12x$ is
1) $x - y - 3 = 0$ 2) $x + y - 3 = 0$ 3) $x - y + 3 = 0$ 4) $x + y + 3 = 0$

100. The equation of the tangent at (-3,1) to the parabola $x^2 = 9y$ is
1) $3x - 2y - 3 = 0$ 2) $2x - 3y + 3 = 0$ 3) $2x + 3y + 3 = 0$ 4) $3x + 2y + 3 = 0$

101. The equation of chord of contact of tangents from the point ( -3, 1) to the parabola $y^2 = 8x$ is
1) $4x - y - 12 = 0$ 2) $4x + y + 12 = 0$ 3) $4y - x - 12 = 0$ 4) $4y - x + 12 = 0$

102. The equation of chord of contact of tangents from (2,4) to he ellipse $2x^2 + 5y^2 = 20$ is
1) $x - 5y + 5 = 0$ 2) $5x - y + 5 = 0$ 3) $x + 5y - 5 = 0$ 4) $5x - y - 5 = 0$

103. The equation of chord of contact of tangents from (5,3) to the hyperbola $4x^2 - 6y^2 = 24$ is
1) $9x + 10y + 12 = 0$ 2) $10x + 9y - 12 = 0$ 3) $9x - 10y + 12 = 0$ 4) $10x - 9y - 12 = 0$

104. The combined equation of the asymptotes to the hyperbola $36x^2 - 25y^2 = 900$ is

1) $25x^2 + 36y^2 = 0$ 2) $36x^2 - 25y^2 = 0$ 3) $36x^2 - 25y^2 = 0$ 4) $25x^2 + 36y^2 = 0$

105. Find the angle between the asymptotes of the hyperbola $36x^2 - 25y^2 = 0$ is

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

106. The point of contact of the tangent $y = mx + c$ and the parabola $y^2 = 4ax$ is

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

107. The point of contact of the tangent $y = mx + c$ and the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

1) $\left(\frac{b^2}{c}, \frac{a^2m}{c}\right)$ 2) $\left(\frac{-a^2m}{c}, \frac{b^2}{c}\right)$ 3) $\left(\frac{a^2m}{c}, \frac{-b^2}{c}\right)$ 4) $\left(\frac{-a^2m}{c}, \frac{-b^2}{c}\right)$

108. The point of contact of the tangent $y = mx + c$ and the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

1) $\left(\frac{am^2}{c}, \frac{b^2}{c}\right)$ 2) $\left(\frac{a^2m}{c}, \frac{b^2}{c}\right)$ 3) $\left(\frac{-a^2m}{c}, \frac{-b^2}{c}\right)$ 4) $\left(\frac{-am^2}{c}, \frac{-b^2}{c}\right)$

109. The true statements of the following are

i) Two tangents and 3 normal can be drawn to a parabola from a point
ii) Two tangents and 4 normal can be drawn to an ellipse from a point
iii) Two tangents and 4 normal can be drawn to an hyperbola from a point
iv) Two tangents and 4 normal can be drawn to an R.H. from a point

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

110. If ' $t_1$ ' ' $t_2$ ' are the extremities of any focal chord of a parabola $y^2 = 4ax$ then $t_1\ t_2$ is

1)-1 2)0 3) $\pm 1$ 4)1 / 2

111. The normal at ' $t_1$ ' on the parabola $y^2 = 4ax$ meets the parabola at ' $t_2$ ' then $\left(t_1 + \frac{2}{t_1}\right)$ is

1) $-t_2$ 2) $t_2$ 3) $t_1 + t_2$ 4) $\frac{1}{t_2}$

112. The condition that the line $lx + my + n = 0$ may be normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

1) $al^3 + 2alm^2 + m^2n = 0$ 2) $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{(a^2+b^2)^2}{n^2}$

3) $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{(a^2-b^2)^2}{n^2}$ 4) $\frac{a^2}{l^2} - \frac{b^2}{m^2} = \frac{(a^2+b^2)^2}{n^2}$

113. The condition that the line $lx + my + n = 0$ may be a normal to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

1) $al^3 + 2alm^2 + m^2n = 0$ 2) $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{(a^2+b^2)^2}{n^2}$

3) $\frac{a^2}{l^2}+\frac{b^2}{m^2}=\frac{(a^2-b^2)^2}{n^2}$ 4) $\frac{a^2}{l^2}-\frac{b^2}{m^2}=\frac{(a^2+b^2)^2}{n^2}$

114. The condition that the line $lx+my+x=0$ may be a normal to the parabola $y^2=4ax$ is

1) $al^3+2alm^2+m^2n=0$ 2) $\frac{a^2}{l^2}+\frac{b^2}{m^2}=\frac{(a^2+b^2)^2}{n^2}$

3) $\frac{a^2}{l^2}+\frac{b^2}{m^2}=\frac{(a^2-b^2)^2}{n^2}$ 4) $\frac{a^2}{l^2}-\frac{b^2}{m^2}=\frac{(a^2+b^2)^2}{n^2}$

115. The chord of contact of tangents from any point on the directrix of the parbola $y^2=4ax$ passes through its

1)vertex 2)focus 3)directrix 4)latus rectum

116. The chord of contactof tangents from any point on the directrix of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ passes through its

1)vertex 2)focus 3)directrix 4)latus rectum

117. The chord of contact of tangents from any point on the directrix of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ passes through its

1)vertex 2)focus 3)directrix 4)latus rectum

118. The point of intersection of tangents at '$t_1$' and '$t_2$' to the parabola $y^2=4ax$ is

1) $(a(t_1+t_2), at_1t_2)$ 2) $(at_1t_2, a(t_1+t_2))$ 3) $(at^2, 2at)$ 4) $(at_1t_2, a(t_1-t_2))$

119. If the normal to the R.H. $xy=c^2$ at '$t_1$' meets the curve again at '$t_2$' then $t_1^3t_2=$

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

120. The locus of the point of intersection of perpendicular tangents to the parabola $y^2=4ax$ is

1)latus rectum 2)directrix 3)tangent at the vertex 4)axis of the parabola

121. The locus of the foot of perpendicular from the focus on any tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

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

122. The locus of the foot of perpendicular from the focus on any tangent to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is

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

123. The locus of the foot of perpendicular from the focus on any tangent to the parabola $y^2=4ax$ is

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

124. The locus of point of intersection of perpendicular tangents to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

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

125. The locus of point of intersection of perpendicular tangents to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is

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

126. The condition that the line $lx+my+n=0$ may be a tangent to the parabola $y^2=4ax$ is

1) $a^2l^2+b^2m^2=n^2$ 2) $am^2=ln$ 3) $a^2l^2-b^2m^2=n^2$ 4) $4c^2lm=n^2$

127. The condition that the line $lx+my+n=0$ may be a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

1) $a^2l^2+b^2m^2=n^2$ 2) $am^2=ln$ 3) $a^2l^2-b^2m^2=n^2$ 4) $4c^2lm=n^2$

128. The condition that the line $lx+my+n=0$ may be a tangent to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is

1) $a^2l^2+b^2m^2=n^2$ 2) $am^2=ln$ 3) $a^2l^2-b^2m^2=n^2$ 4) $4c^2lm=n^2$

129. The condition that the line $lx+my+n=0$ may be a tangent to the rectangular hyperbola $xy=c^2$ is

1) $a^2l^2+b^2m^2=n^2$ 2) $am^2=ln$ 3) $a^2l^2-b^2m^2=n^2$ 4) $4c^2lm=n^2$

130. The foot of a perpendicular from a focus of the hyperbola on an asymptote lies on the -----

1)Centre 2)corresponding directrix 3)vertex 4)L.R.

## CHAPTER V

01. The gradient of the curve $y=-2x^3+3x+5$ at $x=2$ is

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

02. 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) $\pi\frac{dr}{dt}$

03. The velocity 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) $\frac{x}{a}$

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

1) $\frac{-1}{50\pi}cm/\text{min}$ 2) $\frac{1}{50\pi}cm/\text{min}$ 3) $\frac{-11}{75\pi}cm/\text{min}$ 4) $\frac{-2}{75\pi}cm/\text{min}$

05. The slope of the tangent to the curve $y=3x^2+3\sin x$ at $x=0$

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

06. The slope of the normal to the curve y = 3x² at the point whose x coordinate is 2 is.

1)1 / 13 2)1 / 14 3)-1 / 12 4)1 / 12

07 The point on the curve y = 2x² -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) $\left(\frac{3}{2},\frac{-17}{2}\right)$

08. The equation of the tangent to the curve y = x³ / 5 at the point (-1,-1/5) is

1)5y + 3x = 2 2)5y – 3x = 2 3)3x – 5y = 2 4)3x+3y = 2

09. The equation of the normal to the curve $\theta=1/t$ at the point (-3, -1/3 )is

1) $3\theta=27t-80$ 2) $5\theta=27t-80$ 3) $3\theta=27t+80$ 4) $\theta=1/t$

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) $\pi/4$  2) $\pi/3$  3) $\pi/6$  4) $\pi/2$

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 $\theta$ 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 cm² / sec.  2)3 cm² / sec 3) $3\sqrt{2}$ cm³ / sec.  4)0.15 cm³ / 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) $1/2\pi$  3) $4\pi$  4) $4\pi/3$

16. For what value of x is the rate of increase $x^3-2x^2+3x+8$ 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 5 cm is.  1) $23\pi$  2) $33\pi$  3) $43\pi$  4) $53\pi$

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 4cm³ / sec then the rate of surface area when the volume of the cube is 8 cubic cm is.

1)8 cm² / sec.  2)16cm² / sec.  3)2 cm²  4)4 cm² / 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) $\pi/2$  4) $\pi/4$

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)– $\pi/4$  2) $\pi/4$  3)0  4) $\pi/2$

23. If a normal makes at 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)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) $2\sqrt{3}/3$ 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) 1/ 2

29. The value of c in Rolle's Theorem for the function f(x) = cos x / 2 on $[\pi, 3\pi]$ is
1) 0 2) $2\pi$ 3) $\pi/2$ 4) $3\pi/2$

30. The value of 'c' of Lagranges Mean Value Theorem for $f(x) = \sqrt{x}$ when a = 1 and b = 4 is
1) 9 / 4 2) 3 / 2 3) 1 / 2 4) 1 / 4

31. $\lim_{x \to \infty} \frac{x^2}{e^x}$ is = 1) 2 2) 0 3) $\infty$ 4) 1

32. $\lim_{x \to 0} \frac{a^x - b^x}{c^x - d^x}$ 1) $\infty$ 2) 0 3) $\log \frac{ab}{cd}$ 4) $\frac{\log(a/b)}{\log(c/d)}$

33. If f(1)= 2 ; f' (1)= 1 ; g (1)= -1 ; g' (1)= 2 then the value of $\lim_{x \to a} \frac{g(x)f(a) - g(a)f(x)}{x - a}$ is
1) 5 2) -5 3) 3 4) -3

34. Which of the following function is increasing in $(0, \infty)$
1) $e^x$. 2) 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 100 m² 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
3) 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)3 a + b = 0 4)3a + b = 1

COME BOOK

45. Let " h " be the height of the tank. Then the rate of change of pressure " p " of the tank with respect to height is
1)$\frac{dh}{dt}$ 2)$\frac{dp}{dt}$ 3)$\frac{dh}{dp}$ 4)$\frac{dp}{dh}$

46. If the temperature $\theta°C$ of the certain metal rod of " $l$" meters is given by $l = 1 + 0.00005\theta + 0.0000004\theta^2$ then the rate of change of $l$ in m / C ° when the temperature is 100°C is
1)$0.00013\ m/C°$ 2)$0.00023\ m/C°$ 3)$0.00026\ m/C°$ 4)$0.00033\ m/C°$

47. The following graph gives the functional relationship between distance and time of a moving car in m / sec. The speed of the car is
1)$\frac{x}{t}\ m/s$ 2)$\frac{t}{x}\ m/s$ 3)$\frac{dx}{dt}\ m/s$ 4)$\frac{dt}{dx}\ m/s$

48. The distance – time relationship of a moving body is given by y = F ( t ) then the acceleration of the body is the
1)gradient of the velocity / time graph 2)gradient of the distance / time graph
3)gradient of the acceleration / distance graph 4)gradient of the velocity / distance graph

49. The distance traveled by a car in " t " seconds is given by $x = 3t^3 - 2t^2 + 4t - 1$.Then the initial velocity and initial acceleration respectively are
1)$(-4m/s^2, 4m/s)$ 2)$(4m/s, -4m/s^2)$ 3)(0 , 0) 4)$(18.25m/s, 23\ m/s^2)$

50. The angular displacement of a fly wheel in radius is given by $\theta = 9t^2 - 2t^3$.The time when the angular acceleration zero is
1)2.5 s 2)3.5 s 3)1.5 s 4)4.5 s

51. Food pockets were dropped from an helicopter during the flood and distance fallen in " t " seconds is given by $y = \frac{1}{2}gt^2\ (g = 9.8\ m/s^2)$. Then the speed of the food pocket after it has falled for " 2 " seconds is
1)19.6 m / sec 2)9.8 m / sec 3)– 19.6 m / sec 4)– 9.8 m / sec

52. An object dropped from the sky follows the law of motion $x = \frac{1}{2}gt^2\ (g = 9.8\ m/s^2)$.The acceleration of the object when t = 2 is
1)$-9.8\ m/\sec^2$ 2)$9.8\ m/\sec^2$ 3)$19.6\ m/\sec^2$ 4)$-19.6\ m/\sec^2$

53. A missile fired from ground level rises x metres vertically upwards in " t " seconds and $x = t(100 - 12.5t)$. Then the maximum height reached by the missiles is
1)100m 2)150 m 3)250 m 4)200m

54. A continuous graph y = f ( x ) is such that $f'(x) \to \infty$ as $x \to x_1$, at $(x_1, y_1)$ Then y = f ( x ) has a

1)vertical tangent $y = x_1$ 2)horizontal tangent $x = x_1$
3)vertical tangent $x = x_1$ 4)horizontal tangent $y = y_1$

55. The curve y = f ( x ) and y = g ( x ) cut orthogonally if at the point of intersection
1)slope of f ( x ) = slope of g ( x ) 2)slope of f ( x ) + slope of g ( x ) = 0
3)slope of f ( x ) / slope of g ( x ) = -1 4) [ slope of f ( x ) ] [ slope of g ( x ) ] = -1

56. The law of the mean can also be put in the form
1) $f(a+h)=f(a)-hf'(a+\theta h)$ $0<\theta<1$
2) $f(a+h)=f(a)+hf'(a+\theta h)$ $0<\theta<1$
3) $f(a+h)=f(a)+hf'(a-\theta h)$ $0<\theta<1$
4) $f(a+h)=f(a)-hf'(a-\theta h)$ $0<\theta<1$

57. $l$' Hopital's rule cannot be applied to $\frac{x+1}{x+3}$ as $x\to 0$ because $f(x)=x+1$ and $g(x)=x+3$ are
1)not continuous 2)not differentiable
3)not in the in determine form as $x\to 0$ 4)in the in determine form as $x\to 0$

58. If $\lim_{x\to a} g(x)=b$ and f is continuous at x = b then
1) $\lim_{x\to a} g(f(x)=f\left(\lim_{x\to a} g(x)\right)$ 2) $\lim_{x\to a} f(g(x)=f\left[\lim_{x\to a} g(x)\right]$
3) $\lim_{x\to a} f(g(x)=g\left(\lim_{x\to a} f(x)\right)$ 4) $\lim_{x\to a} f(g(x)\neq f\left(\lim_{x\to a} g(x)\right)$

59. $\lim_{x\to 0}\frac{x}{\tan x}$ is
1)1 2)- 1 3)0 4)$\infty$

60. f is a real valued function defined on an interval $I\subset R$ ( R being the set of real numbers increased on I. Then
1) $f(x_1)\le f(x_2)$ whenever $x_1 < x_2$ $x_1, x_2 \in I$
2) $f(x_1)\ge f(x_2)$ whenever $x_1 < x_2$ $x_1, x_2 \in I$
3) $f(x_1)\le f(x_2)$ whenever $x_1 > x_2$ $x_1, x_2 \in I$
4) $f(x_1)> f(x_2)$ whenever $x_1 > x_2$ $x_1, x_2 \in I$

61. If a real valued differentiable function y = f ( x ) defined on an open interval I is increasing then 1)$\frac{dy}{dx}>0$ 2)$\frac{dy}{dx}\ge 0$ 3)$\frac{dy}{dx}<0$ 4)$\frac{dy}{dx}\le 0$

62. f is a differentiable function defined on an interval I with positive derivative. Then f is
1)increasing on $I$ 2)decreasing on $I$
3)strictly increasing on $I$ 4)strictly decreasing on $I$

63. The function $f(x)=x^3$ is
1)increasing 2)decreasing 3)strictly decreasing 4)strictly increasing

64. If the gradient of a curve changes from positive just before P to negative just after then " P " is a
1)minimum point 2)maximum point 3)inflection point 4)discontinuous point

65. The function $f(x)=x^2$ has
1)a maximum value at x = 0 2)minimum value at x = 0
3)finite no. of maximum values 4)infinite no. of maximum values

66. The function $f(x) = x^3$ has
1)absolute maximum 2)absolute minimum
3)local maximum 4)no extrema

67. If f has a local extremum at a and if f ' ( a ) exists then
1)f ' ( a ) < 0 2) f ' ( a ) > 0 3)f ' ( a ) = 0 4) f " ( a ) = 0

68. In the following figure the curve y = f ( x ) is
1)concave upwards 2)convex upward
3)changes from concavity to convexity 4)changes from convexity and concavity

69. The point that separates the convex part of a continuous curve from the concave part is
1)the maximum point 2)the minimum point
3)the inflection point 4)critical point

70. f is a twice differentiable function on an interval I and if f " ( x ) > 0for all x in the domain I of f then f is
1)concave upward 2)convex upward 3)increasing 4)decreasing

71. $x = x_0$ is a root of even order for the equation f ' ( x ) = 0 then $x = x_0$is a
1)maximum point 2)minimum point 3)inflection point 4)critical point

72. If $x_0$ is the x - coordinate of the point of inflection of a curve y = f ( x ) then (Second derivative exists)
1)$f(x_0) = 0$ 2)$f'(x_0) = 0$ 3)$f''(x_0) = 0$ 4)$f''(x_0) \neq 0$

73. The statement " If f is continuous on a closed interval [ a, b ] then f attains an absolute maximum value f ( c ) and an absolute minimum value f(4)at some number c and d in [ a , b ] " is
1)The extreme value theorem 2)Fermat's theorem
3)Law of Mean 4)Rolle's theorem

74. The statement : " If f has a local extremum (minimum or maximum ) at c and if f ' (c ) exists then f " ( c ) = 0 is
1)the extreme value theorem 2)Fermat's theorem
3)Law of Mean 4)Rolle's theorem

75. Identify the false statement:
1)all the stationary numbers are critical numbers 2)at the stationary point the first derivative is zero 3)at critical numbers the first derivative need not exist
4)all the critical numbers are stationary numbers

76. Identify the correct statement:
i) a continuous function has local maximum then it has absolute maximum
ii) a continuous function has local minimum then it has absolute minimum
iii) a continuous function has absolute maximum then it has local maximum
iv) a continuous function has absolute minimum then it has local minimum
1)(i) and (ii) 2)(i) and (iii) 3)(iii) and (iv) 4)(i) , (iii) and (iv)

77. Identify the correct statements.
i) Every constant function is an increasing function
ii) Every constant function is a decreasing function
iii) Every identity function is an increasing function
iv) Every identity function is a decreasing function
1)(i) , (ii) and (iii) 2)(i) and (iii) 3)(iii) and (iv) 4)(i) , (iii) and (iv)

78. Which of the following statement is incorrect?

1)Initial velocity means velocity at t = 0
2)Initial acceleration means acceleration at t = 0
3)If the motion is upwards, at the maximum height, the velocity is not zero
4)If the motion is horizontal, v = 0 when the particle comes to rest

79. Which of the following statements are correct ( $m_1$ and $m_2$ are slopes of two lines)
i) If the two lines are perpendicular then $m_1 m_2 = -1$
ii) If $m_1 m_2 = -1$ then the two lines are perpendicular
iii) If $m_1 = m_2$ then the two lines are parallel
iv) If $m_1 = -\frac{1}{m_2}$ then the two lines are perpendicular
1)(ii), (iii) and (iv) 2)(i), (ii) and (iv) 3)(iii) and (iv) 4)(i) and (ii)

80. One of the conditions of Rolle's theorem is
1)f is defined and continuous on ( a , b ) 2)f is differentiable on [ a , b ]
3)f ( a ) = f ( b ) 4)f is differentiable on ( a , b )

81. If a and b are two roots of a polynomial f ( x ) = 0 then Rolle's theorem says that there exists atleast
1)one root between a and b for f ' ( x ) = 0 2)two roots between a and b for f ' ( x ) = 0
3)one root between a and b for f '' ( x ) = 0 4)two roots between a and b for f '' ( x ) = 0

82. A real valued function which is continuous on [ a , b ] and differentiable on ( a , b ) then exists at least one c in
1)[ a, b ] such that f ' ( c ) = 0 2)( a , b ) such that f ' ( c ) = 0
3)( a , b ) such that $\frac{f(b)-f(a)}{b-a} = 0$ 4)( a , b ) such that $\frac{f(b)-f(a)}{b-a} = f'(c)$

83. In the law of mean, the value of '□' satisfies the condition
1) $\theta > 0$ 2) $\theta < 0$ 3) $\theta < 1$ 4) $0 < \theta < 1$

84. Which of the following statements are correct?
i) Rolle's theorem is a particular case of Lagranges law of mean
ii) Lagranges law of mean is a particular case of generalized law of mean ( Cauchy)
iii) Lagranges law of mean is a particular case of Rolle's theorem.
iv) Generalized law of mean is a particular case of Lagranges law of mean.
1)(ii) , (iii) 2)(iii) , (iv) 3)(i) , (ii) 4)(i) , (iv)

## CHAPTER VI

01. 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) $xy^{x-1}$.

02. 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

03. 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

04. 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

05. 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) $\text{cosec}\,\theta$

06. 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 the 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)

07. 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)2 u 4)$u^{-1}$.

08. The percentage error in the $11^{th}$ root of the number 28 is approximately………… times the percentage error in 28.
1)1/28 2)1 / 11 3)11 4)28

09. The curve $a^2y^2 = x^2(a^2-x^2)$ 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.

10. 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.

11. 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 < -a and x > 3a 4)–a < x < 3a

12. 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.

13. 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)2 u 4)u

14. 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.

15. 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

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16. For the function $y = x^3 + 2x^2$ the value of dy when x = 2 and dx = 0.1 is
1)1 2)2 3)3 4)4

17. If $U = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial u}{\partial x}$ is

1) $4x^3+6xy^2+6xy$ 2) $3x^4+6x^2y+3xy^2$ 3) $4x^3-6x^2y+6xy^2$ 4) $4x^3+6x^2y^2+3xy$

18. If u = f ( x , y ) then with usual notations, $u_{xy} = u_{yx}$ if

1)u is continuous 2) $u_x$ is continuous 3) $u_y$ is continuous 4) $u$, $u_x$, $u_y$ are continuous

19. If u = f ( x , y ) is a differentiable function of x and y ; x and y are differentiable functions of t then

1) $\frac{du}{dt} = \frac{\partial f}{\partial x}\cdot\frac{\partial x}{\partial t} + \frac{\partial f}{\partial y}\cdot\frac{\partial y}{\partial t}$ 2) $\frac{du}{dt} = \frac{\partial f}{\partial x}\cdot\frac{dx}{dt} + \frac{\partial t}{\partial y}\cdot\frac{\partial y}{\partial t}$

3) $\frac{du}{dt} = \frac{\partial f}{\partial x}\cdot\frac{dx}{dt} + \frac{\partial f}{\partial y}\cdot\frac{dy}{dt}$ 4) $\frac{\partial u}{\partial t} = \frac{\partial f}{\partial x}\cdot\frac{\partial x}{\partial t} + \frac{\partial f}{\partial y}\cdot\frac{\partial y}{\partial t}$

20. If f ( x , y ) is a homogeneous functions of degree n then $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} =$

1)f 2)n f 3)n ( n - 1 ) f 4)n ( n + 1 ) f

21. If $u(x,y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial x\,\partial y}$ is

1) $12xy + 6x$ 2) $12xy - 6x$ 3) $12x^2y - 6x$ 4) $12xy^2 - 6x$

22. If $u(x,y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial y\,\partial x}$ is

1) $12xy + 6x$ 2) $12xy - 6x$ 3) $12x^2y - 6x$ 4) $12xy^2 - 6x$

23. If $u(x,y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial x^2}$ is

1) $3y^2 + 6x^2y + 3x^2$ 2) $6y + 6x^2$ 3) $12x^2y - 6x$ 4) $12x^2 + 6y^2 + 6y$

24. If $u(x,y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial^2 u}{\partial y^2}$ is

1) $6y + 6x^2$ 2) $12xy - 6x$ 3) $12x^2y - 6x$ 4) $3y^2 + 6x^2y + 3x^2$

25. The differential on y of the function $y = \sqrt[4]{x}$ is

1) $\frac{1}{4}x^{-3/4}$ 2) $\frac{1}{4}x^{-3/4}\,dx$ 3) $x^{-3/4}\,dx$ 4)0

26. The differential of y if $y = x^5$ is

1) $5x^4$ 2) $5x^4\,dx$ 3) $5x^5\,dx$ 4) $5x^5$

27. The differential of y if $y = \sqrt{x^4 + x^2 + 1}$ is

1) $\frac{1}{2}(4x^3 + 2x)^{-\frac{1}{2}}\,dx$ 2) $\frac{1}{2}(x^4 + x^2 + 1)^{-\frac{1}{2}}(4x^3 + 2x)dx$

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

28. The differential of y if $y = \frac{x-2}{2x+3}$ is

1) $\frac{-7}{(2x+3)^2}dx$ 2) $\frac{1}{(2x+3)^2}dx$ 3) $\frac{7}{(2x+3)^2}dx$ 4) $\frac{7}{(2x+3)^2}$

29. The differential of y if y = sin 2x is

1)2 cos2x 2)2 cos2x.dx 3)– 2 cos2x.dx 4)cos2x.dx

30. The differential of $x \tan x$ is

1) $(x\sec^2 x + \tan^2 x)$ 2) $(x\sec^2 x - \tan x)\,dx$

3) $x \sec^2 x \, dx$ 4) $\left(x \sec^2 x + \tan x\right) dx$

31. If $u(x,y) = x^4 + y^3 + 3x^2y^2 + 3x^2y$ then $\frac{\partial u}{\partial y}$ is

1) $3y^2 + 6xy + 3x^2$ 2) $3y^2 + 6xy^2 + 3x^2$ 3) $3y^2 + 6x^2y + 3x^2$ 4) $3y^2 + 6x^2y^2 + 3x^2$

32. The curve $y^2 = x^2(1 - x^2)$ is defined only for

1) $x \le 2$ and $x \ge -2$ 2) $x \le 1$ and $x \ge -1$ 3) $x \le -1$ and $x \ge 1$ 4) $x < 1$ and $x > -1$

33. The curve $y^2 = x^2(1 - x^2)$ is symmetrical about

1)x-axis only 2)y-axis only 3)a and y axes only 4)x , y axes and the origin

34. The curve $y^2 = x^2(1 - x^2)$ has

1)only one loop between x = 0 and x = 1 2)two loops between x = -1 and x = 0
3)two loops between x = -1 and 0 ; 0 and 1 4)no loop

35. The curve $y^2 = x^2(1 - x^2)$ has

1)an asymptote x = -1 2)an asymptote x = 1
3)two asymptotes x = 1 and x = -1 4)no asymptote

36. The curve $y^2(2 + x) = x^2(6 - x)$ exists for

1) $-2 < x \le 6$ 2) $-2 \le x \le 6$ 3) $-2 < x < 6$ 4) $-2 \le x < 6$

37. The x-intercept of the curve $y^2(2 + x) = x^2(6 - x)$ is

1)0 2)6 , 0 3)2 4)-2

38. The asymptote to the curve $y^2(2 + x) = x^2(6 - x)$ is

1)x = 2 2)x = -2 3)x = 6 4)x = -6

39. The curve $y^2(2 + x) = x^2(6 - x)$ has

1)only one loop between x = 0 and x = 6 2)two loops between x = 0 and x = 6
3)only one loop between x = -2 and x = 6 4)two loops between x = -2 and x = 6

40. The curve $y^2 = x^2(1 - x)$ is defined only for

1) $x \le 1$ 2) $x \ge 1$ 3) $x < 1$ 4) $x > 1$

41. The curve $y^2 = x^2(1 - x)$ is symmetrical about

1)y-axis only 2)x-axis only 3)both the axes 4)origin only

42. The curve $y^2 = x^2(1 - x)$ has

1)an asymptote y = 0 2)an asymptote x = 1
3)an asymptote y = 1 4)no asymptote

43. The curve $y^2 = x^2(1 - x)$ has

1)only one loop between x = -1 and x = 0 2)only one loop between x = 0 and x = 1
3)two loops between x = -1 and x = 1 4)no loop

44. The curve $y^2 = (x - a)(x - b)^2$ $a, b > 0$ and $a > b$ does not exist fro

1) $x \ge a$ 2) x = b 3) $b < x < a$ 4)x = a

45. The curve $y^2 = (x - a)(x - b)^2$ is symmetrical about

1)origin only 2)y-axis only 3)x-axis only 4)both x and y-axis

46. The curve $y^2 = (x - a)(x - b)^2$ $a, b > 0$ and $a > b$ has

1)an asymptote x = a 2)an as asymptote x = b
3)an asymptote y = a 4)no asymptote

47. The curve $y^2 = (x - a)(x - b)^2$ $a, b > 0$ and $a > b$ has



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1)a loop between x = a and x = b 2)two loops between x = a and x = b
3)two loops between x = 0 and x = b 4)no loop

48. The curve $y^2(1+x)=x^2(1-x)$ is defined for
1) $-1 \le x \le 1$ 2) $-1 < x \le 1$ 3) $-1 \le x < 1$ 4) $-1 < x < 1$

49. The curve $y^2(1+x)=x^2(1-x)$ is symmetrical about
1)both the axes 2)origin only 3)y-axis only 4)x-axis only

50. The asymptote to the curve $y^2(1+x)=x^2(1-x)$ is
1)x = 1 2)y = 1 3)y = -1 4)x = -1

51. The curve $y^2(1+x)=x^2(1-x)$ has
1)a loop between x = -1 and x = 1 2)a loop between x = -1 and x = 0
3)a loop between x = 0 and x = 1 4)no loop

52. The curve $a^2y^2=x^2(a^2-x^2)$ is defined for
1) $x \le a$ and $x \ge -a$ 2) $x < a$ and $x > -a$
3) $x \le -a$ and $x \ge a$ 4) $x \le a$ and $x > -a$

53. The curve $a^2y^2=x^2(a^2-x^2)$ is symmetrical about
1)x-axis only 2)y-axis only 3)both the axes 4)both the axes and origin

54. The curve $a^2y^2=x^2(a^2-x^2)$ has
1)an asymptote x = a 2)an asymptote x = -a
3)an asymptote x = 0 4)no asymptote

55. The curve $a^2y^2=x^2(a^2-x^2)$ has
1)a loop between x = a and x = -a 2)two loops between x = -a and x = 0 ; x = 0 and x = a
3)two loops between x = 0 and x = a 4)no loop

56. The curve $y^2=(x-1)(x-2)^2$ is not defined for
1) $x \ge 1$ 2) $x \ge 2$ 3) $x < 2$ 4) $x < 1$

57. The curve $y^2=(x-1)(x-2)^2$ is symmetrical about
1)both x and y-axis 2)x-axis only 3)y-axis only 4)both the axes and origin

58. The curve $y^2=(x-1)(x-2)^2$ has
1)an asymptote x = 1 2)an asymptote x = 2
3)two asymptotes x = 1 and x = 2 4)no asymptote

59. The curve $y^2=(x-1)(x-2)^2$ has
1)two loops between x = 0 and x = 2 2)one loop between x = 0 and x =1
3)one loop between x = 1 and x = 2 4)no loop

## CHAPTER VII

01. The value of $\int_0^{\pi/2} \frac{\cos^{5/3}x}{\cos^{5/3}x+\sin^{5/3}x}dx$ is
1) $\pi/2$ 2) $\pi/4$ 3)0 4) $\pi$

02. The value of $\int_0^{\pi/2} \frac{\sin x-\cos x}{1+\sin x\cos x}dx$ is.
1) $\pi/2$ 2)0 3) $\pi/4$ 4) $\pi$

03. The value $\int_0^1 x(1-x)^4\,dx$ is.

1)1/ 12 2)1/30 3)1/ 24 4)1/ 20

04. 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

05. The value of $\int_0^{\pi} \sin^4 x\,dx$ is

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

06. The value of $\int_0^{\pi/4} \cos^3 2x\,dx$ is

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

07. The value of $\int_0^{\pi} \sin^2 x \cos^3 x\,dx$ is

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

08. The area bounded by the line y = x, the x axis, the ordinates x = 1 , x = 2 is.

1)3 / 2. 2)5 / 2. 3)1 / 2 4)7 / 2

09. The area of the region bounded by the graph of y = sin x and y = cos x between x = 0 and x = $\pi/4$ is.

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

10. 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) $2\pi b(a-b)$

11. The area bounded by the parabola $y^2 = x$ and its latus rectum is.

1)4 / 3 2)1 / 6 3)2 / 3 4)8 / 3

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

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

13. 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)100 / 3

14. The volume generated when the region bounded by y = x, y = 1, x = 0 is rotated about x axis is. 1) $\pi/4$ 2) $\pi/2$ 3) $\pi/3$ 4) $2\pi/3$

15. 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

16. The volume generated by rotating the triangle with vertices at (0,0), (3,0) and (3,3) about x axis is. 1) $18\pi$ 2) $2\pi$ 3) $36\pi$ 4) $9\pi$

17. The length of the arc of the curve $x^{2/3} + y^{2/3} = 4$ is.

1)48 2)24 3)12 4)96

18. 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) $4\sqrt{5}\pi$

19. 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) $20\pi$ 2) $40\pi$ 3) $10\pi$ 4) $30\pi$

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20. $I_n = \int \sin^n x\, dx$ then $I_n =$

1) $-\frac{1}{n}\sin^{n-1} x\cos x + \frac{n-1}{n} I_{n-2}$ 2) $\frac{1}{n}\sin^{n-1} x\cos x + \frac{n-1}{n} I_{n-2}$

3) $-\frac{1}{n}\sin^{n-1} x\cos x - \frac{n-1}{n} I_{n-2}$ 4) $-\frac{1}{n}\sin^{n-1} x\cos x + \frac{n-1}{n} I_{n}$

21. $\int_0^{2a} f(x)\, dx = 2\int_0^{a} f(x)\, dx$ if

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

22. $\int_0^{2a} f(x)\, dx = 0$ if

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

23. If f ( x ) is an odd function then $\int_{-a}^{a} f(x)\, dx$ is

1) $2\int_0^{a} f(x)\, dx$ 2) $\int_0^{a} f(x)\, dx$ 3) 0 4) $\int_0^{a} f(a-x)\, dx$

24. $\int_0^{a} f(x)\, dx + \int_0^{a} f(2a-x)\, dx =$

1) $\int_0^{a} f(x)\, dx$ 2) $2\int_0^{a} f(x)\, dx$ 3) $\int_0^{2a} f(x)\, dx$ 4) $\int_0^{2a} f(a-x)\, dx$

25. If f ( x ) is even then $\int_{-a}^{a} f(x)\, dx$ is

1) 0 2) $2\int_0^{a} f(x)\, dx$ 3) $\int_0^{a} f(x)\, dx$ 4) $-2\int_0^{a} f(x)\, dx$

26. $\int_0^{a} f(x)\, dx$ is

1) $\int_0^{a} f(x-a)\, dx$ 2) $\int_0^{a} f(a-x)\, dx$ 3) $\int_0^{a} f(2a-x)\, dx$ 4) $\int_0^{a} f(x-2a)\, dx$

27. $\int_a^{b} f(x)\, dx$ is

1) $2\int_0^{a} f(x)\, dx$ 2) $\int_a^{b} f(a-x)\, dx$ 3) $\int_a^{b} f(b-x)\, dx$ 4) $\int_a^{b} f(a+b-x)\, dx$

28. If n is a positive integer then $\int_0^{\infty} x^n e^{-ax}\, dx =$

1) $\frac{n!}{a^n}$ 2) $\frac{n+1!}{a^n}$ 3) $\frac{n+1!}{a^{n+1}}$ 4) $\frac{n!}{a^{n+1}}$

29. If n is odd then $\int_0^{\pi/2} \cos^n x\,dx$

1) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{\pi}{2}$
2) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{1}{2}\cdot\frac{\pi}{2}$
3) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{3}{2}\cdot 1$
4) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{2}{3}\cdot 1$

30. If n is even then $\int_0^{\pi/2} \sin^n x\,dx$ is

1) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{\pi}{2}$
2) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{1}{2}\cdot\frac{\pi}{2}$
3) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{3}{2}\cdot 1$
4) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{2}{3}\cdot 1$

31. If n is even then $\int_0^{\pi/2} \cos^n x\,dx$ is

1) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{\pi}{2}$
2) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{1}{2}\cdot\frac{\pi}{2}$
3) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{3}{2}\cdot 1$
4) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{2}{3}\cdot 1$

32. If n is odd then $\int_0^{\pi/2} \sin^n x\,dx$ is

1) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{\pi}{2}$
2) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{1}{2}\cdot\frac{\pi}{2}$
3) $\frac{n}{n-1}\cdot\frac{n-2}{n-3}\cdot\frac{n-4}{n-5}\cdots\frac{3}{2}\cdot 1$
4) $\frac{n-1}{n}\cdot\frac{n-3}{n-2}\cdot\frac{n-5}{n-4}\cdots\frac{2}{3}\cdot 1$

33. $\int_a^b f(x)\,dx =$

1) $-\int_a^b f(x)\,dx$ 2) $-\int_b^a f(x)\,dx$ 3) $-\int_o^a f(x)\,dx$ 4) $2\int_o^b f(x)\,dx$

34. The area bounded by the curve x = g ( y ) to the right of y - axis and the two lines y = c and y = d is given by

1) $\int_c^d x\,dx$ 2) $\int_c^a x\,dy$ 3) $\int_c^d y\,dy$ 4) $\int_c^d x\,dy$

35. The area bounded by the curve x = f ( y ) , y-axis and the lines y = c and y = d is rotated about y-axis. Then the volume of the solid is

1) $\pi\int_c^d x^2\,dy$ 2) $\pi\int_c^d x^2\,dx$ 3) $\pi\int_c^d y^2\,dx$ 4) $\pi\int_c^d y^2\,dy$

36. The area bounded by the curve x = f ( y ) to the left of y-axis between the lines y = c and y = d is

1) $\int_c^d x\,dy$ 2) $-\int_c^d x\,dy$ 3) $\int_c^d y\,dx$ 4) $-\int_c^d y\,dx$

37. The arc length of the curve y = f (x ) from x = a to x = b is

1) $\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$ 2) $\int_c^d \sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dx$

3) $2\pi \int_a^b y \sqrt{1+\left(\frac{dy}{dx}\right)^2}\, dx$ 4) $2\pi \int_a^b y \sqrt{1+\left(\frac{dx}{dy}\right)^2}\, dx$

38. The surface area obtained by revolving the area bounded by the curve y = f ( x ) , the two ordinates x =a , x = b and x-axis , about x-axis is

1) $\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\, dx$ 2) $\int_c^d \sqrt{1+\left(\frac{dx}{dy}\right)^2}\, dx$ 3) $2\pi \int_a^b y \sqrt{1+\left(\frac{dy}{dx}\right)^2}\, dx$ 4) $2\pi \int_a^b y \sqrt{1+\left(\frac{dx}{dy}\right)^2}\, dx$

39. $\int_0^\infty x^5 e^{-4x} dx$ is

1) $\frac{6!}{4^6}$ 2) $\frac{6!}{4^5}$ 3) $\frac{5!}{4^6}$ 4) $\frac{5!}{4^5}$

40. $\int_0^\infty e^{-mx} x^7 dx$ is

1) $\frac{m!}{7^m}$ 2) $\frac{7!}{m^7}$ 3) $\frac{m!}{7^{m+1}}$ 4) $\frac{7!}{m^8}$

41. $\int_0^\infty x^6 e^{-x/2} dx$

1) $\frac{6!}{2^7}$ 2) $\frac{6!}{2^6}$ 3) $2^6\ 6!$ 4) $2^7\ 6!$

42. $I_n = \int \cos^n x\, dx$ then $I_n =$

1) $-\frac{1}{n}\cos^{n-1} x \sin x + \frac{n-1}{n} I_{n-2}$ 2) $\cos^{n-1} x \sin x + \frac{n-1}{n} I_{n-2}$

3) $\frac{1}{n}\cos^{n-1} x \sin x - \frac{n-1}{n} I_{n-2}$ 4) $\frac{1}{n}\cos^{n-1} x \sin x + \frac{n-1}{n} I_{n-2}$

## CHAPTER VIII

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

1)log x. 2)x² 3)$e^x$. 4)x.

02. 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.

03. The integrating factor of dx + xdy = $e^{-y}$ sec² y dy is…

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

04. Integrating factor of $\frac{dy}{dx} + \frac{1}{x\log x}.y = \frac{2}{x^2}$ is

1)$e^x$. 2)log x. 3)1/ x 4)$e^{-x}$.

05. 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.

06. y = cx – c² 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

07. 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.

08. 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) $\frac{d^2y}{dx^2} = m$

09. The differential equation of all circles with centre at the origin is.

1)x dy + y d x = 0 2)x dy – y d x = 0 3)x d x + y dy = 0 4)x d x – y d y =0

10. The integrating factor of the differential equation $\frac{dy}{dx} + Py = Q$ is

1) $\int Pdx$ 2) $\int Qdx$ 3) $e^{\int Q dx}$ 4) $e^{\int P dx}$

11. The complementary function of $(D^2 + 1)\,y = e^{2x}$ is.

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

12. 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) $\frac{x}{2}e^{-2x}$

13. The differential equation of the family of lines y = mx is.

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

14. 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

15. 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.

16. 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) $\frac{dp}{dt} = -kt$

17. 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) $\frac{d^2y}{dx^2} + y = 0$

18. 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) $\frac{dy}{dx} = e^{\lambda x}$

19. 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) $\frac{d^2y}{dx^2}+9x=0$

20. 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) $y_2 - 2y_1 - 2y = 0$

21. 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) $x^2-y^2-2xy = c$.

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

23. On putting y = v x, the homogeneous differential equation $x^2\,dy + y(x+y)\,dx = 0$ becomes.
1) $x\,dv + (2v + v^2)\,dx = 0$ 2) $v\,dx + (2x + x^2)\,dv = 0$
3) $v^2\,dx - (x + x^2)\,dv = 0$ 4) $v\,dv + (2x + x^2)\,dx = 0$

24. 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.

25. The P.I of $(3D^2+D-14)\,y = 13e^{2x}$ is..
1) $26\,x\,e^{2x}$. 2) $13\,x\,e^{2x}$. 3) $x\,e^{2x}$. 4) $\frac{x^2}{2}e^{2x}$

26. The particular integral of the differential equation f(4)y = $e^{ax}$ where f(4)= (D-1)g(4), g(1)□□0 is.
1) $me^{ax}$ 2) $e^{ax}$ / g(1) 3) g(1)$e^{ax}$ 4) $xe^{ax}$ / g(1)

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27. The order and degree of the differential equation $\frac{d^3y}{dx^3}+\left(\frac{d^2y}{dx^2}\right)+\left(\frac{dy}{dx}\right)+y=7$ are
1) 3 , 1 2) 1 , 3 3) 3 , 5 4) 2 , 3

28. The order and degree of the differential equation are $y = 4\frac{dy}{dx}+3x\frac{dx}{dy}$
1) 2, 1 2) 1 ,2 3) 1 ,2 4) 2,2

29. The order and degree of the differential equation are $\frac{d^2y}{dx^2}=\left[4+\left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{4}}$
1) 2,1 2) 1,2 3) 2,4 4) 4,2

30. The order and degree of the differential equation are $(1+y')^2 = y'^2$
1) 2,1 2) 1,2 3) 2,2 4) 1,1

31. The order and degree of the differential equation are $\frac{dy}{dx}+y=x^2$
1) 1,1 2) 1,2 3) 2,1 4) 0,1

32. The order and degree of the differential equation are $y'+y^2=x$
1) 2,1 2) 1,1 3) 1,0 4) 0,1

33. The order and degree of the differential equation $y''+3y'^2+y^3=0$ are

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

34. The order and degree of the differential equation are $\frac{d^2y}{dx^2}+x=\sqrt{y+\frac{dy}{dx}}$

1)2,1 2)1,2 3)2 , 1 /2 4)2,2

35. The order and degree of the differential equation are $\frac{d^2y}{dx^2}-y+\left(\frac{dy}{dx}+\frac{d^3y}{dx^3}\right)^{\frac{3}{2}}=0$

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

36. The order and degree of the differential equation are $y''=\left(y-y'^3\right)^{\frac{2}{3}}$

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

37. The order and degree of the differential equation are $y'+(y'')^2=(x+y'')^2$

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

38. The order and degree of the differential equation are $y'+(y'')^2=x(x+y'')^2$

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

39. The order and degree of the differential equations are $\left(\frac{dy}{dx}\right)^2+x=\frac{dx}{dy}+x^2$

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

40. The order and degree of the differential are $\sin x\ (dx+dy)=\cos x\,(dx-dy)$

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

41. The differential equation corresponding to $xy=c^2$ where c is an arbitrary constants is

1)xy''+ x = 0 2)y'' = 0 3)xy' + y = 0 4)xy''-x=0

42. In finding the differential equation corresponding to $y=e^{mx}$ where m is the arbitrary constant, then m is

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

43. The solution of a linear differential equation $\frac{dx}{dy}+Px=Q$ where P and Q are functions of y, is

1) $y(I.F)=\int(I.F)Q\,dx+c$ 2) $x(I.F)=\int(I.F)Q\,dy+c$
3) $y(I.F)=\int(I.F)\,Q\ dy+c$ 4) $x(I.F)=\int(I.F)Q\,dx+c$

44. The solution of the linear differential equation $\frac{dy}{dx}+Py=Q$ where P and Q are functions of x is

1) $y(I.F)=\int(I.F)Q\,dx+c$ 2) $x(I.F)=\int(I.F)Q\,dy+c$
3) $y(I.F)=\int(I.F)\,Q\ dy+c$ 4) $x(I.F)=\int(I.F)Q\,dx+c$

45. Identify the incorrect statement

1)The order of a differential equation is the order of the highest derivative occurring in it.

2)The degree of the differential equation is the degree of the highest order derivative which occurs in it (the derivatives are free from radicals and fractions)

3) $\frac{dy}{dx}=\frac{f_1(x,y)}{f_2(x,y)}$ is the first order first degree homogeneous differential equation

4) $\frac{dy}{dx}+xy=e^x$ is a linear differential equation in x.

## CHAPTER IX

01. 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)

02. 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

03. If p is T and q is F, then which of the following have the truth value T ?
 (i) p v q (ii) ~ p v q iii) p v ~q iv) p ^ ~ q.
 1)(i), (ii), (iii) 2)(i), (ii),(iv) 3)(i), (iii), (iv) 4)(ii), (iii), (iv)

04. The number of rows in the truth table of ~ [ p ^ (~q) ] is.
 1)2 2)4 3)6 4)8.

05. The conditional statement $p \to q$ is equivalent to
 1)p v q. 2)p v ~ q 3)~p v q. 4)p ^ q.

06. Which of the following is a tautology ?
 1)p v q. 2)p ^ q 3)p v ~p. 4)p ^ ~p.

07. Which of the following is a contradiction ?
 1)p v q. 2)p ^ q 3)p v ~p. 4)p ^ ~p.

08. $p \leftrightarrow q$ is equivalent to
 1) $p \to q$ 2) $q \to p$ 3) $(p \to q) \vee (q \to p)$ 4) $(p \to q) \wedge (q \to p)$

09. 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 = $\sqrt{a^2 + b^2}$

10. A monoid becomes a group if it also satisfies the
 1)closure axiom. 2)associative axiom 3)identity axiom 4)inverse axiom.

11. Which of the following is not a group ?
 1)$(Z_n, +_n)$. 2)(Z, +) 3)(Z, .) 4)(R, +)

12. 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

13. The order of [7] in $(Z_9, +_9)$ is…
 1)9 2)6 3)3 4)1.

14. In the multiplicative group of cube root of unity, the order of $\omega^2$ is.
 1)4 2)3 3)2 4)1

15. The value of [ 3 ] $+_{11}$( [5] $+_{11}$[6]) is.
 1)[0] 2)[1] 3)[2] 4)[3]

16. 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

17. Which of the following is correct ?
 i. an element of a group can have more than one inverse.
 ii. if every element of a group is its own inverse, then the group is abelian.
 iii. the set of all 2 x 2 real matrices forms a group under matrix multiplication.
 iv. $(a*2)^{-1} = a^{-1} * b^{-1}$ for all a, b □ G

18. The order of –i in the multiplicative group of 4th roots of unity
 1)4 2)3 3)2 4)1

19. In the multiplicative group of nth roots of unity, the inverse of $\omega^k$ is (k<n)
1) $\omega^{1/k}$ 2) $\omega^{-1}$ 3) $\omega^{n-k}$ 4) $\omega^{n/k}$

20. 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

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21. Which of the following are statements ?
i.Chennai is the capital of Tamil Nadu. ii.The earth is a planet.
iii.Rose is a flower iv.Every triangle is an isosceles triangle
1) all 2)(i) and (ii) 3) (ii) and (iii) 4) (iv) only

22. Which of the following are not statements ?
i. Three plus four is eight ii. The sun is a planet
iii. Switch on the light iv. Where are you going ?
1) (i) and (ii) 2) (ii) and (iii) 3) (iii) and (iv) 4) (iv) only

23. The truth values of the following statements are
i. Ooty is in Tamilnadu and 3 + 4 = 8 ii. Ooty is in Tamilnadu and 3 + 4 = 7
iii. Ooty is in Kerala and 3 + 4 = 7 iv. Ooty is in Kerala and 3 + 4 = 8
1)F,T,F,F 2)F,F,F,T 3) T,T,F,F 4) T,F,T,F

24. The truth values of the following statements are
i) Chennai is in India or $\sqrt{2}$ is an integer.
ii) Chennai is in India or $\sqrt{2}$ is an irrational number
iii) Chennai is in China or $\sqrt{2}$ is an integer
iv) Chennai is in China or $\sqrt{2}$ is an irrational number
1)T F T F 2)T F F T 3)F T F T 4) T T F T

25. Which of the following are not statements ?
i. All natural numbers are integers. ii. A square has five sides
iii. The sky is blue iv. How are you ?
1) (iv) only 2)(i) and (ii) 3) (i) (ii) and (iii) 4) (iii) and (iv)

26. Which of the following are statements?
i. 7 + 2 < 10 ii. The set of rational numbers is finite
iii. How beautiful you are iv. Wish you all success.
(1)(iii) (iv) 2)(i) , (ii) 3)(i) , (iii) 4)(ii) , (iv)

27. The truth values of the following statements are
i. All the sides of a rhombus are equal in length ii. $1+\sqrt{19}$ is an irrational number
iii. Milk is white iv. The number 30 has four prime factors.
1)T T T F 2)T T T T 3)T F T F 4)F T T T

28. The truth values of the following statements are
i) Paris is in France ii) sinx is an even function
iii) Every square matrix is non-singular iv) Jupiter is a planet
1) T F F T 2) F T F T 3) F T T F 4) F F T T

29. Let p be " Kamala is going to school " and q be " There are twenty students in the class ". " Kamala is not going to school or there are twenty students in the class " stands for
1) $p \vee q$ 2) $p \wedge q$ 3) $\sim p$ 4) $\sim p \vee q$

30. If p stands for the statement " Sita likes reading " and q for the statement " Sita likes playing ". " Sita likes neither reading not playing " stands for
1) $\sim p \wedge \sim q$ 2) $p \wedge \sim q$ 3) $\sim p \wedge q$ 4) $p \wedge q$

31. If p is true and q is unknown then
1) $\sim p$ is true 2) $p \vee (\sim p)$ is false 3) $p \wedge (\sim p)$ is true 4) $p \vee q$ is true

32. If p is true and q is false then which of the following statements is not true ?
1) $p \to q$ is false 2) $p \vee q$ is true 3) $p \wedge q$ is false 4) $p \leftrightarrow q$ is true

33. Which of the following is not true?
i) Negation of a negation of a statement is the statement itself
ii) If the last column of its truth table contain only T then it is tautology
iii) If the last column of its truth table contains only F then it is contradiction
iv) If p and q are any two statements then $p \leftrightarrow q$ is a tautology

34. Which of the following are binary operation on R?
i) $a * b = \min\{a, b\}$ ii) $a * b = \max\{a, b\}$ iii) $a * b = a$ iv) $a * b = b$
1)all 2)(i) , (ii) and (iii) 3)(ii), (iii) and (iv) 4)(iii) , (iv)

35. '+' is not a binary operation on
1) N 2) Z 3) C 4) $Q - \{0\}$

36. '-' is a binary operation on
1) N 2) $Q - \{0\}$ 3) $R - \{0\}$ 4) Z

37. '$\div$' is a binary operation on
1) N 2) R 3) Z 4) $C - \{0\}$

38. In congruence modulo 5, $\{x \in Z / x = 5k + 2, k \in Z\}$ represents
1) $[0]$ 2) $[5]$ 3) $[7]$ 4) $[2]$

39. $[5] \cdot_{12} [11]$ is
1) $[55]$ 2) $[12]$ 3) $[7]$ 4) $[11]$

40. $[3] +_8 [7]$ is
1) $[10]$ 2) $[8]$ 3) $[5]$ 4) $[2]$

41. In the group (G, . ), $G = \{1, -1, i, -i\}$, the order of –1 is
1) -1 2) 1 3) 2 4) 0

42. In the group (G, . ), $G = \{1, -1, i, -i\}$, the order of –i is
1) 2 2)0 3) 4 4) 3

43. In the group (G, . ), $G = \{1, \omega, \omega^2\}$, the order of $0(\omega^2)$ is ( where $\omega$ is a cube root of unity)
1) 2 2) 1 3) 4 4) 3

44. In the group $(Z_4, +_4)$, order of $[0]$ is
1) 1 2) $\infty$ 3) cannot be determined 4)0

45. In the group $(Z_4, +_4)$ , $0([3])$ is
1)4 2)3 3)2 4)1

46. In $(S, o)$, $xoy = x$, $x, y \in s$ then 'o' is
1)only associative 2)only commutative
3)associative and commutative 4)neither associative nor commutative

47. In $(N, *)$, $x * y = \max\{x, y\}$, $x, y \in N$ then $(N, *)$ is
1)only closed 2)only semi group 3)only a monoid 4)an infinite group

48. The set of positive even integers, with usual addition forms

1)a finite group 2)only a semi group 3)only a monoid 4)an infinite group

49. The set of positive even numbers, with usual addition forms

1)a finite group 2)only a semi group 3)only a monoid 4)an infinite group

50. In $(Z_5 - \{[0]\}, \cdot_5)$ the order of $0([3])$ is

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

51. In the group (G, . ), $G = \{1, -1, i, -i\}$, the order of 1 is

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

52. In the group (G, . ), $G = \{1, -1, i, -i\}$, the order of i is

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

53. In the group (G, . ), $G = \{1, \omega, \omega^2\}$, $\omega$ is cube root of unity then $0(\omega)$ is

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

54. In the group (G, . ), $G = \{1, \omega, \omega^2\}$, $\omega$ is cube root of unity then $0(1)$ is

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

55. In the group $(Z_4, +_4)$, $0([1])$ is

1)1 2)$\infty$ 3)can not be determined 4)4

56. In the group $(Z_4, +_4)$, $0([2])$ is

1)1 2)2 3)can not be determined 4)0

57. In $(Z_5 - \{[0]\}, \cdot_5)$ the order of $0([2])$ is

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

58. In $(Z_5 - \{[0]\}, \cdot_5)$ the order of $0([4])$ is

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

59. In $(Z_5 - \{[0]\}, \cdot_5)$ the order of $0([1])$ is

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

**CHAPTER X**

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

1)1/ 3 2)1/ 6 3)1/ 9 4)1/12.

02. 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

03. A random variable X has the following probability distribution

| X | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| P(X=x) | ¼ | 2a | 3a | 4a | 5a | ¼ |

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

1)10 / 21 2)2 / 7 3)1/ 14 4)1/ 2

04. A random variable X has the following probability mass function as follows

| x | -2 | 3 | 1 |
|---|---|---|---|
| P(X=x) | $\lambda/6$ | $\lambda/4$ | $\lambda/12$ |

Then the value of $\lambda$ is...

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

05. X is a discrete random variable which takes the values 0,1,2 and P(X =0) = 144 / 169, P(X=1) = 1/169 then the value of P(X=2) is.
1)145 / 169 2)24 / 169 3)2 / 169 4)143 /169

06. 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)1/ 8 2)1/ 10 3)0 4)-1 or 1/10

07. Given E(X +3)= 8 and E (X –3)= 12 then the value of c is.
1)-2 2)4 3)-4 4)2.

08. X is a random variable taking the values 3,4 and 12 with probabilities 1/3, 1/4 and 5 / 12 . Then E(X) is. 1)5 2)6 3)7 4)3

09. 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

10. $\mu_2 = 20, \mu_2' = 276$ for a discrete random variable X. Then the mean of the random variable X is. 1)16 2)5 3)2 4)1

11. Var (4X+ 3) is. 1)7 2)16 Var (X) 3)19 4)0.

12. In 5 throws of a die, getting 1 or 2 is a success. The mean number of successes is
1)5/3 2)3/5 3)5/9 4)9/5

13. The mean of 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)$\left(25, \frac{1}{5}\right)$

14. If the mean and standard deviation of a binomial distribution are 12 and 2 respectively. Then the value of its parameter p is.
1)1/ 2 2)1 / 3 3)2 / 3 4)1 / 4.

15. 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

16. A box contains 6 red and 4 white balls. If 3 balls are drawn at random, the probability of getting 2 white balls is. 1)1/20 2)18 / 125 3)4 /25 4)3 /10

17. If 2 cards are drawn from a well shuffled pack of 52 cards, the probability that they are of the same colours is.
1)1 / 2. 2)26 / 51 3)25 /51 4)25 /102

18. If in a Poisson distribution P(X=0) = k then the variance is.
1)log 1/ k 2)log k. 3)$e^{\lambda}$ 4)1 / k

19. 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

20. The distribution function F(x) of a random variable X is.
1)a decreasing function 2)a non decreasing
3)a constant function 4)increasing first and then decreasing.

21. For a Poisson distribution with parameter $\lambda$ = 0.25 the value of the 2nd moment about the origin is. 1)0.25 2)0.3125 3)0.0625 4)0.025

22. In a Poisson distribution if P(X = 2 ) = P(X=3) then the value of its parameter $\lambda$ is.
1) 6 2)2 3)3 4)0

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

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

24. 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) $\frac{1}{5\sqrt{2\pi}}$

25. 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

26. 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

COME BOOK

27. A discrete random variable takes

1)only a finite number of values 2)all possible values between certain given limits
3)infinite number of values 4)a finite or countable number of values

28. A continuous random variable takes

1)only a finite number of values 2)all possible values between certain given limits
3)infinite number of values 4)a finite or countable number of values

29. If X is a discrete random variable then $P(X \geq a) =$

1) $P(X < a)$ 2) $1 - P(X \leq a)$ 3) $1 - P(X < a)$ 4) 0

30. If X is a continuous random variable then $P(X \geq a) =$

1) $P(X < a)$ 2) $1 - P(X > a)$ 3) $P(X > a)$ 4) $1 - P(X \leq a - 1)$

31. If X is a continuous random variable then $P(a < X < b) =$

1) $P(a \leq X \leq b)$ 2) $P(a < X \leq b)$ 3) $P(a \leq X < b)$ 4)all the three above

32. A continuous random variable X has p.d.f . f(x) then

1) $0 \leq f(x) \leq 1$ 2) $f(x) \geq 0$ 3) $f(x) \leq 1$ 4) $0 < f(x) < 1$

33. A discrete random variable X has probability, mass function p(x), then

1) $0 \leq p(x) \leq 1$ 2) $p(x) \geq 0$ 3) $p(x) \leq 1$ 4) $0 < p(x) < 1$

34. Mean and variance of binomial distribution are

1)nq, npq 2)np, $\sqrt{npq}$ 3)np, np 4)np, npq

35. Which of the following is or are correct regarding normal distribution curve?

i) Symmetrical about the line $X = \mu$ ( mean ) ii) Mean = median = mode
iii) Unimodal iv) Point of inflextion are at $X = \mu \pm \sigma$

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

36. For a standard normal distribution the mean and variance are

1) $\mu$ , $\sigma^2$ 2) $\mu$ , $\sigma$ 3)0,1 4)1,1

37. The p.d.f of the standard normal variate Z is $\varphi(z) =$

1) $\frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{1}{2}z^2}$ 2) $\frac{1}{\sqrt{2\pi}} e^{-z^2}$ 3) $\frac{1}{\sqrt{2\pi}} e^{\frac{1}{2}z^2}$ 4) $\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}z^2}$

38. If X is a discrete random variable then which of the following is correct?

1) $0 \le F(x) < 1$ 2) $F(-\infty)=0$ and $F(\infty) \le 1$

3) $P[X = x_n] = F(x_n) - F(x_n - 1)$ 4) $F(x)$ is a constant function

39. If X is a continuous random variable then which of the following is incorrect?

1) $F'(x) = f(x)$ 2) $F(\infty)=1$ ; $F(-\infty)=0$

3) $P[a \le x \le b] = F(b) - F(a)$ 4) $P[a \le x < b] \ne F(b) - F(a)$

40. Which of the following are correct?

i) $E(aX+b) = aE(X)+b$ ii) $\mu_2 = \mu_2' - (\mu_1')^2$

iii) $\mu_2$ = variance iv) var $(aX+b) = a^2$ var $(X)$

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

15. Which of the following is not true regarding the normal distribution?

1) skewness is zero 2) Mean = median = mode

3) the Points of inflection are at $X = \mu \pm \sigma$ 4) maximum height of the curve is $\frac{1}{\sqrt{2\pi}}$

**CHAPTER - 1 (MATRICES AND DETERMINANTS)**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | 1 | 3 | 1 | 3 | 1 | 3 | 3 | 4 | 3 | 3 | 1 | 4 | 1 | 2 | 1 | 4 | 1 |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 2 | 3 | 1 | 2 | 2 | 4 | 2 | 4 | 4 | 4 | 1 | 2 | 3 | 2 | 4 | 1 | 3 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | | | | | | | | | |
| A | 2 | 4 | 3 | 1 | 2 | 2 | 1 | 4 | | | | | | | | | |

**CHAPTER - 2 (VECTOR ALGEBR1)**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | 3 | 4 | 2 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 3 | 1 | 1 | 3 | 4 | 2 | 1 |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 3 | 3 | 4 | 1 | 2 | 2 | 4 | 2 | 2 | 2 | 4 | 1 | 3 | 2 | 1 | 3 | 3 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| A | 2 | 1 | 1 | 1 | 3 | 3 | 4 | 4 | 4 | 3 | 1 | 3 | 1 | 2 | 4 | 1 | 2 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
| A | 1 | 1 | 1 | 4 | 2 | 1 | 1 | 3 | 1 | 4 | 3 | 1 | 4 | 1 | 2 | 1 | 4 |
| Q | 69 | 70 | 71 | 72 | 73 | 74 | | | | | | | | | | | |
| A | 1 | 1 | 1 | 1 | 4 | 3 | | | | | | | | | | | |

**CHAPTER - 3 (COMPLEX NUMBERS)**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | 3 | 4 | 1 | 4 | 3 | 3 | 4 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 2 | 4 | 1 |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 3 | 3 | 1 | 3 | 3 | 1 | 3 | 4 | 4 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| A | 1 | 1 | 2 | 4 | 3 | 4 | 3 | 3 | 4 | 1 | 1 | 4 | 4 | 1 | 2 | 2 | 4 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
| A | 3 | 2 | 3 | 3 | 2 | 1 | 2 | 1 | 4 | 1 | 1 | 3 | 3 | 4 | 4 | 4 | 4 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 69 | 70 | 71 | 72 | 73 | 74 | 75 | | | | | | | | | | |
| A | 4 | 4 | 4 | 3 | 2 | 1 | 4 | | | | | | | | | | |

## CHAPTER - 4 (ANALYTICAL GEOMETRY)

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | **4** | **4** | **4** | **1** | **3** | **3** | **4** | **2** | **3** | **4** | **2** | **4** | **2** | **4** | **3** | **2** | **2** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 3 | 4 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 4 | 1 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| A | 1 | 4 | 4 | 3 | 2 | 3 | 4 | 2 | 1 | 4 | 2 | 4 | 2 | 3 | 2 | 4 | 4 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
| A | 1 | 3 | 2 | 2 | 1 | 3 | 2 | 3 | 4 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 2 |
| Q | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
| A | 4 | 2 | 3 | 1 | 1 | 4 | 1 | 2 | 1 | 3 | 4 | 2 | 1 | 3 | 1 | 2 | 3 |
| Q | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 |
| A | 2 | 3 | 1 | 3 | 4 | 2 | 4 | 3 | 2 | 3 | 4 | 3 | 2 | 4 | 3 | 1 | 3 |
| Q | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| A | 4 | 2 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 2 | 3 |
| Q | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | | | | | | |
| A | 2 | 2 | 2 | 4 | 3 | 1 | 2 | 1 | 3 | 4 | 2 | | | | | | |

## CHAPTER - 5 (DIFFERENTIAL CALCULUS - I )

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | **4** | **2** | **3** | **2** | **1** | **3** | **4** | **2** | **3** | **4** | **1** | **2** | **2** | **1** | **1** | **4** | **2** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 4 | 2 | 1 | 2 | 4 | 1 | 1 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| A | 3 | 2 | 1 | 2 | 3 | 4 | 4 | 1 | 4 | 3 | 4 | 1 | 1 | 1 | 2 | 3 | 1 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
| A | 2 | 4 | 2 | 4 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 2 | 2 | 4 | 3 | 1 |
| Q | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | |
| A | 3 | 1 | 3 | 3 | 1 | 2 | 4 | 1 | 1 | 3 | 1 | 3 | 1 | 4 | 4 | 3 | |

## CHAPTER - 6 (DIFFERENTIAL CALCULUS - II )

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| A | **1** | **3** | **4** | **2** | **3** | **1** | **1** | **2** | **3** | **2** | **3** | **1** | **1** | **4** | **4** | **2** | **1** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| A | 4 | 3 | 2 | 1 | 1 | 4 | 1 | 2 | 2 | 2 | 3 | 2 | 4 | 3 | 2 | 4 | 3 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| A | 4 | 1 | 2 | 2 | 1 | 1 | 2 | 4 | 2 | 3 | 3 | 4 | 4 | 2 | 4 | 4 | 3 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | | | | | | | | | |
| A | 1 | 4 | 4 | 2 | 4 | 2 | 4 | 3 | | | | | | | | | |

## CHAPTER - 7 ( INTEGRAL CALCULUS )

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | **2** | **2** | **2** | **1** | **4** | **2** | **4** | **1** | **2** | **3** | **2** | **2** | **3** | **3** | **4** | **4** | **1** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| **A** | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 2 | | 2 | 4 | 4 | 2 | 2 | 4 | 2 | 4 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | | | | | | | | | |
| **A** | 1 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | | | | | | | | | |

**CHAPTER - 8 ( DIFFERENTIAL EQUATIONS)**

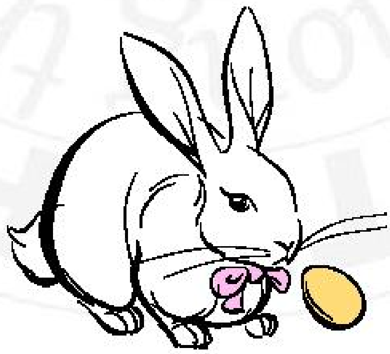
| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **A** | **2** | **4** | **3** | **2** | **2** | **1** | **2** | **2** | **3** | **4** | **2** | **1** | **2** | **4** | **2** | **3** | **2** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| **A** | 1 | 2 | 3 | 4 | 3 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 2 | 4 | 1 | 1 | 4 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | | | | | | |
| **A** | 2 | 1 | 3 | 1 | 4 | 1 | 3 | 2 | 2 | 1 | 4 | | | | | | |

**CHAPTER - 9 (DISCRETE MATHEMATICS)**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **A** | **4** | **1** | **3** | **2** | **3** | **3** | **4** | **4** | **3** | **4** | **3** | **1** | **1** | **2** | **4** | **2** | **2** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| **A** | 1 | 3 | 2 | 1 | 3 | 1 | 4 | 1 | 2 | 1 | 1 | 4 | 1 | 4 | 4 | 4 | 1 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| **A** | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 4 |
| Q | 52 | 53 | 54 | 55 | 56 | 57 | 58 | | | | | | | | | | |
| **A** | 3 | 4 | 2 | 4 | 2 | 3 | 4 | | | | | | | | | | |

**CHAPTER - 10 (PROBABILITY DISTRIBUTIONS)**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **A** | **3** | **3** | **4** | **2** | **2** | **2** | **1** | **2** | **4** | **1** | **2** | **1** | **4** | **3** | **1** | **4** | **3** |
| Q | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| **A** | 1 | 2 | 2 | 2 | 3 | 1 | 4 | 3 | 3 | 4 | 2 | 3 | 3 | 4 | 2 | 1 | 4 |
| Q | 35 | 36 | 37 | 38 | 39 | 40 | 41 | | | | | | | | | | |
| **A** | 4 | 3 | 4 | 3 | 4 | 1 | 4 | | | | | | | | | | |



All the best