QUESTION BANK(FOR DA STUDENTS)
MATHS-10+2(2025-26)

CHAPTER 1: RELATIONS & FUNCTIONS

Multiple Choice Questions:

1. Let $\boldsymbol{R}$ be the relation in the set $\boldsymbol{N}$ of Natural number given by $\boldsymbol{R}$=$\{(x,y): x = y-2,\ y>6\}$ Choose the correct answer.

(a) $(2,4) \in \boldsymbol{R}$ (b) $(3,8) \in \boldsymbol{R}$ (c) $(6,8)\ \boldsymbol{R}$ (d)$(8,7) \in \boldsymbol{R}$

Answer: (c) $(6,8) \in \boldsymbol{R}$

2. Let R= {(1,2), (2,2) ,(1,1),(4,4), (1,3),(3,3),(3,2)} be a relation defined on the set A= {1,2,3,4}, then

(a) $\boldsymbol{R}$ is reflexive and symmetric but not transitive
(b) $\boldsymbol{R}$ is reflexive and transitive but not symmetric
(c) $\boldsymbol{R}$ is symmetric and transitive but not reflexive
(d) $\boldsymbol{R}$ is an equivalence relation

Answer: (b) $\boldsymbol{R}$ is reflexive and transitive but not symmetric

3. Let $f: \boldsymbol{N} \to \boldsymbol{N}, f(x) = x^2$, then

(a) f is only one-one but not onto
(b) f is only onto but not one-one
(c) f is one-one and onto
(d) None of the above

Answer: (a) f is only one-one but not onto

4. $If f: \boldsymbol{R} - \{0\} \to \boldsymbol{R} - \{0\},\ f(x) = \frac{1}{x} then fof(x) is$

(a) 1 (b) $\frac{1}{x}$ (c) x (d) none of these

Answer: (c) x

5. If$\boldsymbol{R} = \{(x,y): x - y\ is\ divisible\ by\ 3, x, y \in \mathrm{Z}\}$ then $\boldsymbol{R}$ is

(a) Reflexive only (b) Symmetric only
(c) Transitive only (d) Equivalence Relation

Answer:(d) Equivalence Relation

Match the column

6.

	Column-A	Column-B
(i)	$f: A \xrightarrow{one-one} f(A)$	(a) f is one one only
(ii)	$f: \boldsymbol{N} \to \boldsymbol{N}, f(x) = x^2$	(b) f is onto only
		(c) f is one-one and onto

(Answer:- $\boldsymbol{i.} \to (\boldsymbol{c})$, $\boldsymbol{ii.} \to (\boldsymbol{a})$**)**

7.

	Column-A	Column-B
(i)	$f(x) = x \; \forall \; \boldsymbol{R}$	(a) constant function
(ii)	$f(x) = 2 \; \forall \; \boldsymbol{R}$	(b) Identity function
		(c) $f = g$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{b})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

8.

	Column-A	Column-B
(i)	$\boldsymbol{R} = \{(x, y): x \leq y^2, \; x, y \in \boldsymbol{R}\}$	(a) Equivalence Relation
(ii)	$\boldsymbol{R} = \{(x, y): x - y \; is \; an \; integer \; x, y \in \mathrm{Z}\}$	(b) Only symmetric
		(c) Not reflexive

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

9.

	Column-A	Column-B
(i)	$R = \Phi$	(a) Universal Relation
(ii)	$R = A \times A$	(b) R is reflexive but not symmetric
		(c) Empty Relation

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

10.

	Column-A	Column-B
(i)	$R = \{(\mathrm{x}, \mathrm{x}): \mathrm{x} \in \mathrm{A}\}$	(a) Empty Relation
(ii)	$R = \{(1,2), (2,3), (1,3)\}$	(b) Identity Relation
		(c) Transitivity

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{b})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{c})$**)**

Fill in the blanks from the following options:

(one-one, onto, 2,3, $A \times A$, reflexive, symmetric, 1, $\sqrt{3}$, $\frac{1}{\sqrt{3}}$)

11. If $f(x) = logx \;\; then \; f(e)$..... **Answer:** 1
12. If $f(x) = tanx \;\; then \; f\left(\frac{\pi}{3}\right)$..... **Answer:**$\sqrt{3}$
13. Identity relation is also ..... **Answer:**reflexive
14. If R is defined relation on set A then R is subset of..... **Answer:** $A \times A$
15. If f is defined as $f : A \rightarrow f(A)$ then f is ..... **Answer:** onto

State as true or false:

16. A bijection is always one-one and onto. (✓)
17. If $f(x) = x$ then $f(4) = 4$ (✓)
18. If R is any relation defined on A where A is non-empty set then $R \subseteq A \times A$ (✓)
19. If $R = \{(x, y): x - y \; is \; an \; integer, x, y \in \boldsymbol{Z}\}$ is defined on set of integers then R is not reflexive. (×)
20. If $f(x) = [x] \;\; then \; f(2.5) = -2$ (×)
21. If$f(x) = |x| \; then \; f(-7.5) = 7.5$ (✓)

CHAPTER 2: INVERSE TRIGONOMETRIC FUNCTIONS

Multiple Choice Questions:

1. Principal value of $\sin^{-1}\left(\frac{-1}{2}\right)$ is :

   (a) $-\frac{\pi}{6}$ (b) $\frac{\pi}{6}$ (c) $-\frac{\pi}{3}$ (d) $\frac{\pi}{3}$

   Answer:(a)$-\frac{\pi}{6}$

2. Principal value of $\cos^{-1}\left(\frac{-1}{2}\right)$ is :

   (b)$\frac{\pi}{3}$ (b) $\frac{2\pi}{3}$ (c) $-\frac{\pi}{3}$ (d) $\frac{5\pi}{3}$

   Answer: (b) $\frac{2\pi}{3}$

3. Principal value of $\tan^{-1}\left(\sqrt{3}\right)$ is :

   (a) 0 (b) $\frac{\pi}{6}$ (c)$\frac{\pi}{4}$ (d)$\frac{\pi}{3}$

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

4. Value of $\sin\left(\frac{\pi}{3}-\sin^{-1}\left(\frac{-1}{2}\right)\right)$ is:

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

   Answer: (d) 1

5. If $\sin^{-1}x=y$, then:

   (a) $x\in[-1,1]$ (b) $x\in(-1,1)$ (c) $x\in[0,1]$ (d) $x\in(0,1)$

   Answer: $x\in[-1,1]$

6. If $\tan^{-1}x=y$, then:

   (a) $y\in\boldsymbol{R}$ (b) $y\in[\frac{-\pi}{2},\frac{\pi}{2}]$ (c) $y\in(\frac{-\pi}{2},\frac{\pi}{2})$ (d) $y\in[-1,1]$

   Answer: (c) $y\in(\frac{-\pi}{2},\frac{\pi}{2})$

7. $\tan^{-1}\left(\sqrt{3}\right)-\sec^{-1}(-2)$ is equal to

   (a) π (b) $\frac{-\pi}{3}$ (c) $\frac{\pi}{3}$ (d) $\frac{2\pi}{3}$

   Answer: (b) $\frac{-\pi}{3}$

Match the Column:

8.

Column-A	Column-B
(i) $cos^{-1}\left[\cos\left(\frac{\pi}{6}\right)\right]$	(a) $3\ cos^{-1}x$
(ii) $sin^{-1}(3x-4x^3)$	(b)$3\ sin^{-1}x$
	(c) $\pi\ /6$

(Answer:- $\boldsymbol{i.\rightarrow(c)}$, $\boldsymbol{ii.\rightarrow(b)}$**)**

9.

Column-A	Column-B
(i) $sin^{-1}x$	(a) $Domain=[-1,1]$
(ii) $cos^{-1}x$	(b) $Range=[0,\frac{\pi}{2}]$
	(c) $Range=[\frac{-\pi}{2},\frac{\pi}{2}]$

(Answer:- $\boldsymbol{i.\rightarrow(c)}$, $\boldsymbol{ii.\rightarrow(a)}$**)**

10.

Column-A	Column-B
(i) $tan^{-1}(1)$	(a) $-\frac{\pi}{3}$
(ii) $sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$	(b)$\frac{\pi}{3}$
	(c)$\frac{\pi}{4}$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

Fill in the blanks from the following options:-

$$(\left(\frac{-\pi}{2}, \frac{\pi}{2}\right), [0, \pi], \left[\frac{-\pi}{2}, \frac{\pi}{2}\right], \sqrt{3}, \boldsymbol{R}, \frac{-1}{2}, \bar{\sqrt{3}}).$$

11. If $cos^{-1}x = y\ then\ y \in$ …… **Answer:**$[0, \pi]$
12. If $tan^{-1}x = y\ then\ x \in$ …… **Answer:**$\boldsymbol{R}$
13. If $tan^{-1}x = \frac{\pi}{3}\ then\ x =$ …… **Answer:**$\sqrt{3}$
14. If $cos^{-1}x = \frac{2\pi}{3}\ then\ x =$…… **Answer:**$\frac{-1}{2}$
15. If $sin^{-1}(\sin x) = x\ then\ x \in$…… **Answer:**$\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$

State as true or false:

16. Principal value of $sin^{-1}\left(\frac{1}{2}\right)\ is\ \frac{\pi}{3}$ (×)
17. Principal value of $tan^{-1}(-1)\ is\ \frac{\pi}{4}$ (×)
18. If $\theta = sin^{-1}\left(\frac{3}{5}\right)$ then $\theta = tan^{-1}\left(\frac{4}{5}\right)$ (×)
19. If $sin^{-1}x = y$ then $y \in [0, \pi] - \left\{\frac{\pi}{2}\right\}$ (×)

3- Marks Questions

20.Find the value of $7\cos^{-1}\left(\frac{1}{2}\right) + 12\tan^{-1}(1) - 4\sin^{-1}(-1)$

21.Find the value of $5\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) - 3\tan^{-1}\left(\sqrt{3}\right) + 7\sin^{-1}(\frac{1}{2})$

22. Find the value of $5\sec^{-1}(0) + 8\tan^{-1}(1) - 3\sin^{-1}(-\frac{1}{2})$

23. Find the value of$2\text{cosec}^{-1}(-1) - 5\sec^{-1}\left(\frac{2}{\sqrt{3}}\right) + \sin^{-1}(-\frac{1}{2}) - 4\cot^{-1}(\sqrt{3})$

24. Find the value of $3\text{cosec}^{-1}(1) + 5\sec^{-1}(2) - 5\sin^{-1}(-\frac{\sqrt{3}}{2}) + 7\cot^{-1}(\frac{1}{\sqrt{3}})$

25. If $\theta = \cos^{-1}\left(\cos\frac{13\pi}{6}\right)$ then find the value of $\sin\theta$

26. If $\theta = \tan^{-1}\left(\tan\frac{7\pi}{6}\right)$ then find the value of $\text{cosec}\,\theta$

27. If $\theta = \tan^{-1}\left(\tan\frac{5\pi}{4}\right)$ then find the value of $\tan\theta$

28. If $\theta = \sin^{-1}\left(\sin\frac{2\pi}{3}\right)$ then find the value of $\tan\theta$

29. If $\theta = \cos^{-1}\left(\cos\frac{\pi}{6}\right)$ then find the value of $\sin 2\theta$

30. If $\theta = \sin^{-1}\left(\sin\frac{\pi}{3}\right)$ then find the value of $\cos 3\theta$

CHAPTER 3: MATRICES

Multiple Choice Questions:

1. If matrix $A = [a_{ij}]_{2\times 2}$ is such that $a_{ij} = i^2 + j$ then a_{21} is
   (a)4 (b) 5 (c) 6 (d) 7
   Answer:(b) 5
2. If $AB = C$where A is matrix of order $2 \times 3$and B is a matrix of order 3×4 then order of matrix C is:
   (a) 2×4 (b) 4×2 (c)2×2 (d)3×3
   Answer:(a) 2×4
3. If $A + B = C$ where order of matrices A and B is 3×4 then order of matrix c is
   (a) 4×3 (b) 3×2 (c)2×3 (d) 3×4
   Answer:(d) 3×4
4. If matrix $AB = C$ where B is a matrix of order 4×2 and C is a matrix of order 3×2then order of matrix A is:
   (a) 3×4 (b) 4×3 (c) 3×3 (d) 2×2
   Answer: (a) 3×4
5. The number of all possible matrices of order 3×3 with entry 0 or 1 is:
   (a) 27 (b) 18 (c) 81 (d) 512
   Answer: (c) 81
6. If $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix} = \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$ then
   (a) $x = \frac{-1}{3}, y = 7$ (b) $Not\ possible\ to\ find\ the\ value\ of\ x\ \&\ y$
   (c) $x = \frac{-2}{3}, y = 7$(d) $x = \frac{-1}{3},\ y = \frac{-2}{3}$
   Answer: (b) $Not\ possible\ to\ find\ the\ value\ of\ x\ \&\ y$

Match the column

7.

Column-A		Column-B	
(i)	$A + A'$	(a)	Rectangular Matrix
(ii)	$A - A'$	(b)	skew-symmetric matrix
		(c)	Symmetric matrix

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{b})$)

8.

Column-A		Column-B	
(i)	$(AB)'$	(a)	$A'B'$
(ii)	$(BA)'$	(b)	$(A + B)'$
		(c)	$B'A'$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$)

9.

Column-A		Column-B	
(i)	$(AB)^{-1}$	(a)	A
(ii)	$(A')'$	(b)	A'
		(c)	$B^{-1}A^{-1}$
		(d)	$A^{-1}B^{-1}$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$)

10.

Column-A		Column-B	
(i)	Identity Matrix	(a)	Only one column
(ii)	Row Matrix	(b)	Square Matrix
		(c)	Only one row

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{b})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{c})$)

11.

	Column-A		Column-B
(i)	Matrix Addition	(a)	Non- commutative
(ii)	Matrix Multiplication	(b)	Transpose
		(c)	Commutative

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

12.

	Column-A		Column-B
(i)	$A = [a_{ij}]_{m\times n}$, $m = n$	(a)	Row Matrix
(ii)	$A = [a_{ij}]_{1\times n}$	(b)	Column Matrix
		(c)	Square Matrix

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

Fill in the blanks from the following options:-

(Inverse, 9,10, 3, symmetric, skew-symmetric, 4×3 , 4×4)

13. If $A = [a_{ij}]_{3\times4}$ such that $a_{ij} = i + 2j$ then a_{33} ……. **Answer:** 9

14. If order of matrix A is 5×2 then number of elements in A are…….
Answer: 10

15. If $\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$, then z= ……. **Answer:** 3

16. If order of A is 3×4 thenorder of A' ……. **Answer:** 4×3

17. If for a matrix A, $A' = A$ holds then *A* is called ……. matrix.
Answer:symmetric

18. If for a matrix A, $A' = -A$ holds then is called ……. matrix.
Answer: skew-symmetric

19. If $AB = BA = I$ then *A* and *B* are ……. matrices of each other.
Answer: Inverse

State as true or false:

20. If *A* and *B* are symmetric matrices of same order then $AB - BA$ is a symmetric matrix. $(\times)$

21. If a matrix is symmetric as well as skew-symmetric then it is a null matrix. $(\checkmark)$

22. Any square matrix can be expressed as the sum of symmetric and skew-symmetric matrix. $(\checkmark)$

23. Matrix multiplication is not associative. $(\times)$

24. AB is a null matrix iff either A is null matrix or B isnull matrix. $(\times)$

25. If *A* is a square matrix then$A - A'$ is skew-symmetric. $(\checkmark)$

3- Marks Questions

26. If $A = [a_{ij}]_{2\times2}, a_{ij} = (i + 2j)^2$ then find A. **Answer:**$A = \begin{bmatrix} 9 & 25 \\ 16 & 36 \end{bmatrix}$

27. Find $x, y \; and \; z, if \begin{bmatrix} x + y + z \\ x + z \\ y + z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$

Answer:$(x = 2, y = 4, \; z = 3)$

28.Find X, if $Y = \begin{bmatrix} 5 & 3 \\ 2 & 6 \end{bmatrix}$ and $2X + Y = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$ **Answer:** $\boldsymbol{X} = \begin{bmatrix} -2 & -5/2 \\ 1/2 & -3 \end{bmatrix}$

29. If $A = \begin{bmatrix} 2 & 3 \\ 7 & 2 \end{bmatrix}$ then find $A^2 - 5A + 2\mathrm{I}$ **Answer:** $\begin{bmatrix} 17 & -3 \\ -7 & 17 \end{bmatrix}$

30. If $A = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}, B = [-2 \;\; 3 \;\; 1]$ then verify that $(AB)' = B'A'$

31. Express $\begin{bmatrix} 5 & 6 \\ -1 & 7 \end{bmatrix}$ as sum of symmetric and skew-symmetric matrices.

32. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ then show that $A + A'$ is a symmetric matrix.

33. If $A = \begin{bmatrix} 3 & -1 \\ 5 & 10 \end{bmatrix}$ then show that $A - A'$ is a skew-symmetric matrix.

34. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 \\ 2 & 5 \end{bmatrix}$ then show that $(A - B)' = A' - B'$

35. If $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$ then find AB and BA.

Answer: $\mathrm{AB} = \begin{bmatrix} 0 & -4 \\ 10 & 3 \end{bmatrix}, \mathrm{BA} = \begin{bmatrix} -10 & 2 & 21 \\ -16 & 2 & 37 \\ -2 & 2 & 11 \end{bmatrix}$

36. Simplify : $\cos\theta \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$

Answer: $\mathrm{AB} = \begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$

37. If $A = [a_{ij}]$ is a matrix of order 3×3 such that $a_{ij} = i^2 - 2j$, then construct matrix A.

4- Marks Questions

38. Give two examples each of

(i) Row Matrix (ii) Square Matrix

39. Give two examples each of

(i) Column Matrix (ii) Diagonal Matrix

40. Write null matrix and identity matrix of two different orders each.

41. If $\begin{bmatrix} x & y \\ z & a \\ b & c \end{bmatrix} = \begin{bmatrix} \frac{-3}{2} & 0 \\ 2 & \sqrt{6} \\ 3 & 2 \end{bmatrix}$ then find *x,y,z,a,b&c.*

42. Write two differences between symmetric matrices and skew-symmetric matrices.

43. Give two example each of

(i) square matrix (ii) diagonal matrix

44. Give an example of matrices A and B where $A \neq 0, B \neq 0$ but $AB = 0$

45.Give an example of matrices A and B where $AB = BA$

46. Write two differences between null matrix and identity matrix.

47. Write two differences between identity matrix and diagonal matrix

48. Give one example of each of the following:

(i) 2×2 symmetric matrix. (ii) 3×3 symmetric matrix.

(iii) 2×2 skew-symmetric matrix. (iv) 3×3 skew-symmetric matrix.

CHAPTER 4: DETERMINANTS

Multiple Choice Questions:

1. If $\begin{vmatrix} x & 1 \\ 2 & 1 \end{vmatrix} = \begin{vmatrix} 3 & 1 \\ 2 & 1 \end{vmatrix}$ then value of x is:
   (a) 1 (b) 2 (c) 3 (d) 4
   Answer: (c) 3

2. If $\begin{vmatrix} x & 1 \\ 1 & x \end{vmatrix} = \begin{vmatrix} 2 & 0 \\ 2 & 4 \end{vmatrix}$ then value of x is:
   (a) 0 (b) ± 1 (c) ± 2 (d) ± 3
   Answer:(d) ± 3

3. If $\Delta = \begin{vmatrix} 2 & 4 \\ -5 & -1 \end{vmatrix}$ then value of Δ is:
   (a) 18 (b) 20 (c) 22 (d) 24
   Answer: (a) 18

4. Which of the following is correct:
   (a) Determinant is a square matrix.
   (b) Determinant is a number associated to a matrix.
   (c) Determinant is a number associated to a square matrix.
   (d) None of these
   Answer: (c) Determinant is a number associated to a square matrix.

5. If A is a matrix of order 3×3 then $|KA|$ is:
   (a) $K|A|$ (b) $K^2|A|$ (c) $K^3|A|$ (d) $3K|A|$
   Answer: (c) $K^3|A|$

6. If A is non-singular square matrix of order 3×3, then $|adj.A|$ is equal to:
   (a) $|A|$ (b) $|A|^2$ (c) $|A|^3$ (d) $3|A|$
   Answer: (b) $|A|^2$

Match the columns:

7.

Column-A		Column-B
(i)	$\|A\|$	(a) $\|A\| = 0$
(ii)	Singular Matrix A	(b) $\|A\| \neq 0$
(c)	$\|A'\|$	

(Answer:- $i. \rightarrow (c)$, $ii. \rightarrow (a)$)

8.

Column-A		Column-B
(i)	$AB = BA = I$	(a) $A = B = 0$
(ii)	$(A^{-1})^{-1}$	(b) $A^{-1} = B \ or \ B^{-1} = A$
(c)	A	

(Answer:- $i. \rightarrow (b)$, $ii. \rightarrow (c)$)

9.

Column-A		Column-B
(i)	$A(adj\ A)$	(a) A
(ii)	AI	(b) $\|A\|I$
(c)	I	

(Answer:- $i. \rightarrow (b)$, $ii. \rightarrow (a)$)

10. Column-A Column-B

(i) $|A| = 0$(a) $A = \begin{bmatrix} 1 & 2 \\ 4 & 8 \end{bmatrix}$

(ii) $|A| = 2$(b) $A = \begin{bmatrix} 3 & 4 \\ -1 & -1 \end{bmatrix}$

(c) $A = \begin{bmatrix} 5 & 4 \\ 2 & 2 \end{bmatrix}$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{a})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{c})$**)**

11. Column A Column B

(i) $Non - Singular\ matrix\ A$(a) $|A| = 0$

(ii) $Singular\ matrix\ A$ (b) $|A| \neq 0$

(c) A = 0

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{b})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

12. Column A Column B

(i) $\begin{vmatrix} x & 2 \\ 3 & 4 \end{vmatrix} = 0$ (a) $x = {}^{4}/_{3}$

(ii) $\begin{vmatrix} 4 & 3 \\ x & 1 \end{vmatrix} = 0$ (b) $x = {}^{3}/_{4}$

(c) $x = {}^{3}/_{2}$

(Answer:- $\boldsymbol{i.} \rightarrow (\boldsymbol{c})$, $\boldsymbol{ii.} \rightarrow (\boldsymbol{a})$**)**

Fill in the blanks from the following options:

(Square, 10, $9\,|A|$, $27\,|A|$, 25, 125, 0, 1, singular, non-singular)

13. Determinant is a number associated to a ……matrix.**Answer:** Square
14. If $|A| = 10$ then $|A'| =$ …… **Answer:** 10
15. $\begin{vmatrix} x & x+1 \\ x-1 & x \end{vmatrix} =$…… **Answer:** 1
16. If $|A| = 0$ then A is a ……matrix. **Answer:** singular
17. If$|A| \neq 0$ then A is a ……matrix. **Answer:** non-singular
18. If A is a matrix of order 3×3 and$|A| = 5$ then $|adj.\,A| =$…….. **Answer:** 25
19. If A is a matrix of order 3×3 then $|3A| =$……**Answer:** $27\,|A|$

State as true or false:

20. Determinant of a square matrix is always positive. (×)
21. Determinant is only associated with a square matrix. (✓)22.

$|adj(A)| = |A|^n$ (×)23.

If A is a matrix of order 3×3 then $|kA| = k|A|$ (×)24.

Area of a triangle cannot be calculated using determinants. (×)25.

A system of linear equations can be solved by matrices and determinants.(✓)

26. Minors and co-factors of determinants are one and the same things.(×)

3 -Marks Questions

27. Using determinants find the equation of the line passing from the points (2, -6) and (4,5).
28. Find the area of triangle with vertices (2, 3), (5,7) and (9, -3).
29. Find the values of K if area of triangle is 4 sq. units and vertices are (K, 0), (4, 3), (5, 4).

30. Find the minor M_{23}, M_{31}, M_{33} in the determinant

$$\Delta = \begin{vmatrix} 1 & 2 & 3 \\ 4 & -1 & 7 \\ 6 & 0 & 8 \end{vmatrix}$$

31. Find the co- factors A_{11}, A_{22}, and A_{32} in the determinant

$$\Delta = \begin{vmatrix} 4 & -1 & 0 \\ 3 & 7 & 8 \\ 5 & 3 & 6 \end{vmatrix}$$

32. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then show that $|3A| = 9|A|$

33. If $A = \begin{bmatrix} 2 & 6 \\ 5 & 1 \end{bmatrix}$ then find $adj.(A)$

34. Using matrices solve the equations:

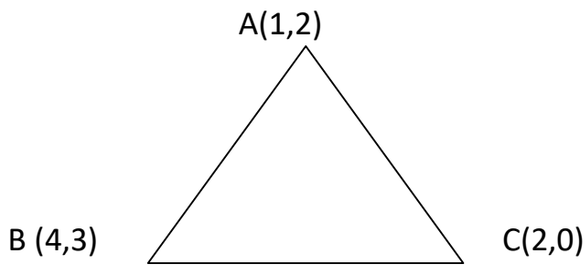
$2x + 5y = 1, 3x + 2y = 7$

35. If $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ then show that $A.(adj.A) = (adj.A)\ A$

36. If $A = \begin{bmatrix} 4 & 5 \\ 2 & 3 \end{bmatrix}$ then find A^{-1}

4- Marks Questions

37. Find the area of ΔABC using determinants.



38. Write the differences between matrix and determinant.

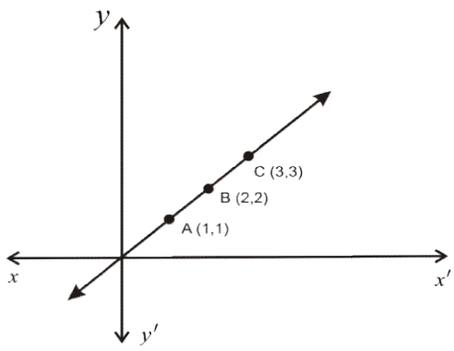
39. Write the differences between minors and co-factors.

40. Give two examples of determinants with value zero.

41. Give two examples of square matrices whose determinant is zero.

42. Give two examples of 2×2 non-singular matrices.

43. Using determinant show that given points in the figure are collinear.

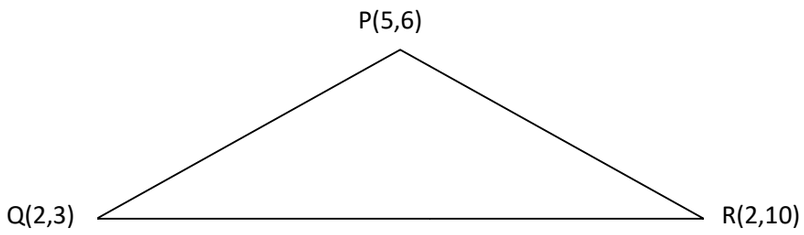


44. Give one example each of a singular matrix and non-singular matrix of order2×2

45.Write the numbers in spaces for which given determinant vanishes.

$$\begin{vmatrix} 0 & 4 & - \\ - & 0 & 6 \\ 5 & -6 & 0 \end{vmatrix}$$

46. Find the area of ΔPQR using determinants.



CHAPTER 5: CONTINUITY AND DIFFERENTIABILITY

Multiple Choice Questions:

1. If $x = at^2, y = 2at$, then $\frac{dy}{dx}$ is :

   (a) t (b) 0 (c) $\frac{1}{t}$ (d) a **Ans = (c)**

2. The derivative of $\cos 5x$ w.r.t. x is

   (a) $5\sin 5x$ (b) $\sin 5x$ (c) $-5\sin 5x$ (d) $5\cos 5x$ **Ans = (c)**

3. If $f(x) = \begin{cases} kx - 2, x \le 4 \\ 1 + 2x, x > 4 \end{cases}$ is a continuous function, then the value of k is

   (a) $\frac{11}{4}$ (b) $\frac{-5}{4}$ (c) $\frac{7}{4}$ (d) $\frac{4}{11}$ **Ans = (a)**

4. If $x^3 + y^3 = 10$, then the value of $\frac{dy}{dx}$ is

   (a) $\frac{-y^2}{x^2}$ (b) $\frac{-x^2}{y^2}$ (c) $\frac{x^2}{y^2}$ (d) $\frac{y^2}{x^2}$ **Ans = (b)**

5. If $y = cos^{-1}\left[\frac{\sqrt{x}-1}{\sqrt{x}+1}\right] + sin^{-1}\left[\frac{\sqrt{x}-1}{\sqrt{x}+1}\right]$ then $\frac{dy}{dx}$ is equal to

   (a) 1 (b) $\frac{\sqrt{x}+1}{\sqrt{x}-1}$ (c) $\frac{\sqrt{x}-1}{\sqrt{x}+1}$ (d) 0 **Ans = (d)**

6. The derivative of $\tan\left(\frac{\pi}{2} - x\right)$ is equal to

   (a) $\sec^2\left(\frac{\pi}{2} - x\right)$ (b) $-\operatorname{cosec}^2 x$ (c) $\operatorname{cosec}^2 x$ (d) $\tan^2\left(\frac{\pi}{2} - x\right)$ **Ans = (b)**

Match the Column:

7.

Column - A		Column - B	
(a)	$\frac{d}{dx}(e^{-nx})$	(i)	$-ne^{-nx}$
(b)	$\frac{d}{dx}(e^{nx})$	(ii)	$-ne^{nx}$
		(iii)	ne^{nx}

Ans $\begin{bmatrix} (a) \to (i) \\ (b) \to (iii) \end{bmatrix}$

8.

Column -A		Column - B
(a)	$\frac{d}{dx}\tan^{-1}(\cot x)$	(i) 0
(b)	$\frac{d}{dx}(\sec^{-1} x + \operatorname{cosec}^{-1} x)$	(ii) 1
		(iii)-1

Ans $\begin{bmatrix} (a) \to (iii) \\ (b) \to (i) \end{bmatrix}$

9.

Column-A		Column-B	
(a)	$\frac{d}{dx}(n^x)$	(i)	$x^a \log a$
(b)	$\frac{d}{dx}(x^a)$	(ii)	ax^{a-1}
		(iii)	$n^x \log n$

Ans $(a) \to (iii)$
$(b) \to (ii)$

10.

Column - A		Column - B	
(a)	$\frac{d}{dx}(\sin x)$ at $x = \frac{\pi}{2}$	(i)	0
(b)	$\frac{d}{dx}(\cos x)$ at $x = \frac{\pi}{2}$	(ii)	1
		(iii)	-1

Ans $\begin{bmatrix}(a) \to (i)\\(b) \to (iii)\end{bmatrix}$

11.

Column-A		Column-B
(a)	$x = 2at^2, y = at^4$	(i) Implicit function
(b)	$x^2 + xy + y^2 = 100$	(ii) Logarithmic function
		(iii) Function in Parametric from

Ans $\begin{bmatrix}(a) \to (iii)\\(b) \to (i)\end{bmatrix}$

12.

Column-A		Column-B	
(a)	$\underset{x\to 0}{Lt}\frac{\sin 2x}{x} =$	(i)	3
(b)	$\underset{x\to 0}{Lt}\frac{\tan 3x}{3x} =$	(ii)	2
		(iii)	1

Ans $\begin{bmatrix}(a) \to (ii)\\(b) \to (iii)\end{bmatrix}$

13.

Column-A		Column -B	
(a)	$\frac{d}{dx}(\sin^{-1} x)$	(i)	$\frac{1}{\sqrt{1-x^2}}$
(b)	$\frac{d}{dx}(\cos^{-1} x)$	(ii)	$\frac{1}{1+x^2}$
		(iii)	$\frac{-1}{\sqrt{1-x^2}}$

Ans $\begin{bmatrix}(a) \to (i)\\(b) \to (iii)\end{bmatrix}$

Fill in the blanks from followings options:

($\frac{1}{x}$, $\frac{-1}{x^2} - 2$, Integral points,applicable, $\frac{\cos(\log x)}{x}, \frac{5}{2}, 3x^2, \frac{\sqrt{3}+1}{2}, \frac{3}{2}, \frac{\sin(\log x)}{x}, \frac{\sqrt{3}-1}{2}$)

14. The derivative of sin (log x) is _____

Ans : $\frac{\cos(\log x)}{x}$

15. If $y = \log x - x^2$ then y_2 =_____

Ans : $\frac{-1}{x^2} - 2$

16. The derivative of log 3x =_____

Ans : $\frac{1}{x}$

17. The function $f(x) = [x]$ is discontinuous at all _____.

Ans : Integral points.

18. If $f(x) = \sin x - \cos x$, then $f'(\frac{\pi}{3})$ is equal to _____. **Ans :** $\frac{\sqrt{3}+1}{2}$

19. The derivative of $e^{3\log x} w.r.t.x$ is equal to _____. **Ans :** $3x^2$

State as true or false:

20. Trigonometric functions are differentiable functions in their respective domains . **Ans : True**

21. $\frac{d}{dx}(e^{\sin^{-1}x}) = e^{\cos^{-1}x}\left(\frac{1}{\sqrt{1-x^2}}\right)$ **Ans : False**

22. If $x = ct, y = \frac{c}{t}$, then $\frac{dy}{dx}$ at t = 2 is 4 . **Ans : False**

23. $|x|$ is a continuous function . **Ans : True**

24. Every differentiable function is a Continuous functions. **Ans : True**

25. $\frac{d}{dx}(tan^{-1}x) = \frac{-1}{1+x^2}$ **Ans : False**

26. The Composition of two continuous function is Continuous. **Ans : True**

3 -Marks Questions

27. If $y = \frac{1}{x^{19}}$, then find $\frac{dy}{dx}$ at $x = -1$.

28. If $x = a\ sec\theta, y = b\ \tan\theta$, find $\frac{dy}{dx}$.

29. If $y = \frac{3}{x^2+3}$ then find $\frac{dy}{dx}$

30. Differentiate $y = x^x$ w. r. t. x

31. Find $\frac{dy}{dx}$ if $x^2 + y^2 + 4xy - 3x = \alpha$

32. If $2x + 3y = \sin x$, find $\frac{dy}{dx}$.

33. Find $\frac{dy}{dx}$ if $x = a(\theta - \sin\theta), y = a(1 + cos\theta)$,

34. If $y = x\cos x$, then find $\frac{d^2y}{dx^2}$.

35. If $y = \sin x + \cos x$ then prove that $\frac{d^2y}{dx^2} = -y$

36. If $f(x) = \begin{cases} kx^2, & x \le 7 \\ 98, & x > 7 \end{cases}$ is a continuous function then find the value of k.

37. Find k, if $f(x) = \begin{cases} \frac{x^2-9}{x-3}, x \neq 3 \\ k, \quad x = 3 \end{cases}$ is continuous at $x = 3$.

38. Discuss the continuity of the function

$$\boldsymbol{f(x)} = \begin{cases} \frac{\sin x}{2x}, \boldsymbol{x \neq 0} \\ \frac{1}{2}, \quad \boldsymbol{x = 0} \end{cases} \quad \textbf{at } x = 0$$

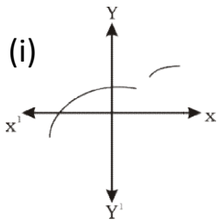
39. If $y = e^{4\tan^{-1}(3t+7)}$ then find $\frac{dy}{dt}$.

40. If $y = (x^2 + 2)^{x^2-1}$ then find $\frac{dy}{dx}$.

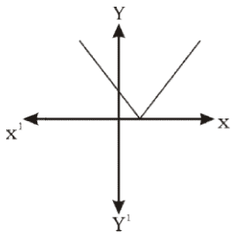
4- Marks Questions :

41. Which of the following graphs are of continuous and discontinuous functions?

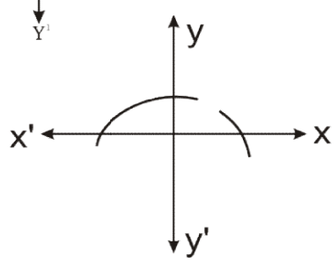
(i)



(ii)



(iii)



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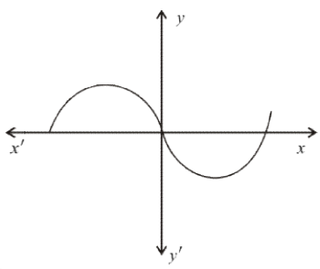


42. Write the formula of differentiation using :

(i) Product rule (ii) Quotient rule

43. Differentiate $y = \frac{e^x + e^{-x}}{e^x - e^{-x}}$ w. r. t . x

44. Write the formula for finding derivative of absolute function $|f(x)|$. Hence find $f'(x)$ if $f(x) = |2x - 3|$.

45. Differentiate $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right), -1 < x < 1$ w. r. t . x

46. If $y = 5\cos x - 3\sin x$, prove that $\frac{d^2y}{dx^2} + y = 0$.

47. If $y = (\sin x)^{\cos x}$ find $\frac{dy}{dx}$.

48. Differentiate $\cos^2 3x$ w.r.t. $\tan^2 5x$.

49. Differentiate $e^{\sin^{-1}x}$ w.r.t. $\sqrt{1-x^2}$

50. Examine the continuity of

$$f(x) = \begin{cases} \frac{\sin 2x}{\sin 3x} & , \quad x \neq 0 \\ 2 & , \quad x = 0 \end{cases} \qquad \text{at } x = 0$$

CHAPTER 6: APPLICATIONS OF DERIVATIVE

Multiple choice Questions:

1. The value of x for which $\cos 2x$ attains its minimum value is :

   (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{6}$ **Ans : (c)**

2. The interval in which the function $f(x) = x^2 - 6x + 3$ is strictly increasing is

   (a) $(1,+\infty)$ (b) (1,2) (c) $(3,+\infty)$ (d) $(-\infty, 3)$

   Ans : (c)

3. The maximum value of $f(x) = x^3 - 3x$ in the interval [0,2] is :

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

   Ans : (c)

4. The rate of change of the area of a circle with respect to its radius at r = 5 is :

   (a) 10π (b) 8π (c) 12π (d) 13π

   Ans : (a)

Match the column:

5.

Column - A		**Column - B**
(a) The minimum Value for the function $f(x) = (2x-1)^2 + 3$ is	(i)	3
(b) The minimum value for the function $f(x) = 16(x-1)^2 + 24$	(ii)	24
	(iii)	16

Ans $\begin{bmatrix} (a) \to (i) \\ (b) \to (ii) \end{bmatrix}$

6.

Column - A		**Column - B**
(a) Rate of change of volume of sphere, w.r.t. its radius.	(i)	4
(b) Rate of change of perimeter of square w.r.t. its side .	(ii)	$\frac{4}{3}\pi r^3$
	(iii)	$4\pi r^2$

Ans $\begin{bmatrix} (a) \to (iii) \\ (b) \to (i) \end{bmatrix}$

7.

Column - A		**Column - B**
(a) $f(x) = 3x^2 + 17$	(i)	Strictly increasing in $(0, \infty)$
(b) $f(x) = \lvert x \rvert$	(ii)	Strictly increasing on **R**
	(iii)	Strictly decreasing in $[-\infty, 0)$

Ans $\begin{bmatrix} (a) \longrightarrow (i) \\ (b) \longrightarrow (iii) \end{bmatrix}$

8.

Column -A		**Column - B**
(a) The rate of change of area of a circle w.r.t. its radius r is	(i)	$2\pi r$
	(ii)	$8\pi r$
(b) The rate of change of surface area of a ball w.r.t. its radius r is	(iii)	$\frac{4}{3}\pi r^3$

Ans $\begin{bmatrix}(a)\to(i)\\(b)\to(ii)\end{bmatrix}$

Fill in the blanks from the following options :

(percentage, equilateral, 3, -1, increasing, decreasing, 1, critical point, relative error, isosceles,$2\pi r$)

9. The Point where$f'(x)=0$ is called _____. **Ans: critical point**
10. If $f'(x)\geq 0,$then the function is _____ **Ans: Increasing**
11. The local minimum Value of the function is given by $f(x)=3+|x|, x\in \mathrm{R}$ _____ **Ans: 3**
12. The triangle of maximum area that can be inscribed in a given circle is an _____triangle. **Ans: Equilateral**
13. Rate of change of area of a circle with respect to the radius r of the circle is _____

Ans. $2\pi r$

14. Rate of change of $\sin x$ at $x=\frac{\pi}{6}$ is _____

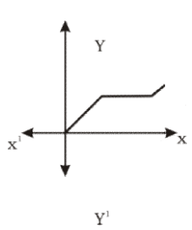
Ans. $\frac{\sqrt{3}}{2}$

State as true or false:

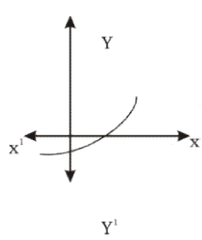
15. $f(x)=\sin x$ is strictly decreasing function in $(0,\frac{\pi}{2})$ **Ans: False**
16. If x is real then maximum value of $x^2-8x+17$ is 2 **Ans: False**
17. The value of function$f$ is maximum at $x=a$ if $f'(a)=0$ and $f''(a)<0$ **Ans: True**
18. The minimum value for $f(x)=x^2, x\in \mathrm{R}$ is zero **Ans: True**
19. The logarithmic functions is strictly increasing on $(0,\infty)$ **Ans: True**
20. The interval in which $f(x)=2x^2-3x$ is strictly decreasing is $(\frac{3}{4},\infty)$ **Ans: False**

4- Marks Questions

21. Find the rate of change of area of a circle w.r.t. its radius r at $r=6$ cm.
22. Prove that $f(x)=\cos x$ is strictly decreasing on $(0,\pi)$
23. Find all the points of local maxima and local minima of the function f given by : $f(x)=2x^3-6x^2+6x+5$
24. Which of the following graphs represents increasing and strictly increasing function.

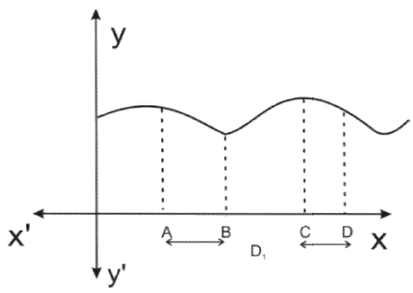


(i)



(ii)

25. Let a real valued function f be defined in the domain of f i.e. D_f,. Write the points from the given figure which describe absolute maxima and absolute minima.



Also find absolute maximum and minimum value if the function $f(x) = x^{50} - x^{20}$ in the interval [0,1]

26. Find two positive numbers whose sum is 24 and their sum of squares is minimum.

27. A square piece of tin of side 24 cm is to be made in to a box without top by cutting a square from each corner and folding up the flaps to form a box. What should be the side of the square to be cut off so that the value of the box is maximum.

28. Let $f(x)$ be continuous on [a,b] and differentiable on (a,b). Write the conditions on derivative of $f(x)$when

(i) $f(x)$ is increasing in [a,b]

(ii) $f(x)$ is decreasing in (a,b]

29. Find two natural numbers whose sum is 36 and whose product is as large as possible.

30. Find the intervals where the function $f(x) = 2x^3 - 3x^2 - 36x + 11$

(i)strictly increases (ii)strictly decreases.

CHAPTER 7: INTEGRALS

Multiple Choice Questions:

1. If $\int f(x)dx = g(x) + c$, then

   (a) $g(x) = f(x)$ (b) $\frac{d}{dx}g(x) = f(x)$

   (c) $\frac{d}{dx}f(x) = g(x)$ (d) $g(x) \neq f(x)$

   Ans : (b)

2. $\int x^{-1}dx =$ .....

   (a) $\frac{x^0}{c} + c$ (b) $\log_e x + c$

   (c) $\log_{10} x + c$ (d) $\log_e |x| + c$

   Ans : (d)

3. Which of the following is equal to $\int \frac{dx}{\sqrt{1-x^2}}$

   (a) $sin^{-1}x + c$ (b) $cos^{-1}x + c$

   (c) $\frac{\pi}{2} + cos^{-1}x + c$ (d) $tan^{-1}x + c$ **Ans : (a)**

4. $\int e^x[f(x) + f'(x)]dx$ is equal to

   (a) $e^x f'(x) + c$ (b) $e^x f(x) + c$

   (c) $e^x + f(x) + c$ (d) $e^x - f(x) + c$ **Ans : (b)**

5. $\int e^x(\cos x - \sin x)dx$ is equal to

   (a) $e^x \sin x + c$ (b) $-e^x \cos x + c$

   (c) $e^x \cos x + c$ (d) $-e^x \sin x + c$ **Ans : (c)**

6. $\int \tan x \sec^2 x$ is equal to

   (a) $\tan x + c$ (b) $\frac{1}{2}\tan^2 x + c$

   (c) $\sec^2 x + c$ (d) $\sec x \tan x + c$ **Ans : (b)**

7. $\int_0^2 [x]dx$ is equal to

   (a) 2 (b) 1 (c) $\frac{1}{2}$ (d) 0 **Ans : (b)**

Match the Column

8.

	Column - I		**Column - II**	
(a)	$\int \frac{dx}{1+x^2}$	(i)	$\cos ec^{-1}x + c$	
(b)	$\int \frac{dx}{\sqrt{1-x^2}}$	(ii)	$\sin^{-1} x + c$	
		(iii)	$\tan^{-1} x + c$	**Ans** $\begin{bmatrix}(a) \to (iii)\\(b) \to (ii)\end{bmatrix}$

9.

	Column - I		**Column - II**	
(a)	$\int_{-\pi/2}^{\pi/2} \sin^7 x dx$	(i)	0	
(b)	$\int_0^{\pi/2} \frac{\cos^5 x}{\sin^5 x + \cos^5 x} dx$	(ii)	$\frac{\pi}{2}$	
		(iii)	$\frac{\pi}{4}$	**Ans** $\begin{bmatrix}(a) \to (i)\\(b) \to (iii)\end{bmatrix}$

10.

Column - I		**Column - II**	
(a)	$\int_{-a}^{a} f(x)dx = 0$	(i)	If $f(x) = x^3 + 1$
(b)	$\int_{-a}^{a} f(x)dx = 2\int_{0}^{a} f(x)dx$	(ii)	If $f(x)$ is an odd function
		(iii)	If $f(x)$ is an even function

Ans $\begin{bmatrix}(a)\to(ii)\\(b)\to(iii)\end{bmatrix}$

11.

Column - I		**Column - II**	
(a)	$\int e^x(\tan^{-1}x + \frac{1}{1+x^2})dx$	(i)	$e^x \sin^{-1}x + c$
(b)	$\int e^x(\sin^{-1}x + \frac{1}{\sqrt{1-x^2}})dx$	(ii)	$e^x \tan^{-1}x + c$
		(iii)	$e^x co\sec^{-1}x + c$

Ans $\begin{bmatrix}(a)\to(ii)\\(b)\to(i)\end{bmatrix}$

12.

Column - I		**Column - II**	
(a)	$\int \sqrt{a^2 - x^2}dx$ =	(i)	$\frac{x\sqrt{a^2-x^2}}{2} + \frac{a^2}{2}\sin^{-1}\frac{x}{a} + c$
(b)	$\int \sqrt{a^2 + x^2}dx =$	(ii)	$\frac{x\sqrt{a^2+x^2}}{2} + \frac{a^2}{2}\log\left(x + \sqrt{a^2+x^2}\right) + c$
		(iii)	$\frac{x\sqrt{x^2-a^2}}{2} - \frac{a^2}{2}\log\left\|x + \sqrt{a^2+x^2}\right\| + c$

Ans $\begin{bmatrix}(a)\to(i)\\(b)\to(ii)\end{bmatrix}$

13.

Column - I		**Column - II**	
(a)	$\int \frac{ax+b}{(x-p)(x-q)}dx$	(i)	$\frac{A}{x-p} + \frac{B}{(x-p)^2} + \frac{C}{x-q}$
(b)	$\int \frac{ax^2+bx+c}{(x-p)^2(x-q)}dx$	(ii)	$\frac{A}{x-p} + \frac{B}{(x-p)^2} + \frac{C}{x-r}$
		(iii)	$\frac{A}{x-p} + \frac{B}{x-q}$

Ans $\begin{bmatrix}(a)\to(iii)\\(b)\to(ii)\end{bmatrix}$

14.

Column - I		**Column - II**	
(a)	$\int \frac{1}{x^2+2x+3}\,dx$	(i)	$\int \frac{1}{(x+1)^2+2}\,dx$
(b)	$\int \frac{1}{x^2+4x+6}\,dx$	(ii)	$\int \frac{1}{(x-1)^2+2}\,dx$
		(iii)	$\int \frac{1}{(x+2)^2+2}\,dx$

Ans $\begin{bmatrix}(a)\to(i)\\(b)\to(iii)\end{bmatrix}$

Fill in the blanks from the following options:

$\left(\frac{-1}{2x^2}, 0, 1, \frac{\pi}{4}, \text{odd, even, } \sec x + \mathbf{c}, \frac{\pi}{6}, -cosec\ x + c, \frac{a^x}{loga} + c, e^x + c\right)$

15. $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}}\,dx =$ _____ **Ans :** $\frac{\pi}{4}$

16. $\int_{-a}^{a} f(x)dx = 0$ if f is an _____function. **Ans :odd**

17. $\int_{-\pi}^{\pi} \sin^3 \cos^2 x dx$ is equal to _____ **Ans :0**

18. $\int e^{-3\log x} dx$ is equal to _____ **Ans :** $-\frac{1}{2x^2}$

19. $\int \frac{\sin x}{\cos^2 x} dx$ is equal to _____ **Ans :** $\sec x + \mathbf{c}$

20. $\int_0^1 \frac{dx}{1+x^2}$ is equal to _____ **Ans :** $\frac{\pi}{4}$

21. $\int \cos ecx \cot x \, dx$ is equal to _____ **Ans:** $-cosec\, x + c$

22. $\int a^x dx =$ _____ **Ans :** $\frac{a^x}{\log a} + c$

State as true or false:

23. $\int x^n dx = \frac{x^{n+1}}{n+1} + c$ **Ans : True**

24. If $f(a-x) = f(x)$, then $\int_0^{2a} f(x)dx = 0$ **Ans : False**

25. $\int_a^b f(x)dx \neq \int_a^b f(a+b-x)dx$ **Ans : False**

26. $\int_a^b f(x)dx$ if it exists, is a uniquely determined real number. **Ans : True**

27. $\int_0^{2\pi} \sin^2 x \, dx = 4 \int_0^{\pi/2} \sin^2 x \, dx$ **Ans : True**

28. $\int_a^b f(x)dx = \int_b^a f(x)dx$ **Ans : False**

3- Marks Questions :

29. Evaluate $\int \frac{dx}{\sqrt{9-25x^2}}$

30. Evaluate $\int \tan^2 x \, dx$

31. Evaluate $\int \frac{1-\tan x}{1+\tan x} dx$

32. Evaluate $\int x \, e^{3x} dx$

33. Evaluate $\int e^x (\sec x + \sec x \tan x) dx.$

34. Evaluate $\int \frac{dx}{x^2+2x+7}$

35. Evaluate $\int_{-1}^{3} (x^2+1)dx$

36. Evaluate $\int_0^1 \frac{x^8}{1+x^9} dx$

37. Evaluate $\int_0^{\pi/2} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$

38. Evaluate $\int_{-2}^{2} |x+1| dx$

4-Marks Questions

39. Evaluate $\int \frac{dx}{x^2-3^2}$

40 Evaluate $\int \cot^2 x \, dx$

41 Evaluate $\int \frac{e^{\tan^{-1}x}}{1+x^2} dx$

42 Evaluate $\int \frac{\cos x}{3+\sin} dx$

43 Evaluate $\int_0^{\pi/6} \cos 2x \, dx$

44 Evaluate $\int_1^5 |x-1| \, dx$

45. Complete perfect square of the quadratic equation $x^2 + 4x + 5 = 0$.Hence Evaluate $\int \frac{dx}{x^2+4x+5}$.

46. Write the properties to evaluate definite integrals when (i) $f(x)$ is an odd function (ii) $f(x)$ is an even function.

47. Write the name of the rule for integrating the product of two functions. Also Evaluate $\int x \sin x \, dx$.

48. Evaluate $\int \frac{x^2}{x-1} dx$.

49. Evaluate $\int_0^1 \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a-x}} dx$

50. Evaluate $\int \frac{dx}{1+\sin x}$

CHAPTER 8: APPLICATION OF INTEGRALS

Multiple Choice Questions:

1.Using integration, area of circle $x^2 + y^2 = 25$ is:

(a) 5π sq.units(b) 10 sq.units (c) 25π sq.units (d) 10π sq.units

Ans:(c) 25π sq.units

2.Using integration, area of ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is:

(a) 20π sq.units (b) 20 sq.units (c) 25π sq.units (d) 16π sq.units

Ans:(a) 20π sq.units

3. Integral for the area of circle $x^2 + y^2 = 16$ is:

(a) $\int_0^4 \sqrt{16 - x^2}\ dx$ (b) $\int_0^4 (16 - x^2)\ dx$ (c) $4\int_0^{16} \sqrt{16 - x^2}\ dx$ (d) $4\int_0^4 \sqrt{16 - x^2}\ dx$

Ans:(d) $4\int_0^4 \sqrt{16 - x^2}\ dx$

4. Integral for the area bouned by parabola $y^2 = 4x$ and straight lines $x = 1,\ x = 5$ in the first quadrant is:

(a) $\int_1^5 2\sqrt{x}\,dx$ (b) $\int_1^5 4x\,dx$ (c) $\int_1^5 2x\,dx4$ (d) $\int_1^5 16x^2\,dx$

Ans:(a) $\int_1^5 2\sqrt{x}\,dx$

State as True or False:

5. We can find the area between curve and x-axis using definite integrals.(T)
6. We can find the area between curves using differentiation. (F)
7. Finding area under the curve is an application of integrals. (T)
8. Integral $\int_0^5 \sqrt{25 - x^2}\,dx$ represents the area of circle $x^2 + y^2 = 25$ (F)
9. Integral $\int_0^3 x\,dx$ represents the area bounded by $-axis$, lines $x - y = 0$ and $x = 3$

(T)

3 -Marks Questions :

10. Find the area of the region bounded by the curves :

$y = x^2, x = 1, x = 5$ and $x - axis$ [Ans : 41.33]

11. Find the area between the curve :

$y = x^2, x - axis$ and the line $x = 0$ and $x = 2$ [Ans : $\frac{8}{3}$]

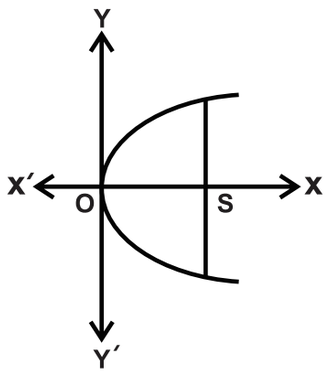
12. Formulate the integral for the curve $y = f(x)$ above the $x - axis$, between $x = a$ and $x = b$. [Ans : $\int_a^b y\,dx$]

13. Using integration, find the area in the first quadrant of circle $x^2 + y^2 = 4$ [Ans : π]

14. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$. [Ans : $4\sqrt{3}$]

4- Marks Questions :

15. Find the area bounded by the ellipse :
$$\frac{x^2}{16}+\frac{y^2}{9}=1$$
16. Find the area enclosed under the parabola $y^2 = 49x$ and its latus rectum.



17. Find the area bounded by the ellipse $\frac{x^2}{4}+\frac{y^2}{25}=1$ in the first quadrant.

18. Using integration, find the area bounded by the circle $x^2 + y^2 = 36$

19. Using integration, find the area bounded by the circle $x^2 + y^2 = 49$ lines $x = 1$ $x = 5$ and $x - axis$ in the first quadrant.
20. Using integration, find the area bounded by the circle $x + y = 10$, lines $x = 3$,$x = 7$ and $x - axis$ in the first quadrant.

CHAPTER 9: DIFFERENTIAL EQUATIONS

Multiple Choice Questions:

1. The order of the given differential equation is :
$(y''')^2 + (y'')^3 + (y')^4 + y^5 = 0$
(A) 0 (B) 3 (C) 2 (D) Not defined
[Ans : B]

2. The degree of the given differential equation :
$\frac{dy}{dx} + 5y = 0$ is :
(A) 3 (B) 0 (C) 1 (D) 2 [Ans : C]

3. The number of arbitrary constants in the particular solution of a differential equation of fourth order are :
(A) 0 (B) 2 (C) 3 (D) 4
[Ans : A]

4. The number of arbitrary constants in the general solution of a differential equation of third order are .
(A) 3 (B) 2 (C) 1 (D) 0
[Ans : A]

5. Which of the following of differential equation has $y = c_1e^x + c_2e^{-x}$ as the general solution?
(A) $\frac{d^2y}{dx^2} + y = 0$ (B) $\frac{d^2y}{dx^2} - y = 0$
(C) $\frac{d^2y}{dx^2} + 1 = 0$ (D) $\frac{d^2y}{dx} - 1 = 0$ [Ans : B]

6. Which of the following differential equation has $y = x$ as one of its particular solution?
(A) $\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + xy = x$ (B) $\frac{d^2y}{dx^2} - x\frac{dy}{dx} + xy = x$
(C) $\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + xy = 0$ (D) $\frac{d^2y}{dx^2} - x\frac{dy}{dx} + xy = 3$
[Ans : C]

7. Solution of the given differential equation.
$\frac{dy}{dx} = \tan^2 x$ is :
(A) $y = \cot - x + c$ (B) $y = \sec x - x + c$
(C) $y = \tan x - x + c$ (D) None of these
[Ans : C]

8. The general solution of differential equation $\frac{dy}{dx} = e^{x+y}$ is;
(A) $e^x + e^{-y} = c$ (B) $e^x + e^y = c$
(C) $e^{-x} + e^y = c$ (D) $e^{-x} + e^{-y} = c$ [Ans : A]

9. A homogenous differential equation of the form $\frac{dx}{dy} = h(\frac{x}{y})$ can be solved by making the substitution :

(A) $y = vx$ (B) $v = yx$ (C) $x = vy$ (D) $x = v$

[Ans : C]

10. Which of the following is homogenous differential equation.

(A) $(4x + 6y + 5)dy - (3y + 2x + 4)dx = 0$

(B) $(xy)dx - (x^3 + y^3)dy = 0$

(C) $(x^3 + 2y^2)dx + 2xy\,dy = 0$

(D) $y^2dx + (x^2 - xy - y^2)dy = 0$ [Ans : D]

Fill in the blanks from the following options :

$[\frac{1}{\sqrt{1-y^2}}$, Positive, $\frac{1}{x}$, mx, Negative]

11. Order and degree (if defined) of a differential equation are always _____integers. [Ans: Positive]

12. The integrating factor of the differential equation $(1 - y^2)\frac{dx}{dy} + yx = ay, (-1 < y < 1)$ is _____. [Ans : $\frac{1}{\sqrt{1-y^2}}$]

13. The integrating factor of Differential equation $x\frac{dy}{dx} - y = 2x^2$ is_____.

[Ans : $\frac{1}{x}$]

State as True/False:

14. The given differential equation $(x - y)\frac{dy}{dx} = x + 2y$ is homogenous.

[Ans:T]

15. $\frac{dy}{dx} + Py = Q$ is a homogenous differential equation. [Ans : F]

Match the Columns:

16.

Column A	Column B
(a) $\frac{dy}{dx} = e^x + 1$	(i) $e^x + e^{-y} = c$
(b) $\frac{dy}{dx} = e^{x+y}$	(ii) $e^x e^y = c$
	(iii) $y = x + e^x + c$

[Ans : a - (iii), b- (i)]

17.

	Column A		Column B
(a)	$\frac{d^2y}{dx^2}$	(i)	y'
(b)	$\frac{d^3y}{dx^3}$	(ii)	y'''
(c)	$\frac{dy}{dx}$	(iii)	y_n
		(iv)	y''

((a)-(iv),(b)-(ii),(c-i) **)**

4- Marks Questions:

18. Give an example of a differential equation whose degree is not defined?

19. Give an example of linear differential equation.

20. Find the integrating factor of differential equation $\frac{dy}{dx} + y = \cos x$

21. Find the general solution of the differential equation

$$\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$$

22 Find the generalsolution of the differentialequation $\frac{dy}{dx} = \frac{x+1}{2-y}$; $(y \neq 2)$

23 Find the general solution of the differential equation

$$\frac{dy}{dx} = (1+x^2)(1+y^2)$$

24 Find the general solution of the differential equation

$$x\frac{dy}{dx} + 2y = x^2 \;\; ; \; x \neq 0$$

25 Find the general solution of the differential equation $\frac{dy}{dx} + 3y = e^x$

CHAPTER 10: VECTORS

Choose the correct option from the given options:

1. The unit vector in the direction of the vector $\vec{a} = \hat{i} + \hat{j} + 2\hat{k}$

(a) $\hat{i} + \hat{j} + 2\hat{k}$ (b) $\frac{\hat{i}}{2} + \frac{\hat{j}}{2} + \frac{2\hat{k}}{3}$

(c) $\frac{\hat{i}}{\sqrt{6}} + \frac{\hat{j}}{\sqrt{6}} + \frac{2\hat{k}}{\sqrt{6}}$ (d) $\frac{\hat{i}}{\sqrt{3}} + \frac{\hat{j}}{\sqrt{3}} + \frac{2\hat{k}}{\sqrt{3}}$

[Ans :(c)]

2. If $\vec{a}$ and $\vec{b}$ are two vectors, then scalar projection of vector $\vec{a}$ onvector $\vec{b}$ is :

(a) $\frac{\vec{a} \times \vec{b}}{|\vec{a}|}$ (b) $\frac{\vec{a}.\vec{b}}{|\vec{a}|}$

(c) $\frac{\vec{a} \times \vec{b}}{|\vec{b}|}$ (d) $\frac{\vec{a}.\vec{b}}{|\vec{b}|}$ [Ans :(d)]

3. Area of a parallogram, whose two adjacent sides are given by the two vectors $\vec{a}$ and $\vec{b}$, is :

(a) $|\vec{a} \times \vec{b}|$ (b) $|\vec{a}|$

(c) $|\vec{b}|$ (d) $\frac{1}{2}|\vec{a} \times \vec{b}|$ [Ans :(a)]

4. Area of a parallogram whose diagonals are represent by the two vectors $\vec{d_1}$ and $\vec{d_2}$ is :

(a) $|\vec{d_1} \times \vec{d_2}|$ (b) $|d_1.d_2|$

(c) $\frac{1}{2}|\vec{d_1} \times \vec{d_2}|$ (d) $\frac{1}{2}|d_1.d_2|$ [Ans :(c)]

Fill in the blanks from the following options :

$$(\ \mathbf{0^o}, \vec{a} - \vec{b}, \vec{0}, 1, |\vec{a}||\vec{b}|\cos\theta, |\vec{a}||\vec{b}|)$$

5. $\vec{a} + (-\vec{b}) =$ ------ $[Ans.\ \vec{a} - \vec{b}]$

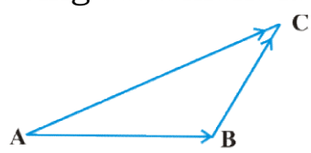
6. $\vec{a} \cdot \vec{b} =$ --------- $[Ans.\ |\vec{a}||\vec{b}|\cos\theta]$

7. When two vectors $\vec{a}$ and $\vec{b}$ are parallel to each other then angle between them is ---------- $[Ans.\ 0^0]$

8. $\hat{i} \times i = \hat{j} \times \hat{j} = \hat{k} \times \hat{k} =$ ------ (Ans.$\vec{0}$)

9. $\hat{i} \cdot \hat{i} = \hat{j} \cdot \hat{j} = \hat{k} \cdot \hat{k} =$ ------- $[Ans.\ 1\ ]$

10. For Δ ABC (figure), which of the following statement is not true?



(A) $\overrightarrow{AB} - \overrightarrow{BC} + \overrightarrow{CA} = \vec{0}$

(B) $\overrightarrow{AB} + \overrightarrow{BC} - \overrightarrow{AC} = \vec{0}$

(C) $\overrightarrow{AB} + \overrightarrow{BC} - \overrightarrow{CA} = \vec{0}$

(D) $\overrightarrow{AB} - \overrightarrow{CB} - \overrightarrow{CA} = \vec{0}$ [Ans :(b)]

11. Which of the following statements is not true?

(a) $(\hat{i} \times \hat{j}) \cdot \hat{k} + \hat{i} \cdot \hat{j} = 1$

(b) $(\hat{k} \times \hat{j}) \cdot \hat{i} + \hat{j} \cdot \hat{k} = 1$

(c) $(\hat{k} \times \hat{i}) \cdot \hat{j} + \hat{i} \cdot \hat{k} = 1$ [Ans :(b)]

3 -Marks Questions :

12. Find the sum of vectors :

$\vec{a} = \hat{i} - 2\hat{j} + \hat{k}$, $\vec{b} = -2\hat{i} - 4\hat{j} + 5\hat{k}$, $\vec{c} = \hat{i} - 6\hat{j} - 7\hat{k}$ [Ans :$-12\,\hat{j} - \hat{k}$]

13. If $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$, then find $|\vec{a}|$. [Ans : 3]

14. Find the vector joining the points P (2,3,0) and Q (-1, -2, -4), directed from P to Q. [Ans : $-3\hat{i} - 5\hat{j} - 4\hat{k}$]

15. Show that the vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $4\hat{i} + 6\hat{j} - 8\hat{k}$ are collinear.

16. Find the unit vector in the direction of the vector $\vec{a} = -\hat{i} + 2\hat{j} + 2\hat{k}$.

[Ans :$\frac{-1}{3}\hat{i} + \frac{2}{3}\hat{j} + \frac{2}{3}\hat{k}$]

17. Find the direction cosine of the vector given by $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$

Ans :$\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}} \frac{3}{\sqrt{14}}$]

18. Find the value of 'x' and 'y' if the two vectors $2\hat{i} + 3\hat{j}$ and $x\hat{i} + y\hat{j}$ are equal. [Ans : $x = 2, y = 3$]

19. Find the angle between vectors $\hat{i} - 2\hat{j} + 3\hat{k}$ and $3\hat{i} - 2\hat{j} + \hat{k}$.

[Ans : $\cos^{-1}(\frac{5}{7})$]

20. Show that the vectors $\vec{a} = 2\hat{i} + 3j$ and $\vec{b} = 4\hat{i} + 6\hat{j}$ are parallel**.**

21. Find $|\vec{a} \times \vec{b}|$ if $\vec{a} = 2\hat{i} + \hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} + 5\hat{j} + 2\hat{k}$. [Ans :$\sqrt{243}$]

22. Find the area of a parallogram if two adjacent sides of a parallogram are $\vec{a} = 3\hat{i} + \hat{j} + 4\hat{k}$ and $\vec{b} = \hat{i} - \hat{j} + \hat{k}$. [Ans : $\sqrt{42}$]

23. Find the value of : $(3\vec{a} - 5\vec{b}).(2\vec{a} + 7\vec{b})$.

24. Find the value of 'p' for which the vectors :

$3\hat{i} + 2\hat{j} + 9\hat{k}$ and $\hat{i} - 2p\hat{j} + 3\hat{k}$ are parallel. [Ans :$p = (-\frac{1}{3})$]

CHAPTER 11: THREE-DIMENSIONAL GEOMETRY

Fill in the blanks from following options:

$(1, a_1a_2 + b_1b_2 + c_1c_2 = 0, (\overrightarrow{a_2} - \overrightarrow{a_1}).(\overrightarrow{b_1} \times \overrightarrow{b_2}) = 0, \vec{r} = -\hat{\imath} + 2\hat{k} \pm \lambda(3\hat{\imath} + 4\hat{\jmath} + 6\hat{k}), \frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1, \left|\frac{(\overrightarrow{b_1} \times \overrightarrow{b_2}).(\overrightarrow{a_2} - \overrightarrow{a_1})}{|(\overrightarrow{b_1} \times \overrightarrow{b_2})|}\right|, < \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}} >)$

1. If <l,m,n> are direction cosines of a line, then $l^2+m^2+n^2$ = _____.

   Answer :1

2. The vector equation of a line passing through the points (-1,0,2) and (3,4,6) is _____. Answer : $\bar{r} = -\hat{\imath} + 2\hat{k} + \lambda(\hat{\imath} + \hat{\jmath} + \hat{k})$

3. The shortest distance between the lines $\vec{r} = \overrightarrow{a_1} + \lambda\overrightarrow{b_1}$ and $\vec{r} = \overrightarrow{a_2} + \mu\overrightarrow{b_2}$ is _____. Answer : $\left|\frac{(\overrightarrow{b_1} \times \overrightarrow{b_2}).(\overrightarrow{a_2} - \overrightarrow{a_1})}{|(\overrightarrow{b_1} \times \overrightarrow{b_2})|}\right|$

4. Direction cosines of a line which makes equal angles with co-ordinate axes are _____. Answer : $< \frac{\pm1}{\sqrt{3}}, \frac{\pm1}{\sqrt{3}}, \frac{\pm1}{\sqrt{3}}, >$

5. Two lines with direction ratios a_1,b_1,c_1 and a_2,b_2,c_2 are perpendicular if _____. Answer : $a_1a_2 + b_1b_2 + c_1c_2 = 0$

Multiple Choice Questions:

6. The direction ratios of a line joining the points A(2,3,-4) and B(1-2,3) are
   (a) <1,5,7> (b) <1,-5,7> (c) $|1, -5, -7|$ (d) < 1,5, -7 >

   Answer :(d)

7. The lines $\frac{x-5}{7} = \frac{y+2}{-5} = \frac{z}{1}$ and $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ are
   (a) Perpendicular (b) Parallel
   (c) Intersecting (d) None of these Answer : (a)

State as True/False:

8. The pair of lines given by $\vec{r} = 3\hat{\imath} + 2\hat{\jmath} - 4\hat{k} + \lambda(6\hat{\imath} + 4\hat{\jmath} - 8\hat{k})$ and $\vec{r} = -5\hat{\imath} + 7\hat{\jmath} - 4\hat{k} + \mu(3\hat{\imath} + 2\hat{\jmath} - 4\hat{k})$ are parallel . (T)

9. The equation of line passing through the point (1,2,3) and parallel to the vector $3\hat{\imath} + 2\hat{\jmath} - 4\hat{k}$ is $\vec{r} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k} + \mu(3\hat{\imath} + 2\hat{\jmath} - 4\hat{k})$ (F)

10. The angle between the lines passing through origin and direction ratios a_1,b_1,c_1 and a_2,b_2,c_2 is $\sin\theta = \frac{a_1a_2 + b_1b_2 + c_1c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2}\sqrt{a_2^2 + b_2^2 + c_2^2}}$ (F)

Match the following:

11. (i) Lines are perpendicular — (q) $a_1a_2 + b_1b_2 + c_1c_2 = 0$
    (ii) Lines are parallel — (r) $a_1 = ka_2$, $b_1 = kb_2$, $c_1 = kc_2$
    (p) $l^2+m^2+n^2 = 1$

    Answer (i) - (q), (ii)- (r)

12. (i) Equation of a line passing through one point and parallel to given vector
(ii) Equation of line passing through two vectors

(p) $\vec{r} = \vec{a} + \lambda(\vec{b} - \vec{a})$
(q) $\vec{r}.\hat{n} = d$
(r) $\vec{r} = \vec{a} + \lambda\vec{b}$

Answer (i) - (r), (ii)- (p)

13. (i) Shortest distance between two lines

(p) d
(q $\left|\frac{\hat{b} \times (\vec{a}_2 - \vec{a}_1)}{|b|}\right|$
(r) $\left|\frac{(\vec{a}_2 - \vec{a}_1).(\vec{b}_2 - \vec{b}_1)}{|\vec{b}_1 \times \vec{b}_2|}\right|$

Answer (i) - (r)

3- Marks Questions

14.Find the angle between the pair of lines given by $\vec{r}$ = $3\hat{\imath}+2\hat{\jmath}+4\hat{k}$ + $\lambda(\hat{\imath}+2\hat{\jmath}+2\hat{k})$ and

$\vec{r} = \hat{\imath} + \hat{\jmath} + \hat{k} + \mu\left(3\hat{\imath} + \hat{\jmath} + 2\hat{k}\right)$

15. Find the value of p so that the lines $\frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$ and $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$ are at right angles.

16. Show that the points A(2,3,-4),B(1,-2,3) and (3,8,-11) are collinear.

17.Find the shortest distance between the lines

$\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$and $\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1}$

18.Find the shortest distance between the lines

$r = \hat{\imath} + 2\hat{\jmath} + \hat{k} + \lambda(\hat{\imath} - \hat{\jmath} + \hat{k})$ $r = 2\hat{\imath} + 2\hat{\jmath} - \hat{k} + \mu(2\hat{\imath} + \hat{\jmath} + 2\hat{k})$

19. Find the angle between the lines :

$\vec{r} = 2\hat{\imath} - \hat{\jmath} - 4\hat{k} + \mu\left(\hat{\imath} + 3\hat{\jmath} - 7\hat{k}\right)$ and $\vec{r} = 5\hat{\imath} - 3\hat{\jmath} + 4\hat{k} + \lambda\left(\hat{\imath} + 3\hat{\jmath} - 7\hat{k}\right)$

20 Find the value of m so that the lines $\frac{2-6x}{m} = \frac{y+5}{-2} = \frac{7-z}{-5}$ and $\frac{9-x}{4} = \frac{3y-9}{3m} = \frac{z+10}{-7}$ are at right angles.

CHAPTER 12: LINEAR PROGRAMMING

Fill in the blanks from following options:

(Maxima and minima, optimal solution, linear programming problem, feasible region, constraints, unbounded, common, bounded)

1. The problems which seeks to maximize or minimize profit or loss is called_____.
   Ans : Liner programming problems.
2. The linear inequalities of a linear programming problem are called_____.
   Ans : Constraints .
3. The maximum or minimum value of linear function is called _____.
   Ans:optimal solution.
4. Feasible region is the _____region determined by all the constraints of a linear programming problem. **Ans:** common
5. The points within and on the boundary of a_____ represents feasible solution.
   Ans : feasible region
6. When the feasible region is bounded then Z _____.**Ans :** has maxima & minima.

State as true or false:

7. Subject to constraints $x+3y \leq 9$, $x \geq 0$, $y \geq 0$, maximum value of $z = x+2y$ is 9 (T)
8. Subject to constraints $2x+y \leq 4$, $x \geq 0$, $y \geq 0$, minimum value of $z = 2x+3y$ is 8 (F)
9. Subject to constraints $x+y \leq 4$, $x \geq 0$, $y \geq 0$, maximum value of $z = 3x+4y$ is 16 at the point (0,4) (T)
10. Minimum value of $z = 200x+500y$ subject to constraints $x+2y \geq 10$, $x \geq 0$, $y \geq 0$, is 2500. (F)
11. Subject to constraints $x+y \leq 50$, $x \geq 0$, $y \geq 0$, maximum value of $z = 4x+y$ is 200. (T)
12. When the feasible region is bounded, then Z has both maximum and minimum. (T)
13. Any point outside the feasible region is called an infeasible solution. (T)

Match the following:

14. (i) Max value of $z = x+y$ subject to constraints $x+y+2< 0$, $x \geq 0$, $y \geq 0$ is
    (ii) Max value of $z = 2x+3y$ subject to constraints $x+2y \leq 4$, $x \geq 0$, $y \geq 0$ is

    (p) 8
    (q) 3
    (r) Does not exist

    Ans [(i) - (r), (ii) - (p)]

15. (i) Minimum value of z = x+ysubject to constraints x+y+1< 0, x ≥ 0, y ≥ 0 is
(ii) Minimum value of z = 3x+2y subject to constraints 2x+y ≤ 8, x ≥ 0, y ≥ 0 is

(p) 12
(q) -1
(r) Does not exist

Ans [(i), - (r), (ii) - (p)]

16. (i) Maximum value of z = 2x+y sub constraints x+y≤ 3, x ≥ 0, y ≥ 0 is
(ii) Maximum value of z = x+3y subject to constraints x+y≤ 8, x ≥ 0, y ≥ 0 is

(p) 24
(q) 6
(r) 3

Ans :[(i) - (q), (ii) - (p)

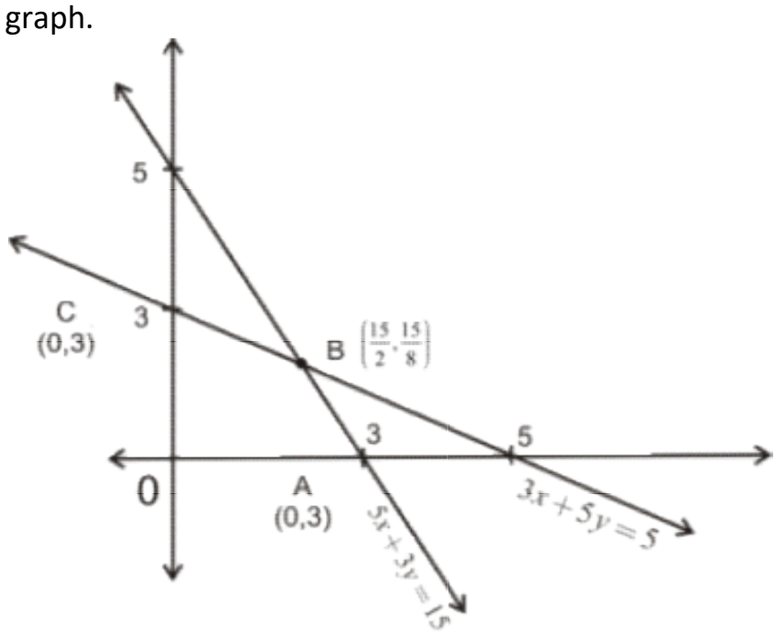
17. (i) Minimum value of z = x+2y subject to constraints x+y≤ 5, x ≥ 0, y ≥ 0 is
(ii) Minimum value of z = 3x+y subject to constraints x+y≤ 3, x ≥ 0, y ≥ 0 is

(p) 3
(q) 9
(r) 5

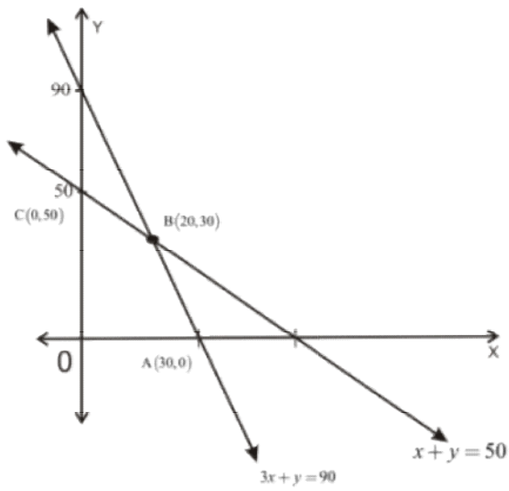
Ans :[(i) - (r) (ii) -(p)]

***4 -Marks Questions* :**

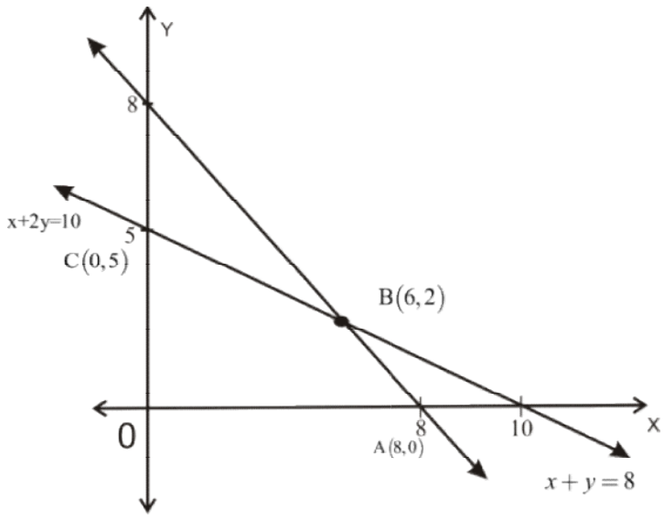
18. Shade the feasible region in the given figure subject to constraints $5x + 3y \leq 15, 3x + 5y \leq 15, x \geq 0, y \geq 0$ also maximize $z = 8x + 16y$ for the given graph.



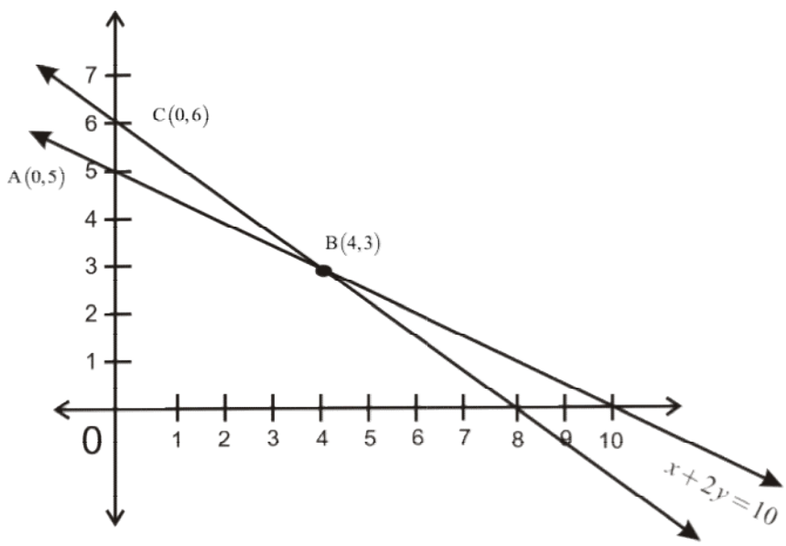
19. Maximize $z = 4x + y$ for the given graph subject to constraints $x + y \leq 50, 3x + y \leq 90, x \geq 0, y \geq 0$, Also shade the feasible region is given graph.



20. Minimize $z = 3x + 2y$ from your graph subject to constraints$x + y \leq 8, x + 2y \leq 10$, $x \geq 0$, $y \geq 0$



21. Shade the feasible region to the given figure subject to constraints$x + 2y \geq 10, 3x + 4y \leq 24$, $x \geq 0$, $y \geq 0$. Also minimize $z = 200x + 500y$.



CHAPTER 13: PROBABILITY

Fill in the blanks from following options:

(5/6 ½,$\Sigma x_i^2 p(x_i)$, impossible , 0.35, 0, not defined, sure, 0.65, 16/25)

1. If P (A) = 0.35, then P($\overline{A}$) _____. **Answer :** 0.65
2. P(A) = 1 is called _____ event. **Answer :** Sure
3. If a dice is tossed once, the probability of getting an even number is _____.
   Answer : $\frac{1}{2}$
4. If P (A) = ½, P(B) = 0 then P(A/B) is _____. **Answer:Not defined**
5. If P (A) =0.6, P(B) = 0.5 and P(A∩B) =0.32 then P(A/B) = _____. **Answer :** $\frac{16}{25}$
6. If A is an impossible event than P (A) =_____ **Answer :** 0

Multiple Choice Questions

7. Two cards are drawn from a well shuffled deck of 52 cards with replacement. The probability that both cards are queen is

   (a) $1/13 \times 1/13$ (b) 1/13 + 1/13 (c) $1/52 \times 1/52$ (d) 1/52 + 1/52

   Answer :(a)
8. If P(A) =3/5, P(B) = 1/5 and A and B are independent events the P (A and B) is

   (a) 1/3 (b) 25/3 (c) 1/12 (d) 3/25

   Answer : (d)
9. If A and B are events such that P(A/B) = P(B/A) then

   (a) $A \subset B$ but $A \neq B$ (b) A = B (c) $P(A \cap B) = \phi$ (d) P(A) = P(B)

   Answer : (d)
10. If P(A) = 6/11, P(B) = 5/11 and P(A∩B) =4/11 then P(A/B) is

    (a) 7/11 (b) 2/5 (c) 3/11 (d) 4/5

    Answer : (d)
11. A family has two children. The probability that both the children are boys given that at least one of them is a boy is

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

    Answer : (d) $\frac{1}{3}$

State as true or false:

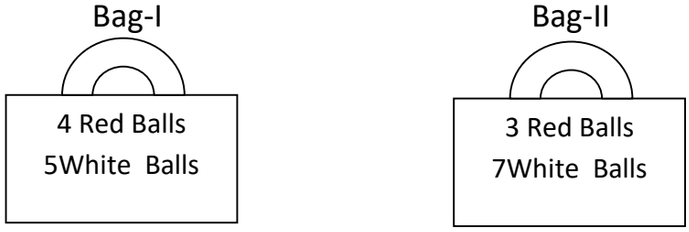
12. If P(A) =3/5, P(B) =3/10 and P(A∩B) = 1/5, then A and B are Independent (F)
13. If A and B are mutually exclusive events then they will be independent (F)
14. Two independent events are mutually exclusive (F)
15. If A and B are independent events then P(A∩B) = P(A) . P(B) (T)
16. If P(A) = 0.6 then P($\overline{A}$) = 0.6 (F)
17. P(A∪B) = P(A) + P(B) – P(A∩B) (T)
18. A coin is tossed six times, the probability of obtaining 4 heads is 15/64 (T)
19. If P(A) = 3/7, P(B) = 7/5, P(A∩B) = 3/5 then A and B are not independent (F)

3- Marks Questions

20. If A and B are independent events with P(A) = 0.3, P(B) = 0.4, find P(A∪B).
21. P($\overline{A}$) = 0.6, P(B) = 0.2, P(B/A) = 0.5, find P(A∩B)
22. P(A) = 0.4, P(B) = 0.8 and P(B/A) = 0.6 find P(A∩B)
23. Probability of solving specific problem independently by A and B are ½ and 1/3 respectively. If both try to solve the problem independently, find the probability that problem is solved.
24. If P(A) = 6/11, P(B) = 5/11 and P(A∪B) = 7/11 then find P(A∩B)
25. If A and B are two independent events and P(A) = ¼, P(B) = 1/3 find P(A∪B)
26. If A and B are two event such that $P(\bar{A}) = \frac{1}{5}$ and $P(A \cap B) = \frac{3}{5}$ then find (A/B) .
27. If A and B are two event such that $P(\bar{A}) = 0.5$ and $P(A \cap B) = 0.3$ then find (A/B) .
28. If A and B are two event such that $P(B\ ) = 0.6$ and $P(A \cap B) = 0.3$ then find (B/A) .
29. Probability of hitting a target independently by A and B are $\frac{4}{5}$ and $\frac{6}{7}$ respectively. If both try to hit the target independently, find the probability that only one of them hits the target.
30. Probability of solving specific problem independently by A and B are $3/7$ and $2/5$ respectively. If both try to solve the problem independently, find the probability that none of them solves the problem.

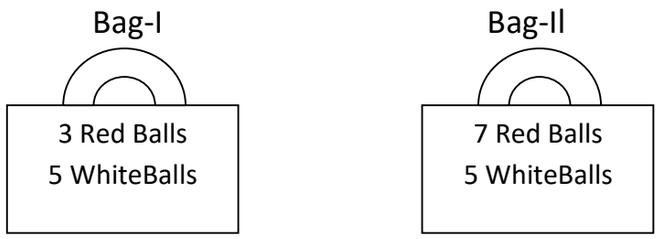
4- Marks Questions

31. Bag- I contain 4 red balls & 5 white balls and bag-II contains 3 red & 7 white balls as shown in figure. A bag is selected at random and a ball is drawn. Find the probability of getting a white ball.



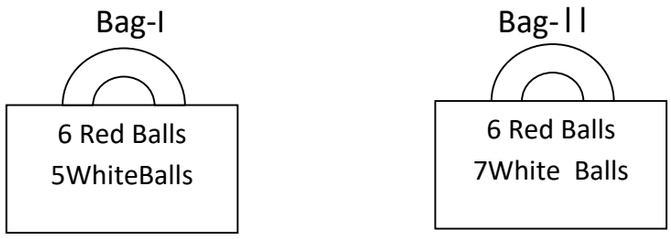
32. The probability of solving a problem by A, B and C are P(A) = 1/3, P(B) = ¼, P(C) = 1/5. What is the probability that at least one of them will solve the problem?
33. If A and B are two independent events such that P(A) = ½, P(B) = p and P(A∪B) = 3/5, find p.

34.There are two similar bags with red and white balls as shown :



One of the bags is chosen at random and a ball is drawn from it, which is found to be red. Find the probability that ball is drawn from bag I.

35There are two similar bags with red and white balls as shown :



If one of the bags is chosen at random and a ball is drawn from it then find that which ball has more chances of being drawn, red or white?