



GOVERNMENT OF KARNATAKA

**DEPARTMENT OF SCHOOL EDUCATION
(PRE-UNIVERSITY)
REVISED QUESTION BANK (2024-25)**

**SUBJECT: MATHEMATICS (35)
CLASS: FIRST YEAR PUC**

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CHAPTER-1 SETS

MCQ/ FB

1. Which of the following is not a sets
A) The collection of all the months of a year beginning with the letter J
B) The collection of all boys in your class.
C) The collection of ten most talented writers of India.
D) The collection of all natural numbers less than 100.
2. The set of intelligent students in a class is
A) A null set B) A singleton set C) A finite set D) Not a well defined collection
3. The set $\{x : x \text{ is a positive integer and } x^2 < 40\}$ in the roster form is
A) $\{1,2,3,4,5\}$ B) $\{1,4,9,16,25,36\}$ C) $\{49,64,81,100,\dots\}$ D) $\{1,2,3,4,5,6\}$
4. The set $A = \{1, 4, 9, 16, 25, \dots\}$ in set-builder form
A) $\{x : x = 2n-1, \text{ where } n \in \mathbb{N}\}$ B) $\{x : x = 3n-2, \text{ where } n \in \mathbb{N}\}$
C) $\{x : x = n^2, \text{ where } n \in \mathbb{N}\}$ D) $\{x : x = 2n, \text{ where } n \in \mathbb{N}\}$.
5. The set $\{x : x \text{ is a prime number which is divisor of } 60\}$ in the roster form is
A) $\{1,2,3,4,5,6,10,12,15,20,30,60\}$ B) $\{1,2, 3, 5\}$ C) $\{2,3,5\}$ D) $\{2, 3\}$.
6. The set $\{x : x \text{ is a letter of the word MATHEMATICS}\}$, in the roster form is
A) $\{M,A,T,H,E,M,A,T,I,C,S\}$ B) $\{M,A,T,H,E,I,C,S\}$
C) $\{H,E,M,A,T,I,S\}$ D) $\{H,E,M,A,T,I,C\}$.
7. The set $\{x : x \neq x\}$ represents
A) $\{0\}$ B) $\{\}$ C) $\{1\}$ D) $\{\emptyset\}$
8. Which of the following sets is not disjoint set.
A) $\{1,2,3\}$ and $\{x | x \in \mathbb{N}, x \geq 4 \text{ \& } x \leq 6\}$
B) $\{a, e, i, o, u\}$ and $\{c, d, g, f\}$
C) $\{x | x \text{ is an even integer}\}$ and $\{x | x \text{ is a odd integer}\}$
D) $\{x | x \text{ is a positive prime } \leq 10\}$ and $\{x | x \text{ is a positive even integer } \leq 10\}$.
9. If R is the set of real number and Q is the set of rational number then, $R - Q$ is
A) set of real number B) set of rational number
C) set of irrational number D) set of integer number.
10. If $A \subset B$ Then the number of elements in $A \cup B$ is equal to
A) $n(A)$ B) $n(B)$ C) $n(A) + n(B)$ D) $n(A) - n(B)$.
11. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1, 3, 5, 7, 9\}$ then the complement of set A is
A) $\{1, 3, 5, 7, 9\}$ B) $\{2,4,6,8,10\}$ C) $\{2,4,8\}$ D) $\{2,4,6,8\}$.
12. The number of non-empty subsets of the set $\{1, 2, 3, 4\}$ is
A) 14 B) 15 C) 16 D) 17.
13. If A and B be any two sets, then $(A \cap B)^c$ is equal to
A) $A^c \cap B^c$ B) $A^c \cup B^c$ C) $A \cap B$ D) $A \cup B$
14. Let A and B be two sets such that $A \cup B = A$. Then, $A \cap B$ is equal to
A) \emptyset B) B C) A D) none of these
15. Which of the following set is not empty set.
A) $\{x : 1 < x < 2, x \text{ is a natural number}\}$. B) $\{x : x^2 - 1 = 0 \text{ and } x \text{ is a natural number}\}$.
C) $\{x : x^2 = 4, x \text{ is odd}\}$ D) $\{x : x \text{ is an even prime number greater than } 2\}$
16. The $\{x | x \in \mathbb{R}, -5 < x \leq 7\}$ sets as intervals is
A) $(-5,7)$ B) $[-5,7]$ C) $\{-5,7\}$ D) $(-5,7]$.
17. The $\{x | x \in \mathbb{R}, 6 < x < 10\}$ sets as intervals is
A) $(6,10)$ B) $[6,10]$ C) $\{6,10\}$ D) $(6,10]$.

18. The $\{x|x \in R, x \leq 1\}$ sets as intervals is
 A) $(-\infty, 1)$ B) $[-\infty, 1]$ C) $[-\infty, 1)$ D) $(-\infty, 1]$.
19. The intervals $[-7, 12)$ sets
 A) $\{x|x \in R, -7 < x \leq 12\}$ B) $\{x|x \in R, -7 \leq x \leq 12\}$
 C) $\{x|x \in R, -7 < x < 12\}$ D) $\{x|x \in R, -7 \leq x < 12\}$.
20. The intervals $(3, 8)$ sets
 A) $\{x|x \in R, 3 < x \leq 8\}$ B) $\{x|x \in R, 3 \leq x \leq 8\}$
 C) $\{x|x \in R, 3 < x < 8\}$ D) $\{x|x \in R, 3 \leq x < 8\}$.
21. Which of the following set is an infinite set.
 A) $\{x : x \in N \text{ and } (x-1)(x-2) = 0\}$ B) $\{x : x \in N \text{ and } x^2 = 4\}$
 C) $\{x : x \in N \text{ and } 2x-1 = 0\}$ D) $\{x : x \in N \text{ and } x \text{ is prime}\}$
22. Which of the following statement is incorrect
 A) Every set is a subset of itself
 B) Null set is a subset of all sets.
 C) If $B \subset A$ and $B \neq A$, then B is called proper subset of A.
 D) If the set A contains n elements then the number of proper subsets is given by 2^n .
23. The number of proper subsets of the set $\{1, 2, 3\}$ is
 (A) 5 B) 6 C) 7 D) 8
24. Which is the following sets are not equal sets.
 A) $A = \{a, b, c, d\}$ and $B = \{c, a, b, d\}$ B) $A = \{1, 2, 3, 4\}$ and $B = \{1, 3, 2, 4\}$
 C) $A = \{2, 4, 6, 8, 10\}$, $B = \{x : x \text{ is positive even integer and } x \leq 10\}$
 D) $\{x|x \text{ is a positive prime } \leq 10\}$ and $\{1, 2, 3, 5, 7\}$.
25. The length of the intervals $(-5, 7]$
 (A) 10 (B) 12 (C) 11 (D) 2
26. Which of the following statement is correct statement.
 i) $A \cup A' = U$ ii) $\phi' \cap A = A$ iii) $U' \cap A = A$
 A) only i and ii B) only ii and iii C) only i D) all i, ii and iii.
27. Which of the following statement is incorrect
 A) $\{a, b\} \not\subset \{b, c, d\}$ B) $\{a, e\} \subset \{x : x \text{ is a vowel in the English alphabet}\}$
 C) $\{a\} \in \{a, b, c\}$ D) $\{a\} \subset \{a, b, c\}$.
28. Let $A = \{1, 2, \{3, 4\}, 5\}$. Which of the following statement is correct
 A) $\{3, 4\} \subset A$ B) $\{3, 4\} \in A$ C) $\{1, 2, 3\} \subset A$ D) $4 \in A$.
29. The number of sub set of a set $A = \phi$ is
 A) 1 B) 2 C) 0 D) 3.
30. If $X = \{a, b, c, d\}$ and $Y = \{f, b, d, g\}$, then $X - Y$ is
 A) $\{b, d\}$ B) $\{f, g\}$ C) $\{a, c\}$ D) $\{a, c, f, g\}$.
31. Which of the following statement is correct
 A) $\{2, 3, 4, 5\}$ and $\{3, 6\}$ are disjoint sets.
 B) $\{a, e, i, o, u\}$ and $\{a, b, c, d\}$ are disjoint sets.
 C) $\{2, 6, 10, 14\}$ and $\{3, 7, 11, 15\}$ are disjoint sets.
 D) $\{2, 6, 10\}$ and $\{2, 3, 7, 11\}$ are disjoint.
32. If $U = \{a, b, c, d, e, f, g, h\}$, then the complements of complements of the sets $\{a, b, c\}$
 A) $\{a, b, c\}$ B) $\{d, e, f, g, h\}$ C) $\{a, b, c, d, e, f, g, h\}$ D) $\{\dots\}$
33. Let A, B, and C be the sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$, then
 A) $B = C$ B) $A = C$ C) $A \cup B = A$ D) $A \cap B = A$
34. Which of the following example of the null set
 A) Set of odd natural numbers less than 3. B) Set of even prime numbers
 C) $\{x : x \text{ is a natural numbers, } x < 5 \text{ or } x > 7\}$
 D) $\{y : y \text{ is a point common to any two parallel lines}\}$.

50. **Statement I:** A set is defined as a well-defined collection of objects.

Statement II: A set can be a collection but a collection cannot be a set.

- (A) Both statements are true
- (B) Statement I is true and statement II is false
- (C) Statement I is false and statement II is true
- (D) Both statements are false.

51. **Statement I:** The set builder notation has a certain rule or a statement that specifically describes the common feature of all the elements of a set.

Statement II: A set of first five even natural numbers is $\{x : x \in N, x \leq 10 \text{ and } x \text{ is even}\}$

- (A) Statement 1 is true, and Statement 2 is false.
- (B) Statement 1 is true, and Statement 2 is true, Statement 2 is correct Explanation for Statement 1
- (C) Statement 1 is true, and Statement 2 is true, Statement 2 is not a correct Explanation for Statement 1
- (D) Statement 1 is false, and Statement 2 is false.

52. **Assertion (A):** The number of proper subsets of the set \emptyset is 0

Reason (R): If A is a proper subsets of B, then at least one element of B is not in A

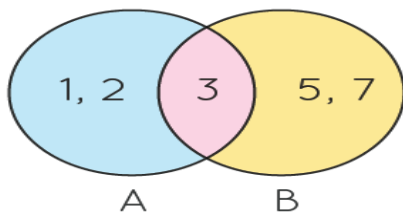
- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion A)
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

53. **Assertion (A):** If $A \cap B^c = \emptyset$, then $A = B$.

Reason (R): set A and B are disjoint, then $A \cap B = \emptyset$.

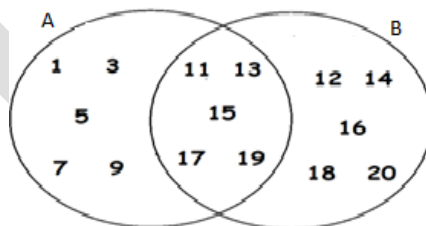
- A) A is false but R is true
- B) A is false and R is false.
- C) A is true but R is false
- D) A is true and R is true.

54. Representation of set using venn diagram



- (A) $A - B = \{5,7\}$
- (B) $B - A = \{1,2\}$
- (C) $A \cup B = \{1,2,5,7\}$
- (D) $A \cap B = \{3\}$.

55. For the figure given below, consider the following statements 1 and 2

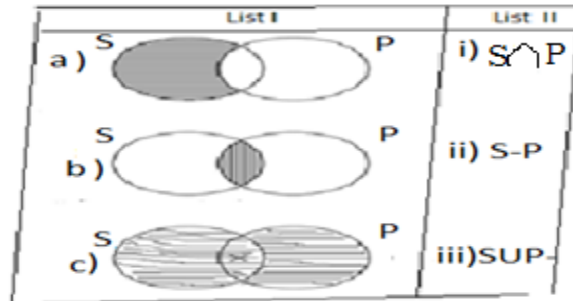


Statement 1: $(A - B) \cup (A \cap B) = \{1,3,5,7,9,11,13,15,17,19\}$

Statement 2: $A - B = A - (A \cap B)$

- A) Statement 1 is true and Statement 2 is false
- B) Statement 1 is false and Statement 2 is true
- C) Both Statement 1 and 2 are true
- D) Both Statement 1 and 2 are false

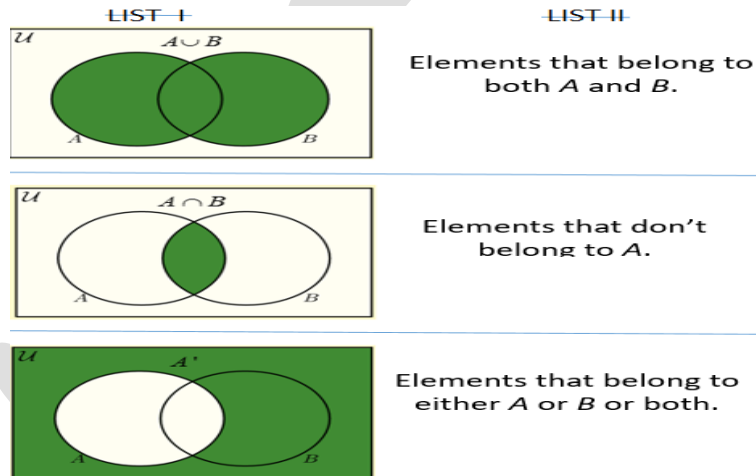
56. Match List I to List II



Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii B) a-iii, b-ii, c-i C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii

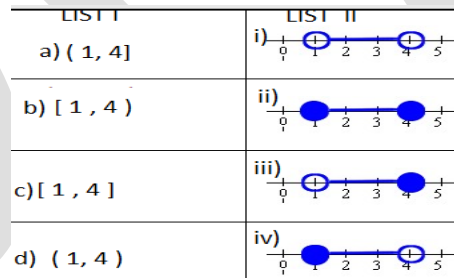
57. Match List I to List II



Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii B) a-iii, b-ii, c-i C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii

58. Match List I to List II



Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii, d-iv B) a-iii, b-iv, c-ii, d-i C) a-iii, b-iv, c-i, d-ii D) a-iii, b-iii, c-i, d-ii
59. The number of elements in set $\{x : x \text{ is a letter of word TRIGONOMETRY}\}$ is _____
60. If $U = \{a, b, c, d, e, f, g, h\}$, and $\{a, b, c\}$ then the number of elements in the complement of set A is _____
61. The number of elements in set $\{x : x \text{ is a positive integer and } x^2 < 50\}$ is _____
62. The number of elements in set $\{x : x \text{ is an integer and } x + 1 = 1\}$ is _____
63. The number of elements in set of all letters of the word BETTER is _____
64. The number of subsets of the set $\{a\}$ is _____
65. The number of improper subsets of the set \emptyset is _____

TWO MARKS QUESTIONS:

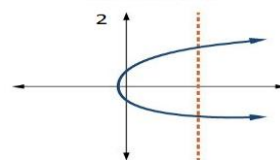
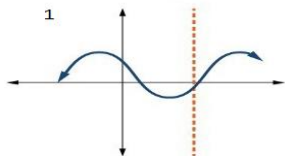
1. Write down all the subsets of the set $\{1,2,3\}$. (U)
2. Write the solution set of the equation $x^2 + x - 20 = 0$ in roster form. (U)
3. Let $A = \{1,2,3,4,5,6\}$, $B = \{2,4,6,8\}$. Find $A - B$ and $B - A$. (U)
4. Let $A = \{a, b\}$, $B = \{a, b, c\}$. Is $A \subset B$? What is $A \cup B$? (U)
5. If $A = \{3,5,7,9,11\}$, $B = \{7,9,11,13\}$ and $C = \{11,13,15\}$, find $A \cap (B \cup C)$. (U)
6. If $A = \{3,5,7,9,11\}$, $B = \{7,9,11,13\}$ and $C = \{15,17\}$, find $A \cap (B \cup C)$. (U)
7. If $A = \{3,6,9,12,15,18,21\}$ and $B = \{4,8,12,16,20\}$, find $A - B$ and $B - A$. (U)
8. If $A = \{3,6,9,12,15,18,21\}$ and $B = \{2,4,6,8,10,12,14,16\}$, find $A - B$ and $B - A$. (U)
9. If $A = \{3,6,9,12,15,18,21\}$ and $B = \{5,10,15,20\}$, find $A - B$ and $B - A$. (U)
10. If $A = \{2,4,6,8,10,12,14,16\}$ and $B = \{4,8,12,16,20\}$, find $A - B$ and $B - A$. (U)
11. If $A = \{4,8,12,16,20\}$ and $B = \{5,10,15,20\}$, find $A - B$ and $B - A$. (U)
12. If $A = \{2,4,6,8,10,12,14,16\}$ and $B = \{5,10,15,20\}$, find $A - B$ and $B - A$. (U)
13. If $X = \{a, b, c, d\}$ and $Y = \{b, d, g, f\}$ find $X - Y$ and $Y - X$. (U)
14. If $X = \{a, b, c, d\}$ and $Y = \{b, d, g, f\}$ find $X - Y$ and $X \cap Y$. (U)
15. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,4\}$ and $B = \{2,4,6,8\}$, find $(A \cup B)'$. (U)
16. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$, find $(A \cup B)'$. (U)
17. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$, find $(A - B)'$. (U)
18. If $A = \{3,5,7,9,11\}$, $B = \{7,9,11,13\}$, $C = \{11,13,15\}$ and $D = \{15,17\}$, find $(A \cap B) \cup (C \cup D)$. (U)
19. If $A = \{3,5,7,9,11\}$, $B = \{7,9,11,13\}$, $C = \{11,13,15\}$ and $D = \{15,17\}$, find $(A \cup B) \cap (C \cup D)$. (U)
20. Taking the set of natural numbers as the universal set, write the complements of the following sets:
 - i) $\{x: x \text{ is an odd natural number}\}$, ii) $\{x: x \text{ is a prime number}\}$. (U)
21. Taking the set of natural numbers as the universal set, write the complement of the following sets: i) $\{x: 2x + 5 = 9\}$, ii) $\{x: x \geq 7\}$. (U)
22. Draw the appropriate Venn diagram for $A' \cap B'$. (U)
23. Draw the appropriate Venn diagram for $(A \cap B)'$. (U)
24. Draw the appropriate Venn diagram for $A' \cup B'$. (U)
25. Draw the appropriate Venn Diagram for $(A \cup B)'$. (U)
26. List all the subsets of the set $\{-1,0,1\}$. (U)
27. Show that $A \cup B = A \cap B$ implies $A = B$. (S)
28. If $A = \{x: x \text{ is a natural number}\}$ and $B = \{x: x \text{ is an even natural number}\}$, find $A \cap B$. (U)
29. If $A = \{x: x \text{ is a natural number}\}$ and $B = \{x: x \text{ is an odd natural number}\}$, find $A \cap B$. (U)
30. If $A = \{x: x \text{ is a natural number}\}$ and $B = \{x: x \text{ is a prime number}\}$, find $A \cap B$. (U)
31. Find the union of the sets $A = \{x: x \text{ is a natural number } \wedge 1 < x \leq 6\}$ and $B = \{x: x \text{ is a natural number and } 6 < x < 10\}$. (U)
32. Find the intersection of the sets $A = \{x: x \text{ is a natural number and multiple of } 3\}$ and $B = \{x: x \text{ is a natural number less than } 6\}$. (U)
33. Find the intersection of the sets $A = \{x: x \text{ is a natural number and } 1 < x \leq 6\}$ and $B = \{x: x \text{ is a natural number and } 6 < x < 10\}$. (U)
34. Let $A = \{1,2,3,4,5,6,7,8,9,10\}$ and $B = \{2,3,5\}$. Find $A \cap B$. (U)
35. Find the union of the sets $X = \{1,3,5\}$ and $Y = \{1,2,3\}$. (U)
36. Find the union of the sets $A = \{a, e, i, o, u\}$ and $B = \{a, b, c\}$. (U)
37. Find the union of the sets $A = \{1,2,3\}$ and $B = \emptyset$. (U)
38. If A and B are two sets such that $A \subset B$, then what is $A \cup B$? (U)
39. If $A = \{1,2,3,4\}$, $B = \{3,4,5,6\}$ and $C = \{5,6,7,8\}$, find $A \cup B \cup C$. (U)
40. If $A = \{1,2,3,4\}$, $B = \{3,4,5,6\}$ and $C = \{7,8,9,10\}$ find $A \cup B \cup C$. (U)

THREE MARKS QUESTIONS:

1. Let $U = \{1,2,3,4,5,6\}$, $A = \{2,3\}$ and $B = \{3,4,5\}$. Show that $(A \cup B)' = A' \cap B'$. (U)
 2. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{2,4,6,8\}$ and $B = \{2,3,5,7\}$. Show that $(A \cup B)' = A' \cap B'$. (U)
 3. Let $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{2,4,6,8\}$ and $B = \{2,3,5,7\}$. Show that $(A \cap B)' = A' \cup B'$. (U)
 4. If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$, $C = \{11, 13, 15\}$ and $D = \{15, 17\}$;
find (i) $(A \cap B) \cap (B \cup C)$ (ii) $(A \cup D) \cap (B \cup C)$
-



20. The domain of the real functions $f(x) = \sqrt{x-1}$
 A) $(1, \infty)$ B) $(-\infty, 1)$ C) $[-\infty, 1]$ D) $[1, \infty)$.
21. The range of the real functions $f(x) = \sqrt{x-1}$
 A) $[0, \infty)$ B) $(-\infty, \infty)$ C) $(-\infty, 0)$ D) $[0, \infty]$.
22. The domain of the real functions $f(x) = |x-1|$
 A) $(-\infty, 0)$ B) $(-\infty, \infty)$ C) $(0, \infty)$ D) $[-\infty, \infty]$.
23. The range of the real functions $f(x) = |x-1|$
 A) $(0, \infty)$ B) $(-\infty, \infty)$ C) $[0, \infty)$ D) $[1, \infty]$.
24. The range of the real functions $f(x) = 2 - 3x, x > 0$ is
 A) $[-\infty, 2]$ B) $(-\infty, 2)$ C) $(2, \infty)$ D) $[2, \infty)$.
25. The range of the real functions $f(x) = 2 + x^2, x \in \mathbb{R}$ is
 A) $[-\infty, 2]$ B) $(-\infty, \infty)$ C) $(2, \infty)$ D) $[2, \infty)$.
26. The domain and range of signum function
 A) \mathbb{R} and $\{-1, 0, 1\}$ B) \mathbb{R} and \mathbb{Z} C) \mathbb{R} and \mathbb{Z}^+ D) \mathbb{R} and \mathbb{R}
27. The domain of the function f given by $f(x) = \frac{x^2+2x+1}{x^2-8x+12}$.
 A) $\mathbb{R} - \{6, -2\}$ B) $\mathbb{R} - \{2, 6\}$ C) $\mathbb{R} - [2, -6]$ D) $\mathbb{R} - (-2, 6)$
28. Let $A = \{9, 10, 11, 12, 13\}$ and let $f: A \rightarrow \mathbb{N}$ be defined by $f(n) =$ the highest prime factor of n . Find the range of f .
 (A) $\{3, 5, 11, 6, 13\}$ B) $\{2, 3, 11, 13\}$ C) $\{3, 5, 11, 6, 13\}$ D) $\{1, 13\}$.
29. Which of the following statement is false
 (A) If $P = \{m, n\}$ and $Q = \{n, m\}$, then $P \times Q = \{(m, n), (n, m)\}$.
 (B) If A and B are non-empty sets, then $A \times B$ is a non-empty set of ordered pairs (x, y) such that $x \in A$ and $y \in B$.
 (C) If $A = \{1, 2\}$, $B = \{3, 4\}$, then $A \times (B \cap \emptyset) = \emptyset$.
 (D) If A and B are non-empty sets and either A or B is an infinite set, then so is $A \times B$.
30. If the set A has 3 elements and the set $B = \{3, 4, 5\}$, then the number of elements in $(A \times B)$
31. Let $A = \{1, 2\}$ and $B = \{3, 4\}$. The number of relations from A to B is
32. If $P = \{1, 2\}$, then $n(P \times P \times P) =$
33. If the set A has 2 elements and the set $B = \{1, 3, 4, 5\}$, then the number of elements in $(A \times B)$ is
34. Let $A = \{1, 2\}$. The number of relations on A is
35. If $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 2, 3, 4, 5, 6, 7, 8\}$
Statement I: The relation $R = \{(1, 2), (2, 3), (3, 4), (4, 5), (5, 6), (5, 7)\}$ is a function.
Statement II: let $f: A \rightarrow B$ is a function, if every elements of A has one and only one elements of B
 (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.
36. From figure

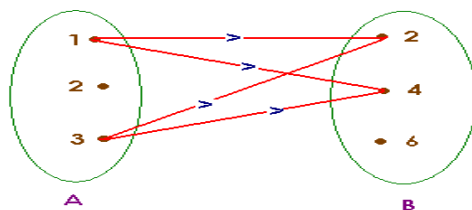


Statement I: Figure 1 is a function,

Statement II: Figure 2 is not a function

- (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true
 (D) Both statements are false.

37. From figure, relation R from A to B



Statement I: Domain of the relation $\{1, 2, 3\}$

Statement II: Range of the relation $\{2, 4\}$

- (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true
 (D) Both statements are false.

38. Figure 1

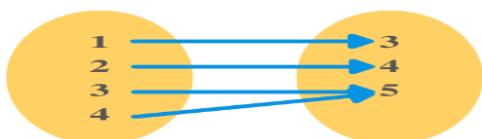
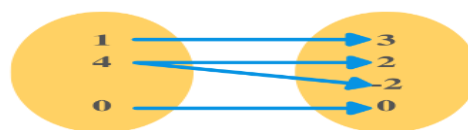


Figure 2



Statement I: Figure 1 is only a relation,

Statement II: Figure 2 is a function

- (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true
 (D) Both statements are false.

39. **Statement I:** The domain of a relation $R = \{(4,5), (4,4), (3,5), (3,4)\}$ is $\{3, 4\}$.

Statement II: The domain of a relation is the set of all first coordinates in the relation

- A) Statement 1 is true, and Statement 2 is false.
 B) Statement 1 is true, and Statement 2 is true, Statement 2 is correct Explanation for Statement 1
 C) Statement 1 is true, and Statement 2 is true, Statement 2 is not a correct Explanation for Statement 1
 D) Statement 1 is false, and Statement 2 is false.

40. **Assertion (A):** The relation $R = \{(1,2), (2,2), (3,2), (4,2), (5,2), (6,2)\}$ is a function.

Reason (R): A function is a relation such that no two ordered pairs have the same first coordinates and different second coordinates.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is *not* the correct explanation of the Assertion (A)
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true

41. Let $A = \{1, 2, 3, 4, 5\}$ and R be a relation from A to A, defined as $R = \{(x, y) : y = x + 1\}$. Then

1. The domain of the relation R is $\{1, 2, 3, 4, 5\}$
2. The co domain of the relation R is $\{1, 2, 3, 4, 5\}$
3. The range of the relation R is $\{2, 3, 4, 5, 6\}$

Which of the above statements are correct?

- (A) 1 only (B) 2 only (C) 3 only (D) All 1, 2 and 3.

42. Let $A = \{1, 2\}$ and $B = \{3, 4\}$.

1. $R = \{(1, 1), (1, 2), (1, 3), (1, 4)\}$ is a relation from A to B
2. $R = \{(1, 3), (1, 4)\}$ is a function from A to B
3. $R = \{(1, 3), (2, 3)\}$ is a relation and also a function from A to B

Which of the above statements are correct?

- (A) 1 only (B) 2 only (C) 3 only (D) All 1, 2 and 3.

43. Let $f(x) = x^2$ and $g(x) = \sqrt{x}$, then

1. $(f+g)(1) = 2$

2. $(g - f)(1) = 0$

3. $(gf)(1) = 1$

Which of the above statements are correct?

(A) 1 only

(B) 2 only

(C) 3 only

(D) All 1, 2 and 3.

44. **Statement I:** If $f(x) = x^2$ and $g(x) = x$ are two functions from \mathbb{R} to \mathbb{R} then $(f \div g)(2) = 2$.

Statement II: $(f+g)(x) = f(x) + g(x)$.

A) Statement 1 is true, and Statement 2 is false.

B) Statement 1 is true, and Statement 2 is true, Statement 2 is correct Explanation for Statement 1

C) Statement 1 is true, and Statement 2 is true, Statement 2 is not a correct Explanation for Statement 1

D) Statement 1 is false, and Statement 2 is false.

45. **Statement 1:** The domain of a relation R is the set of all first elements of the ordered pairs in a relation R.

Statement 2: The range of a relation R is the set of all second elements of the ordered pairs in a relation R.

A) Statement 1 is true and Statement 2 is false.

B) Statement 1 is true, and Statement 2 is true

C) Statement 1 is false, and Statement 2 is true.

D) Statement 1 is false, and Statement 2 is false.

46. **Statement 1:** A real function has a set of real numbers or one of its subsets both as to its domain and as its range.

Statement 2: Let $A = \{0, 1, 2, 3, 4, 5\}$ and let $f: A \rightarrow \mathbb{N}$ be defined by $f(x) = x+1$ is a real function

A) Statement 1 is true, and Statement 2 is false.

B) Statement 1 is true, and Statement 2 is true, Statement 1 is correct Explanation for Statement 2

C) Statement 1 is true, and Statement 2 is true, Statement 1 is not a correct Explanation for Statement 2

D) Statement 1 is false, and Statement 2 is false.

47. Figure 1

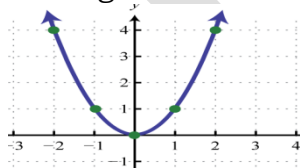
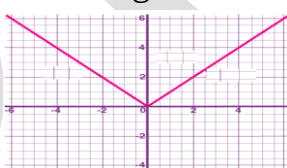


Figure 2



Statement I: Figure 1 is $f(x) = |x|$,

Statement II: Figure 2 is $f(x) = x^2$

(A) Both statements are true

(B) Statement I is true and statement II is false

(C) Statement I is false and statement II is true

(D) Both statements are false.

48. Figure 1

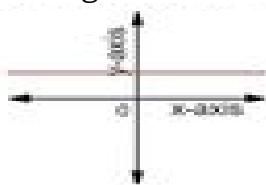
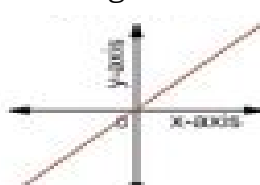


Figure 2



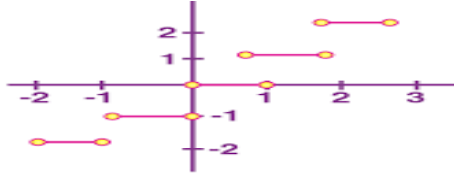
Statement I: Figure 1 is a constant function, **Statement II:** Figure 2 identity function.

(A) Both statements are true

(B) Statement I is true and statement II is false

(C) Statement I is false and statement II is true (D) Both statements are false.

49. From figure

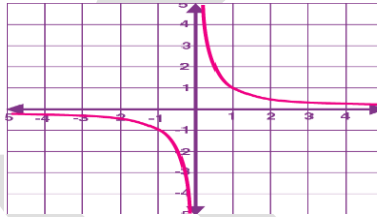


Statement I: Domain of the function is \mathbb{R} (Set of all real numbers)

Statement II: Range of the function is \mathbb{Z} (Set of all positive integers)

- (A) Both statements are true (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.

50. From figure



Statement I: Domain of the function is \mathbb{R} (Set of all real numbers)

Statement II: Range of the function is $\mathbb{R} - \{0\}$ (Set of all non zero real numbers)

- (A) Both statements are true (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.

TWO MARKS QUESTIONS:

- $A = \{1,2,3,5\}$ and $B = \{4,6,9\}$. Define a relation R from A to B by $R = \{(x, y) : \text{the difference between } x \text{ and } y \text{ is odd}; x \in A, y \in B\}$. Write R in roster form. (U)
- The function 't' which maps temperature in degree Celsius into temperature in degree Fahrenheit is defined by $t(C) = \frac{9C}{5} + 32$. Find the value of C , when $t(C) = 212$. (A)
- If $(x + 1, y - 2) = (3, 1)$, find the values of x and y . (U)
- If $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$. Find $A \times (B \cap C)$. (U)
- If $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$. Find $(A \times B) \cap (A \times C)$. (U)
- If $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$. Find $A \times (B \cup C)$. (U)
- If $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$. Find $(A \times B) \cup (A \times C)$. (U)
- If $P = \{1,2\}$, form the set $P \times P \times P$. (U)
- If $A \times B = \{(p, q), (p, r), (m, q), (m, r)\}$, find A and B . (U)
- If $(\frac{x}{3} + 1, y - \frac{2}{3}) = (\frac{5}{3}, \frac{1}{3})$, find the values of x and y . (U)
- If $G = \{7,8\}$ and $H = \{5,4,2\}$, find $G \times H$ and $H \times G$. (U)
- If $A = \{-1,1\}$, find $A \times A \times A$. (U)
- If $A \times B = \{(a, x), (a, y), (b, x), (b, y)\}$. Find A and B . (U)
- Let $A = \{1,2,3,4,5,6\}$. Define a relation R from A to A by $R = \{(x, y) : y = x + 1\}$. Write down the domain and range of R . (U)
- Write the relation $R = \{(x, x^3) : x \text{ is a prime number less than } 10\}$ in roster form. (U)
- Let $A = \{x, y, z\}$ and $B = \{1,2\}$. Find the number of relations from A to B . (S)
- State whether the relation $R = \{(2,2), (2,4), (3,3), (4,4)\}$ is a function or not. Justify your answer. (U)
- State whether the relation $R = \{(1,2), (2,3), (3,4), (4,5), (5,6), (6,7)\}$ is a function or not. Justify your answer. (U)
- State whether the relation $R = \{(1,3), (1,5), (2,5)\}$ is a function or not. Justify your answer (U)
- Find the domain and range of the function $f(x) = -|x|$ (U)
- Find the domain and range of the function $f(x) = \sqrt{9-x^2}$ (U)

22. The relation f is defined by $f(x) = \begin{cases} x^2, & 0 \leq x \leq 3 \\ 3x, & 3 \leq x \leq 10 \end{cases}$ The relation g is defined by $g(x) = \begin{cases} x^2, & 0 \leq x \leq 2 \\ 3x, & 2 \leq x \leq 10 \end{cases}$, Show that f is a function and g is not a function. (U)
23. If $f(x) = x^2$, find $\frac{f(1.1) - f(1)}{1.1 - 1}$ (U)
24. Find the domain and range of the function f defined by $f(x) = \sqrt{x-1}$ (U)
25. Find the domain and range of the function f defined by $f(x) = |x-1|$ (U)
26. Let $f = \{(1,1), (2,3), (0,-1), (-1,-3)\}$ be a function from Z to Z defined by $f(x) = ax + b$, for some integers a, b . Determine a, b . (U)
27. Let $A = \{9,10,11,12,13\}$ and let $f: A \rightarrow N$ be defined by $f(n) =$ the highest prime factor of n . Find the range of f . (U)
28. Let $A = \{1,2,3,4\}$, $B = \{1,5,9,11,15,16\}$ and $f = \{(1,5), (2,9), (3,1), (4,5), (2,11)\}$. Are the following are true?
 (i) f is a relation from A to B
 (ii) f is a function from A to B . Justify your answer in each case. (U)

THREE MARKS QUESTIONS:

- If $A = \{1,2\}$, $B = \{1,2,3,4\}$ and $C = \{5,6\}$. Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$. (U)
- If $P = \{a, b, c\}$ and $Q = \{r\}$, form the sets $P \times Q$ and $Q \times P$. Are these two products equal? (U)
- If $A = \{1,2\}$, $B = \{1,2,3,4\}$, $C = \{5,6\}$ and $D = \{5,6,7,8\}$. Verify that $A \times C$ is a subset of $B \times D$. (U)
- Let $A = \{1,2\}$ and $B = \{3,4\}$. Write $A \times B$. How many subsets will $A \times B$ have? List them. (U)
- The Cartesian product $A \times A$ has 9 elements among which are found $(-1, 0)$ and $(0, 1)$. Find the set A and the remaining elements of $A \times A$. (S)
- Let $A = \{1,2, \dots, 14\}$. Define a relation R from A to A by $R = \{(x, y): 3x - y = 0, \text{ where } x, y \in A\}$. Write down its domain, co domain and range. (U)
- Define a relation R on the set N of natural numbers by $R = \{(x, y): y = x + 5, x \text{ is a natural number less than } 4, x, y \in N\}$. Depict this relationship using roster form. (U)
- Write down the domain and range. Let $A = \{1,2,3,4,6\}$. Let R be the relation on A defined by $R = \{(a, b): a, b \in A, \text{ bisexactlydivisibleby } a\}$. (U)
- Write R in roster form. Find the domain and range of R . (U)
- Determine the domain and range of the relation R defined by $R = \{(x, x + 5): x \in \{0,1,2,3,4,5\}\}$ (U)
- Let R be the relation on Z defined by $R = \{(a, b): a, b \in Z, a - b \text{ is an integer}\}$. Find the domain and range of R . (U)
- Let N be the set of natural numbers and the relation R be defined on N such that $R = \{(x, y): y = 2x, x, y \in N\}$. (U)
- What is the domain and range of R ? Is this relation a function? (U)
- Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions. Find $(f + g)(x)$, $(f - g)(x)$, $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$. (U)
- Let $f(x) = \sqrt{x}$ and $g(x) = x$ be two real functions defined over the set of non-negative real numbers. Find $(f + g)(x)$, $(f - g)(x)$, $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$. (U)
- Is the relation $R = \{(2,1), (5,1), (8,1), (11,1), (14,1), (17,1)\}$ a function? Give reason. If it is a function determine its domain and range. (U)
- Is the relation $R =$ a function? Give reason. If it is a function determine its domain and range. (U)
- A function f is defined by $f(x) = 2x - 5$. Write down the values of (i) $f(0)$, (ii) $f(7)$, (iii) $f(3)$. (U)

19. The function 't' which maps temperature in degree Celsius into temperature in degree Fahrenheit is defined by $t(C) = \frac{9C}{5} + 32$. Find (i) $t(0)$, (ii) $t(28)$, (iii) $t(-10)$. (A)
20. Let R be a relation from Q to Q defined by $R = \{(a, b) : a, b \in Q \wedge a - b \in Z\}$. Show that
 (i) $(a, a) \in R$ for all $a \in Q$ (ii) $(a, b) \in R$ implies that $(b, a) \in R$
 (iii) $(a, b) \in R$ and $(b, c) \in R$ implies that $(a, c) \in R$ (U)
21. Let $f = \{(1,1), (2,3), (0, -1), (-1, -3)\}$ be a linear function from \mathbb{N} to \mathbb{Z} . Find $f(x)$. (A)
22. The function f defined by $f(x) = \begin{cases} 1-x, & x < 0 \\ 1, & x = 0 \\ x+1, & x > 0 \end{cases}$ Draw the graph of $f(x)$. (S)
23. Let $f, g: R \rightarrow R$ be defined, respectively by $f(x) = x + 1, g(x) = 2x - 3$.
 Find $(f + g)(x), (f - g)(x), (fg)(x)$ and $\left(\frac{f}{g}\right)(x)$. (U)
24. Let R be a relation from N to N defined by $R = \{(a, b) : a, b \in N \wedge a = b^2\}$. Are the following true?
 (i) $(a, a) \in R, \text{ for all } a \in N$ (ii) $(a, b) \in R, \text{ implies } (b, a) \in R$
 (iii) $(a, b) \in R \wedge (b, c) \in R \text{ implies } (a, c) \in R$. (S)

FIVE MARKS QUESTIONS:

1. Define Identity function. Draw the graph of it. Also write its domain and range. (S)
2. Define Signum function. Draw the graph of it. Also write its domain and range. (S)
3. Define Greatest integer function. Draw the graph of it. Also write its domain and range (S)
4. Define Constant function. If the function $f: R \rightarrow R$ is defined by $f(x) = 3$ for each $x \in R$, draw the graph of it. Also write its domain and range. (S)
5. Define Rational function. If the real valued function $f: R - \{0\} \rightarrow R$ defined by $f(x) = \frac{1}{x}$, draw the graph of it. Also write its domain and range. (S)
6. Define polynomial function. . If the function $f: R \rightarrow R$ is defined by $f(x) = x^2$, draw the graph of it. Also write its domain and range. (S)
7. Define Modulus function. Draw the graph of it. Also write its domain and range. (S)
8. Draw the graph of the function $f(x) = x^3$. Write its domain and range. (S)

CHAPTER-3

Trigonometric Functions

MCQ/ FB

1. Which of the following is incorrect
 (A) If in a circle of radius r , an arc of length l subtends an angle of θ radians, then $l = r\theta$
 (B) $x^\circ = \frac{\pi}{180}x$ in radian (C) $x^c = \frac{\pi}{180}x$ in degree. (D) 30 minutes = $\frac{\pi}{360}$ radian.
2. Which of the following is incorrect
 (A) 1 radian = $67^\circ 16'$ approximately (B) $1^\circ = 0.01746$ radian approximately.
 (C) π radian = 180° (D) $\theta^c = \frac{l}{r}$
3. $40^\circ 20'$ in radian measure
 (A) $\frac{221\pi}{540}$ (B) $\frac{2\pi}{9}$ (C) $\frac{4\pi}{9}$ (D) $\frac{121\pi}{540}$
4. 6 radians in degree measure approximately
 (A) 343° (B) 333° (C) 323° (D) 353°
5. $22^\circ 30'$ in radian measure
 (A) $\frac{\pi}{4}$ (B) $\frac{\pi}{9}$ (C) $\frac{\pi}{7}$ (D) $\frac{\pi}{8}$
6. $\frac{7\pi}{6}$ radians in degree measure
 (A) 420° (B) 210° (C) -150° (D) 240°
7. -4 radians in degree measure approximately
 (A) 228° (B) -228° (C) -118° (D) 118°
8. A wheel makes 60 revolutions in one minute. Then number of radians does it turn in one second?
 (A) π (B) 2π (C) 3π (D) $\frac{\pi}{3}$
9. Which of the following is incorrect
 (A) $\cos \pi = -1$ (B) $\sin \pi = 0$ (C) $\sin 3\pi/2 = -1$ (D) $\cos \pi/2 = 1$
10. Range of $f(x) = \sin x$ is
 (A) $(-\infty, \infty)$ (B) $R - [-1, 1]$ (C) $R - (-1, 1)$ (D) $[-1, 1]$
11. Domain of $f(x) = \sin x$ is
 (A) $(-\infty, \infty)$ (B) $R - \{n\pi : n \in Z\}$ (C) $R - \left\{\frac{(2n+1)\pi}{2} : n \in Z\right\}$ (D) $[-1, 1]$
12. Range of $f(x) = \cos x$ is
 (A) $(-\infty, \infty)$ (B) $R - [-1, 1]$ (C) $R - (-1, 1)$ (D) $[-1, 1]$
13. Domain of $f(x) = \cos x$ is
 (A) $(-\infty, \infty)$ (B) $R - \{n\pi : n \in Z\}$ (C) $R - \left\{\frac{(2n+1)\pi}{2} : n \in Z\right\}$ (D) $[-1, 1]$
14. Domain of tangent of x is
 (A) $(-\infty, \infty)$ (B) $R - \{n\pi : n \in Z\}$ (C) $R - \left\{\frac{(2n+1)\pi}{2} : n \in Z\right\}$ (D) $[-1, 1]$
15. Range of $f(x) = \tan x$ is
 (A) $(-\infty, \infty)$ (B) $R - [-1, 1]$ (C) $R - (-1, 1)$ (D) $[-1, 1]$
16. Range of $f(x) = \sec x$ is
 (A) $(-\infty, \infty)$ (B) $R - [-1, 1]$ (C) $R - (-1, 1)$ (D) $[-1, 1]$
17. Range of $f(x) = \operatorname{cosec} x$ is
 (A) $(-\infty, \infty)$ (B) $R - [-1, 1]$ (C) $R - (-1, 1)$ (D) $[-1, 1]$
18. Domain of $f(x) = \sec x$ of x is
 (A) $(-\infty, \infty)$ (B) $R - \{n\pi : n \in Z\}$ (C) $R - \left\{\frac{(2n+1)\pi}{2} : n \in Z\right\}$ (D) $[-1, 1]$
19. Domain of $f(x) = \operatorname{cosec} x$ of x is
 (A) $(-\infty, \infty)$ (B) $R - \{n\pi : n \in Z\}$ (C) $R - \left\{\frac{(2n+1)\pi}{2} : n \in Z\right\}$ (D) $[-1, 1]$

20. Which of the following is not correct?
 (A) $\sin\theta = \frac{-1}{5}$ (B) $\cos\theta = 1$ (C) $\sec\theta = \frac{1}{2}$ (D) $\tan\theta = 20$
21. Which of the following is not correct?
 (A) 4th quadrant sin function is increases from -1 to 0
 (B) 3rd quadrant cot function is increases from 0 to ∞
 (C) 2nd quadrant tan function is increases from $-\infty$ to 0
 (D) 1st quadrant cos function is decreases from 1 to 0.
22. If $\cos x = -\frac{3}{5}$ x lies in the third quadrant, then the values of $\sin x$ is
 (A) $-\frac{4}{5}$ (B) $-\frac{3}{4}$ (C) $\frac{3}{4}$ (D) $\frac{4}{5}$.
23. If $\cos x = -\frac{3}{5}$ x lies in the third quadrant, then the values of $\tan x$ is
 (A) $\frac{4}{3}$ (B) $-\frac{3}{4}$ (C) $\frac{3}{4}$ (D) $\frac{4}{3}$
24. If $\cos x = -\frac{3}{5}$ x lies in the third quadrant, then the values of $\operatorname{cosec} x$ is
 (A) $\frac{5}{4}$ (B) $-\frac{5}{4}$ (C) $\frac{5}{3}$ (D) $-\frac{5}{3}$
25. If $\cot x = \frac{3}{4}$ x lies in the third quadrant, then the values of $\cos x$ is
 (A) $-\frac{4}{5}$ (B) $\frac{4}{5}$ (C) $\frac{3}{5}$ (D) $-\frac{3}{5}$
26. If $\cot x = -\frac{5}{12}$ x lies in second quadrant, then the values of $\sec x$
 (A) $-\frac{13}{12}$ (B) $\frac{13}{5}$ (C) $\frac{13}{5}$ (D) $-\frac{13}{5}$
27. The value of $\sin\frac{31\pi}{3}$
 (A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{\sqrt{2}}$ (D) $-\frac{\sqrt{3}}{2}$
28. If $\tan\theta = -\frac{4}{3}$, then $\sin\theta$ is
 (A) $-\frac{4}{5}$ but not $\frac{4}{5}$ (B) $-\frac{4}{5}$ or $\frac{4}{5}$ (C) $\frac{4}{5}$ but not $-\frac{4}{5}$ (D) None of these
29. The value of $\cot\frac{15\pi}{4}$
 (A) -1 (B) 1 (C) $\frac{1}{\sqrt{2}}$ (D) $-\frac{1}{\sqrt{2}}$
29. $\sin(n+1)x\sin(n+2)x + \cos(n+1)x\cos(n+2)x$ is equal to
 (A) $\sin x$ (B) $\cos x$ (C) $\cos 2x$ (D) $\sin 2x$
30. If $\sin x = 0$, then
 (A) $x = n\pi$ (B) $x = 2n\pi$ (C) $x = (2n+1)\frac{\pi}{2}$ (D) $x = 0$
31. If $\cos x = 0$, then
 (A) $x = n\pi$ (B) $x = 2n\pi$ (C) $x = (2n+1)\frac{\pi}{2}$ (D) $x = 0$
32. The value of $\tan\frac{\pi}{8}$ is equal to
 (A) $\sqrt{2} + 1$ (B) $1 - \sqrt{2}$ (C) $\frac{1}{2}$ (D) $\frac{1}{\sqrt{2}+1}$
33. The value of $\cos\frac{\pi}{12}$ is
 (A) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (B) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (C) $\sqrt{2} + 1$ (D) $\sqrt{2} - 1$
34. If $\tan A = 1/2$ and $\tan B = 1/3$, then the value of $A + B$ is
 (A) $\pi/6$ (B) π (C) 0 (D) $\pi/4$
35. The value of $\sin\frac{\pi}{12}$ is
 (A) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (B) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (C) $\sqrt{2} + 1$ (D) $\sqrt{2} - 1$

36. $1 - \sin^2 45^\circ =$ _____
37. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 179^\circ$ is-----
38. If $y = \cos x$, then what is the maximum value of y IS -----
39. If $\cos(-t) = 0.34$, what is $\cos(t)$ IS -----
40. If $\tan x = 5$, then $\tan(2x) =$ -----
41. If $\cos t = 3/4$, and $\sin t < 0$, then $\sin(3t) =$ -----

42. **Statement I:** $\sin(n+1)x \sin(n+2)x + \cos(n+1)x \cos(n+2)x$ is equal to $\cos x$.

Statement II: $\sin x \cos y + \cos x \sin y = \sin(x+y)$

- (A) Both statements are true (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.
43. Match List I with List II

List I	List II
a) Domain of $\sin x$	i) $(-\infty, \infty) - \{n\pi : n \in \mathbb{Z}\}$
b) Domain of $\cot x$	ii) $[-1, 1]$
c) Range of $\cos x$	iii) $(-\infty, \infty)$

Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii B) a-iii, b-ii, c-I C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii
44. Match List I with List II

List I	List II
a) $\sin x$ is positive	i) II and IV quadrant
b) $\cot x$ is negative	ii) I and II quadrant
c) $\sec x$ is positive	iii) I and IV quadrant

Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii B) a-iii, b-ii, c-I C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii
45. Match List I with List II

List I	List II
a) $\sin\left(\pi - \frac{\pi}{4}\right)$	i) 2
b) $\operatorname{cosec}\left(\pi - \frac{\pi}{6}\right)$	ii) -2
c) $\sec\left(\pi - \frac{\pi}{3}\right)$	iii) $\frac{1}{\sqrt{2}}$

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii B) a-iii, b-ii, c-I C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii.
46. **Assertion (A):** If $\cos(-x) = 0.34$, then $\cos(x) = 0.34$.

Reason (R): $\cos(-x) = -\cos x$

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is *not* the correct explanation of the Assertion A)
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is false.

47. **Statement I:** $\sin \frac{\pi}{3} \sin \frac{\pi}{12} + \cos \frac{\pi}{3} \cos \frac{\pi}{12} = \frac{1}{\sqrt{2}}$.

Statement II: $\cos x \cos y + \sin x \sin y = \cos (x - y)$

- (A) Both statements I and II are true and Statement II is the correct explanation of the Statement I.
 (B) Statement I is true and statement II is true and Statement II is not the correct explanation of the Statement I.
 (C) Statement I is false and statement II is true (D) Both statements I and II are false.

48. **Statement I:** $3\sin \frac{\pi}{6} + 4\sin^3 \frac{\pi}{6} = 1$.

Statement II: $3\sin x + 4\sin^3 x = \sin 3x$.

- (A) Both statements I and II are true and Statement II is not the correct explanation of the Statement I.
 (B) Statement I is true and statement II is true and Statement II is the correct explanation of the Statement I.
 (C) Statement I is false and statement II is true (D) Both statements I and II are false.

49. **Statement 1.** $\sin \left(2\pi + \frac{\pi}{6} \right) = \frac{1}{2}$

Statement 2. $\cos \left(2\pi - \frac{\pi}{3} \right) = \frac{1}{2}$

- (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.

50. A point is in III- Quadrant and on the Unit Circle. If its x-coordinate is $-\frac{4}{5}$, then the y-coordinate of the point is

- (A) $\frac{3}{5}$ (B) $-\frac{3}{5}$ (C) $\frac{4}{5}$ (D) $-\frac{3}{4}$.

51. Find the point on the Unit Circle associated with the rotation $-\pi/2$.

- (A) (0,1) (B) [0, -1] (C) (-1,0) (D) [1,0].

52. If point (a , b) is on the Unit Circle associated with the rotation x.

1. $\sin x = b$ 2. $\cos x = a$ 3. $\cos(-x) = -a$

Which of the above statements are correct?

- (A) 1 and 2 but not 3 (B) 1 and 3 but not 3 (C) 3 only (D) All 1, 2 and 3.

53. If $\cos(-x) = 0.34$, then the value of $\cos(x)$ is

- (A) -0.34 (B) 0.66 (C) 0.34 (D) - 0.66

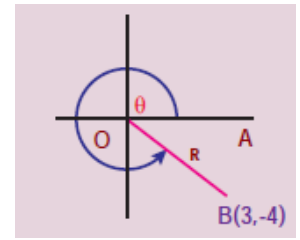
54. If $\cos x = \frac{4}{5}$, then the value of $\cos (2 x) =$

- A) $\frac{8}{25}$ B) $\frac{7}{25}$ C) $-\frac{7}{25}$ D) $\frac{24}{25}$

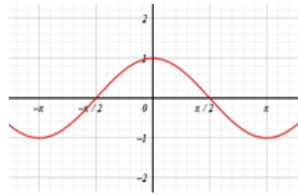
55. If $\sin x = \frac{3}{5}$, then the value of $\cos (2 x) =$

- A) $\frac{18}{25}$ B) $\frac{7}{25}$ C) $-\frac{7}{25}$ D) $\frac{24}{25}$

56. The terminal side of an angle θ in standard position passes through the point $(3, -4)$ as in the following figure, then $\sin\theta =$
- A) $-\frac{3}{4}$ (B) $\frac{3}{5}$ (C) $-\frac{4}{5}$ (D) $-\frac{3}{5}$



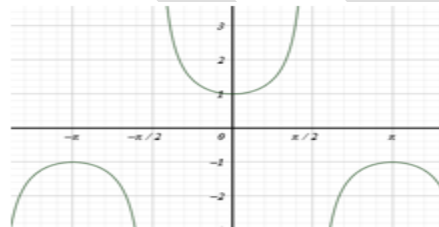
57. The graph drawn below depicts



- (A) sine function (B) cosine function (C) tan function (D) cot function .
58. The graph drawn below depicts



- (A) sine function (B) cosine function (C) tan function (D) cot function
59. The graph drawn below depicts



- (A) sine function (B) cosine function (C) sec function (D) cosec function
- 60.

Figure 1

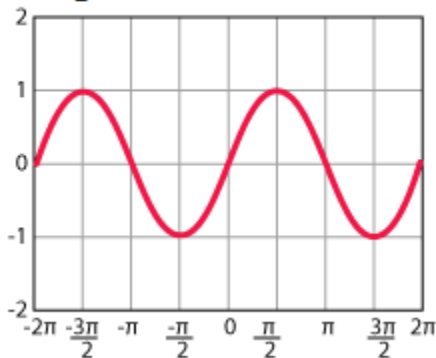
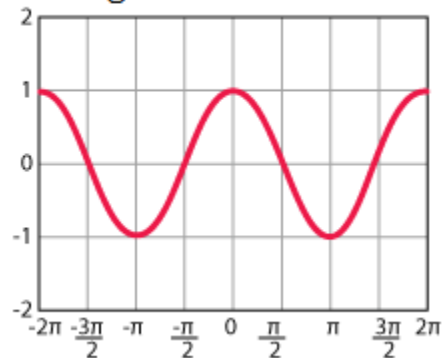


Figure 2



Statement I :Figure1 graph of $y = \cos x$

Statement II :Figure2 graph of $y = \sin x$

- (A) Both statements are true (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true (D) Both statements are false.

Two marks questions

1. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second. (U)
2. Find the degree measure of the angle subtended at the centre of a circle of radius 100 cm by an arc of length 22cm. (use $= \frac{22}{7}$) (U)
3. If in two circles, the arcs of the same length subtend angles 60° and 75° at the centre, find the ratio of their radii. (U)

4. A minute hand of watch is 1.5cm long. How far does its tip move in 40 minutes. (A)
5. Find the angle in radian through which a pendulum swings if its length 75cm and the tip describe an arc of length. (U)
6. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor arc of the chord.
7. Find the angle in radian through which a pendulum swings if its length 75cm and the tip describe an arc of length
(i) 10 cm (ii) 15 cm (iii) 21 cm
8. Convert radians into degree measure. (i) -4 radians (ii) 6 radians (iii) $\frac{11}{16}$ radians
9. Find the radian measure corresponding to the degree measure $40^\circ 20'$
10. Find the value of (i) $\sin 765^\circ$ (ii) $\operatorname{cosec}(-1410^\circ)$ (iii) $\cos(-1710^\circ)$
(iv) $\sin\left(\frac{31\pi}{3}\right)$ (v) $\tan\left(\frac{19\pi}{3}\right)$ (vi) $\sin\left(\frac{-11\pi}{3}\right)$ (vii) $\cot\left(\frac{-15\pi}{4}\right)$ (viii) Find the value of $\tan\frac{\pi}{8}$
11. Prove that $\cos^4\theta - \sin^4\theta = \cos 2\theta$. (A)
12. Prove that $\sqrt{2 + \sqrt{2 + 2\cos\theta}} = 2\cos\theta$. (S)
13. Prove the following:
- i)** $\sin 2x = \frac{2\tan x}{1 + \tan^2 x} (U)$ **(ii)** $\tan 2x = \frac{2\tan x}{1 - \tan^2 x} (U)$ **iii)** $\cos 2x = \frac{1 - \tan^2 x}{1 + \tan^2 x} (U)$
iv) $\sin 3x = 3\sin x - 4\sin^3 x (U)$ **v)** $\cos 3x = 4\cos^3 x - 3\cos x (U)$
vi) $\tan 3x = 3\tan x - \tan^3 x (U)$ **vii)** $\sin 2x = \frac{2\tan x}{1 + \tan^2 x} (U)$
viii) $\cot(x + y) = \frac{\cot x \cot y - 1}{\cot x + \cot y} (U)$ **ix)** $\cot(x + y) = \frac{\cot x \cot y + 1}{\cot y - \cot x} (U)$
14. Prove that (i) $3\sin\frac{\pi}{6}\sec\frac{\pi}{3} - 4\sin\frac{5\pi}{6}\cot\frac{\pi}{4} = 1$ (ii) $\sin^2\frac{\pi}{6} + \cos^2\frac{\pi}{3} - \tan^2\frac{\pi}{4} = \frac{-1}{2}$
(iii) $2\sin^2\frac{\pi}{6} + \operatorname{cosec}^2\frac{7\pi}{6}\cos^2\frac{\pi}{3} = \frac{3}{2}$ (iv) $\cot^2\frac{\pi}{6} + \operatorname{cosec}\frac{5\pi}{6} + 3\tan^2\frac{\pi}{6} = 6$
15. $2\sin^2\frac{3\pi}{4} + 2\cos^2\frac{\pi}{4} + 2\sec^2\frac{\pi}{3} = 10$
16. Find the value of (i) $\sin 15^\circ$ (ii) $\tan 15^\circ$ (iii) $\sin 75^\circ$
17. Prove that $\cos\left(\frac{\pi}{4} - x\right)\cos\left(\frac{\pi}{4} - y\right) - \sin\left(\frac{\pi}{4} - x\right)\sin\left(\frac{\pi}{4} - y\right) = \sin(x + y)$
18. Prove that $\frac{\cos(\pi + x)\cos(-x)}{\sin(\pi - x)\cos\left(\frac{\pi}{2} + x\right)} = \cot^2 x$
19. Prove that $\cos\left(\frac{3\pi}{2} + x\right)\cos(2\pi + x)\left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x)\right] = 1$
20. Prove that $\cos 4x = 1 - 8\sin^2 x \cos^2 x$

Three marks questions.

1. Prove the following:
- (i) $(\sin 3x + \sin x)\sin x + (\cos 3x - \cos x)\cos x = 0$
- (ii) Prove that $\sin 3x = 3\sin x - 4\sin^3 x$
- (iii) Prove that $\tan 3x = \frac{3\tan x - \tan^3 x}{1 - 3\tan^2 x}$
- (iv) Prove that $\cos 3x = 4\cos^3 x - 3\cos x$
- (v) Prove that $\frac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\frac{1 + \tan x}{1 - \tan x}\right)^2$
- (vi) Prove that $\cos\left(\frac{3\pi}{4} + x\right) - \cos\left(\frac{3\pi}{4} - x\right) = -\sqrt{2}\sin x$
- (vii) Prove that $\cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right) = \sqrt{2}\cos x$
- (viii) Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$
- (ix) Prove that $(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4\cos^2\left(\frac{x + y}{2}\right)$

(x) Prove that $(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4 \sin^2 \left(\frac{x-y}{2} \right)$

(xi) Prove that $\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$

(xii) Prove that $\sin 2x + 2 \sin 4x + \sin 6x = 4 \cos^2 x \sin 4x$

2. Prove the following:

(i) $\frac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$ (ii) $\frac{\sin x - \sin y}{\cos x + \cos y} = \tan \left(\frac{x-y}{2} \right)$ (U)

(iii) $\frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$ (iv) $\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$ (U)

(v) $\frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = -\frac{\sin 2x}{\cos 10x}$ (U)

3. Prove the following:

(i) $\frac{\sin A + \sin 2A + \sin 3A}{\cos A + \cos 2A + \cos 3A} = \tan 2A$ (A)

(ii) $\sin(A+B)\sin(A-B) = \sin^2 A - \sin^2 B$ (A)

(iii) $\cos(A+B)\cos(A-B) = \cos^2 A - \sin^2 B$ (A)

(iv) Prove that $\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1$

(v) Prove that $\tan 4x = \frac{4 \tan x - 4 \tan^3 x}{1 - 6 \tan^2 x + \tan^4 x}$.

(vi) Prove that $\cos^2 2x - \cos^2 6x = \sin 4x \sin 8x$.

(v) If $\sin x = \frac{3}{5}$ and $\cos y = -\frac{12}{13}$, where $\frac{\pi}{2} < x, y < \pi$ then find the value of $\sin(x+y)$

(vi) Prove that $\sin^2 6x - \sin^2 4x = \sin 2x \sin 10x$.

Five marks questions

1) Prove geometrically that $\cos(x+y) = \cos x \cos y - \sin x \sin y$.

2) If $\tan x = -\frac{4}{3}$ where x in quadrant II, then find the value of $\sin \frac{x}{2}, \cos \frac{x}{2}, \tan \frac{x}{2}$.

3) If $\sin x = \frac{1}{4}$, x in quadrant II, then find $\sin \frac{x}{2}, \cos \frac{x}{2}, \tan \frac{x}{2}$.

4) If $\cos x = -\frac{1}{3}$, x in quadrant III, then find $\sin \frac{x}{2}, \cos \frac{x}{2}, \tan \frac{x}{2}$.

5) If $\tan x = \frac{3}{4}$ where $\pi < x < \frac{3\pi}{2}$ then find the value of $\sin \frac{x}{2}, \cos \frac{x}{2}, \tan \frac{x}{2}$.

6) Prove that $\cot 4x(\sin 5x + \sin 3x) = \cot x(\sin 5x - \sin 3x)$

7) Prove that $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

8) Prove that $\frac{(\sin 7x + \sin 5x) + (\sin 9x + \sin 3x)}{(\cos 7x + \cos 5x) + (\cos 9x + \cos 3x)} = \tan 6x$

9) Prove that $\sin 3x + \sin 2x - \sin x = 4 \sin x \cos \frac{x}{2} \cos \frac{3x}{2}$

10) Prove that $\cos 2x \cos \frac{x}{2} - \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$

11) Prove that $\cos^2 x + \cos^2 \left(x + \frac{\pi}{3} \right) + \cos^2 \left(x - \frac{\pi}{3} \right) = \frac{3}{2}$.

12) Find If $\cos x = \frac{-3}{5}$, x lies in the third quadrant, find the values of other five trigonometric functions.

13) If $\cot x = \frac{-5}{12}$, x lies in second quadrant, find the values of other five trigonometric functions.

14) If $\cot x = \frac{3}{4}$, x lies in third quadrant, find the values of other five trigonometric functions.

15) If $\cos x = \frac{-1}{2}$, x lies in third quadrant, find the values of other five trigonometric functions.

16) If $\sin x = \frac{3}{5}$, x lies in second quadrant, find the values of other five trigonometric functions.

17) If $\sec x = \frac{13}{5}$, x lies in fourth quadrant, find the values of other five trigonometric functions.

CHAPTER-4

Complex numbers and Quadratic Equations

MCQ / FB

1. If $4x+i(3x-y) = 3 +i(-6)$, where x and y are real numbers, then the values of x .
 (A) $\frac{3}{4}$ (B) $\frac{4}{3}$ (C) $-\frac{3}{4}$ (D) $-\frac{4}{3}$
2. If $4x+i(3x-y) = 3 +i(-6)$, where x and y are real numbers, then the values of y .
 (A) $-\frac{39}{4}$ (B) $\frac{33}{4}$ (C) $\frac{39}{4}$ (D) $-\frac{33}{4}$
3. The additive inverse of $-2+3i$
 (A) $2-3i$ (B) $-2-3i$ (C) $2+3i$ (D) $-2+3i$
4. The multiplicative identity of $Z= a+ib$ is
 (A) $a-ib$ (B) $0+i0$ (C) $1+1i$ (D) $1+0i$
5. The multiplicative inverse of $2 - 3i$.
 (A) $\frac{2 - 3i}{13}$ (B) $\frac{2 + 3i}{\sqrt{13}}$ (C) $\frac{-2 - 3i}{\sqrt{13}}$ (D) $\frac{2 + 3i}{13}$
6. The multiplicative inverse of $-i$
 (A) i (B) $\frac{1+i}{\sqrt{2}}$ (C) $\frac{i}{\sqrt{2}}$ (D) $-i$
7. The multiplicative inverse of $4 - 3i$.
 (A) $\frac{4+3i}{25}$ (B) $\frac{4+3i}{\sqrt{25}}$ (C) $\frac{-4-3i}{25}$ (D) $\frac{-4+3i}{25}$
8. The multiplicative inverse of $\sqrt{5} + 3i$ is
 (A) $\frac{\sqrt{5}+3i}{14}$ (B) $\frac{\sqrt{5}-3i}{14}$ (C) $\frac{-\sqrt{5}+3i}{14}$ (D) $\frac{-\sqrt{5}-3i}{14}$
9. The conjugate of a complex number $-5-3i$
 (A) $5-3i$ (B) $-5+3i$ (C) $-5-3i$ (D) $5+3i$
10. The real numbers x , if $(x - 3i)(3 + 5i)$ is the conjugate of $-6 - 24i$
 (A) 6 (B) -7 (C) -6 (D) 7
11. If $\left(\frac{1+i}{1-i}\right)^n = 1$, then the smallest value of n
 (A) 2 (B) 3 (C) 4 (D) 6
12. The square roots of -1
 (A) 1, -1 (B) $-i$ (C) i (D) $i, -i$
13. The square roots of -3
 (A) 3, -3 (B) $\sqrt{3}, -\sqrt{3}$ (C) $\sqrt{3}i, -\sqrt{3}i$ (D) $\sqrt{3}i$
14. If $(5 - 3i)^3 = a + ib$, then $a =$
 (A) 125 (B) 10 (C) -10 (D) 25
15. The modulus of the complex number $-1+i\sqrt{3}$.
 (A) 2 (B) $\sqrt{2}$ (C) 4 (D) -2
16. Which of the following is incorrect for any two complex numbers z_1 and z_2
 (A) $|z_1 z_2| = |z_1| |z_2|$ (B) $\overline{z_1 z_2} = \overline{z_1} \overline{z_2}$ (C) $\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|}$ (D) $\sqrt{-1}\sqrt{-1} = 1$
17. The modulus of the complex number $\frac{1+i}{1-i}$
 (A) 2 (B) $\sqrt{2}$ (C) 1 (D) 3
18. The modulus of the complex number $\frac{1}{1+i}$
 (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$ (C) 1 (D) $\frac{1}{2}$
19. Simplest form $(1+i)^6$
 (A) $8i$ (B) $64i$ (C) $-8i$ (D) $-64i$

20. Which of the following is incorrect

- (A) $\sqrt{a} \sqrt{b} = \sqrt{ab}$ for all real numbers
- (B) if any of a and b is zero, then $\sqrt{a} \sqrt{b} = \sqrt{ab} = 0$
- (C) $\sqrt{a} \sqrt{b} \neq \sqrt{ab}$, if both a and b are negative real numbers
- (D) $\sqrt{a} \sqrt{b} = \sqrt{ab}$ for all positive real number a and b

21. If $z(5+i\sqrt{2}) = 1+i\sqrt{2}$, then z is

- (A) $3-6\sqrt{2}i$
- (B) $(3-6\sqrt{2}i)^{\frac{1}{27}}$
- (C) $(3-6\sqrt{2}i)^{\frac{1}{23}}$
- (D) $\frac{7+4\sqrt{2}i}{27}$

22. $i^1+i^2+i^3+i^4 =$

- (A) 2
- (B) 1
- (C) 0
- (D) -1.

23. If $\frac{a+ib}{a-ib} = x+iy$, then the value of x^2+y^2

- (A) a^2+b^2
- (B) 1
- (C) 0
- (D) -1.

24. Imaginary part of i^{-35} is

- (A) i
- (B) $-i$
- (C) 1
- (D) -1.

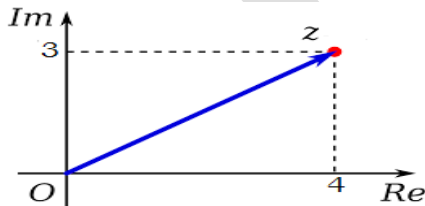
25. Simplest form of i^{-39} is

- (A) i
- (B) $-i$
- (C) 1
- (D) -1.

26. If $x-iy = \sqrt{\frac{a-ib}{c-id}}$ then $(x^2+y^2)^2$ is

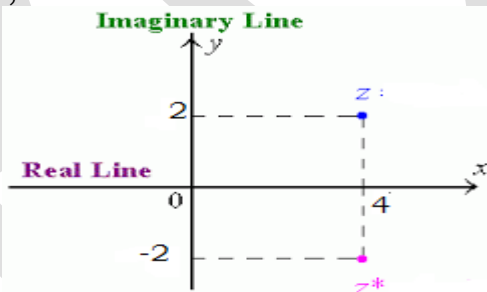
- (A) $\frac{a^2+b^2}{c^2+d^2}$
- (B) $\sqrt{\frac{a^2+b^2}{c^2+d^2}}$
- (C) 1
- (D) -1.

27. The graph drawn below depicts



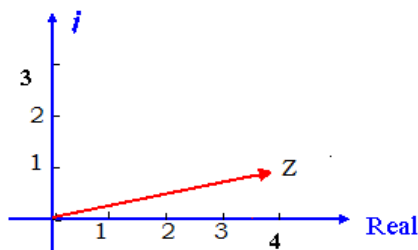
- (A) $Z = 3 + 4i$
- (B) $Z = 3 - 4i$
- (C) $Z = 4 + 3i$
- (D) $Z = 4 - 3i$

28. For the figure given below,



- (A) $Z^* = Z$
- (B) $Z^* = -Z$
- (C) $Z^* = \bar{Z}$
- (D) $Z^* = \frac{1}{Z}$

29. For the figure given below, $|z|$ is



- (A) 4
- (B) 1
- (C) $\sqrt{17}$
- (D) 17.

30. Match List I with List II

List I	List II
a) Additive inverse of $1+i$	i) $\frac{1}{1+i}$
b) conjugate of $1+i$	ii) $1-i$
c) multiplicative inverse of $1+i$	iii) $-1-i$

Choose the correct answer from the options given below:

- A) a-i, b-ii, c-iii B) a-iii, b-ii, c-i C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii

31. **Assertion (A):** The multiplicative inverse of $2 + 2i$ is $\frac{2+2i}{\sqrt{8}}$

Reason (R): The multiplicative inverse of Z is $\frac{\bar{Z}}{|Z|^2}$

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is *not* the correct explanation of the Assertion (A)
 (C) Assertion (A) is true and Reason (R) is false
 (D) Assertion (A) is false and Reason (R) is true

32. **STATEMENT 1:** The modulus of $3 - 4i$ is 5

STATEMENT 2: The modulus of $a + bi$ is $\sqrt{a^2 + b^2}$

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false
 (D) STATEMENT 1 is false and STATEMENT 1 is true

33. **STATEMENT 1:** The value of i (iota) is $(-1)^{1/2}$ **STATEMENT 2:** $i \cdot i = \sqrt{-1}\sqrt{-1} = 1$.

- (A) Both STATEMENT 1 and 2 are true (B) Both STATEMENT 1 and 2 are false.
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 1 is true.

34. **STATEMENT 1:** If $z = 3 + i$, then the real part of $\frac{1}{z}$ is $\frac{3}{10}$

STATEMENT 2: If $z = x + iy$, then $\frac{1}{z} = \frac{x-iy}{x^2+y^2}$.

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 1 is true.

35. **Assertion (A):** The value of $1 + i^2 + i^4 + i^6 + \dots + i^{20}$ is 0

Reason (R): $i^{2n} = \pm 1$. If n is multiple of 4, then $i^n = -1$ and n is not a multiple of 4 then $i^n = 1$

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is *not* the correct explanation of the Assertion (A)
 (C) Assertion (A) is false and Reason (R) is false
 (D) Assertion (A) is false and Reason (R) is true

36. If $\left(\frac{1+i}{1-i}\right)^{2n} = 1$, then the smallest positive value of n is = -----
37. If the complex number $z = x + iy$ satisfies the condition $|z| = 4$, represents a circle with centre (0, 0) and radius r is = -----
38. The value of i^{2025} is ki , then k is
39. If $z = x + iy$, then $\frac{|z|}{|\bar{z}|} = \dots\dots\dots$
40. $\left|\frac{2+i}{1-2i}\right| = \dots\dots\dots$
41. The positive smallest integer n, for which $(1+i)^{2n} = (i-i)^{2n}$ is = -----
42. If $5i\left(-\frac{3}{5}i\right) = a + ib$, then a =
43. If $z(2-i) = 3+i$, then z^2 is equal to a+ib then a =
44. If $4x + i(3x - y) = 3 + i(-6)$, where x and y are real numbers, then $x^2 + y^2 = \dots\dots\dots$
45. 1. If $\sqrt{a+ib} = x - iy$, then $\sqrt{a-ib} = x + iy$.
 2. $|x + iy| = |x - iy|$. 3. If $|z| = 0$, then $z = 0 + i0$.

Which of the above statements are correct?
 (A) 1 only (B) 2 only (C) 3 only (D) All 1, 2 and 3.

46. If $z = x+iy$, then match List I with List II

List I	List II
a) $z \bar{z}$	i) $x^2 + y^2$
b) $z - \bar{z}$	ii) $2x$
c) $z + \bar{z}$	iii) $i2y$

Choose the correct answer from the options given below:
 A) a-i, b-ii, c-iii B) a-iii, b-ii, c-i C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii.

47. If $z_i = x_i + iy_i$, then match List I with List II

List I	List II
a) $z_1 z_2$	i) $(x_1 - x_2) + i(y_1 - y_2)$
b) $z_1 + z_2$	ii) $(x_1 x_2 - y_1 y_2) + i(x_1 y_2 + y_1 x_2)$
c) $z_1 - z_2$	iii) $(x_1 + x_2) + i(y_1 + y_2)$

Choose the correct answer from the options given below:
 A) a-ii, b-iii, c-i B) a-iii, b-ii, c-i C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii

Two Marks Questions

1. Express the following in the form of a + ib

- 1) $\frac{5+\sqrt{2}i}{1-\sqrt{2}i}$ (U) 2) $(5-3i)^3$ (U) 3) $(1-i)^4$ (U)
- 4) $\left(\frac{1}{3}+3i\right)^3$ (U) 5) $\left(-2-\frac{1}{3}i\right)^3$ (U) 6) $\left[i^{18} + \left(\frac{1}{i}\right)^{25}\right]^3$ (A)
- 7) $\frac{(3+i\sqrt{5})(3-i\sqrt{5})}{(\sqrt{3}+\sqrt{2}i)-(\sqrt{3}-i\sqrt{2})}$ (A) 8) $(-\sqrt{3}+\sqrt{-2})(2\sqrt{3}-i)$ (U)

2. Simplify

$$1) (-5i) \left(\frac{1}{8}i \right) \quad (U) \qquad 2) (-i)(2i) \left(\frac{-1}{8}i \right)^3 \quad (U)$$

$$3) (5i) \left(\frac{-3}{5}i \right) \quad (U) \qquad 4) i^9 + i^{19} \quad (U)$$

$$5) i^{-39} \quad (U) \qquad 6) 3(7+i7) + i(7+i7) \quad (U)$$

$$7) (1-i) - (-1+i6) \quad (K) \qquad 8) i^{-35} \quad (K)$$

3. Find the multiplicative inverse of each of the following complex numbers

$$1). 2-3i \quad (U) \quad 2). 4-3i \quad (U) \quad 5). \frac{1+i}{1-i} \quad (A) \quad 6). \frac{2+3i}{3+4i} \quad (A)$$

$$3). \sqrt{5}+3i \quad (U) \quad 4). -i \quad (U)$$

4. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then find the least positive integral value of m

Three Marks Questions

1. If $4x + i(3x - y) = 3 + i(-6)$, where x and y are real numbers, then find the values of x and y (U)

2. Find the real numbers x and y if $(x - iy)(3 + 5i)$ is the conjugate of $-6 - 24i$. (U)

3. If $x - iy = \sqrt{\frac{a-ib}{c-id}}$ prove that $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$ (U)

4. If $x + iy = \frac{a+ib}{a-ib}$, prove that $x^2 + y^2 = 1$ (U)

5. If $a+ib = \frac{(x+i)^2}{2x^2+1}$, prove that $a^2 + b^2 = \frac{(x^2+1)^2}{(2x^2+1)^2}$ (S)

6. If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$ (S)

7. Find real θ such that $\frac{3-2i \sin \theta}{1-2i \sin \theta}$ is purely real (S)

8. Find the conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$, (S)

9. If $Z_1 = 2 - i$, $Z_2 = 1 + i$ then find $\left| \frac{Z_1+Z_2+1}{Z_1-Z_2+1} \right|$ (S)

10. Let $z_1 = 2 - i$, $z_2 = -2 + i$ find $\operatorname{Re}\left(\frac{z_1 z_2}{\bar{z}_1}\right)$ (S)

11. If $(a + i b) (c + i d) (e + i f) (g + i h) = A + i B$
then show that $(a^2 + b^2) (c^2 + d^2) (e^2 + f^2) (g^2 + h^2) = A^2 + B^2$ (U)

12. Express $\frac{(3+i\sqrt{5})(3-i\sqrt{5})}{(\sqrt{3}+i\sqrt{2})-(\sqrt{3}-i\sqrt{2})}$ in a+ib form

13. Evaluate $\left[i^{18} + \left(\frac{1}{i} \right)^{25} \right]^3$

14. Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i} \right) \left(\frac{3-4i}{5+i} \right)$ to the standard form.

15. Find the real numbers x and y if $(x - iy)(3 + 5i)$ is the conjugate of $-6 - 24i$

16. Find the number of non-zero integral solutions of the equation $|1-i|^x = 2^x$

CHAPTER-5 LINEAR INEQUALITIES

MCQ / FB

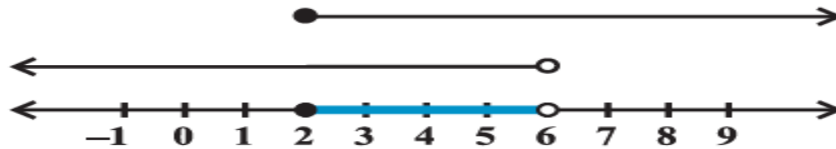
1. Which of the following is incorrect statement
 A) $7 > 5$ is examples of *numerical inequalities*.
 B) $y \leq 4$ is examples of *literal inequalities*
 C) $3 < x < 5$ is examples of *double inequalities*.
 D) $ax + b < 0$ is example of *slack inequalities*.
2. Which of the following is incorrect statement
 A) $ax + by \leq c$ is *slack inequalities*.
 B) $ax + by > c$ is *slack inequalities*.
 C) $ax^2 + bx + c \leq 0$ is *slack inequalities*.
 D) $ax + by \geq c$ is *slack inequalities*.
3. Which of the following is incorrect statement, if $a \leq b$
 A) $a + k \leq b + k$, if $k \in R$
 B) $a - k \leq b - k$, if $k \in R$
 C) $ak \leq bk$ if $k > 0$
 D) $a/k \leq b/k$, if $k \neq 0$.
4. Which of the following is incorrect statement, if $a \leq b$
 A) $ak \leq bk$, if $k > 0$
 B) $ak \geq bk$, if $k < 0$
 C) $ak \leq bk$ if $k < 0$
 D) $a/k \geq b/k$, if $k < 0$
5. The set of solution of the inequality $24x < 100$, when x is a natural number
 A) $\{0,1,2,3,4,5\}$.
 B) $\{1,2,3,4,5\}$
 C) $\{1,2,3,4\}$
 D) $\{5,6,7 \dots \dots\}$.
6. The number of solutions of the inequality $24x < 100$, when x is a natural number
 A) 6
 B) 5
 C) 4.
 D) 3.
7. The set of solution of the inequality $30x < 200$ when x is an integer.
 A) $\{0,1,2,3,4,5,6\}$
 B) $\{1,2,3,4,5,6\}$
 C) $\{\dots\dots-2,-1,0,1,2,3,4,5,6\}$.
 D) $\{\dots\dots-2,-1,0,1,2,3,4,5,6,\dots\dots\}$.
8. The solution of the inequality $x < 0$ for real x .
 A) $(-\infty, 0]$.
 B) $[0, \infty)$
 C) $(-\infty, 0)$
 D) $(0, \infty)$.
9. The solution of the inequality $x \leq 0$ for real x .
 A) $(-\infty, 0]$.
 B) $[0, \infty)$
 C) $(-\infty, 0)$
 D) $(0, \infty)$.
10. The solution of the inequality $x \geq 0$ for real x .
 A) $(-\infty, 0]$.
 B) $[0, \infty)$
 C) $(-\infty, 0)$
 D) $(0, \infty)$.
11. The solution of the inequality $x > 0$ for real x .
 A) $(-\infty, 0]$.
 B) $[0, \infty)$
 C) $(-\infty, 0)$
 D) $(0, \infty)$.
12. The solution of the inequality $-1 < x < 1$ for real x .
 A) $[-1, 1]$.
 B) $(-\infty, -1] \cup [1, \infty)$
 C) $(-1, 1)$
 D) $(-\infty, -1) \cup (1, \infty)$.
13. The solution of the inequality $-1 \geq x$ and $x \geq 1$ for real x .
 A) $[-1, 1]$.
 B) $(-\infty, -1] \cup [1, \infty)$
 C) $(-1, 1)$
 D) $(-\infty, -1) \cup (1, \infty)$.
14. The set of solution of the inequality $4x + 3 < 6x + 7$, when x is real number
 A) $\{-2, -1, 0, 1, 2, 3, 4, 5, 6 \dots \dots\}$.
 B) $\{\dots \dots -4, -3, -2\}$
 C) $(-\infty, -2)$
 D) $(-2, \infty)$.
15. The set of solution of the inequality $4x + 3 < 6x + 7$, when x is real number
 A) $[-\infty, -2]$.
 B) $\{\dots \dots -4, -3, -2\}$
 C) $(-\infty, -2)$
 D) $(-2, \infty)$.
16. The solution of the inequality $3(x - 1) \leq 2(x - 3)$ for real x .
 A) $(-\infty, -3]$.
 B) $[-3, \infty)$
 C) $(-\infty, -3)$
 D) $(-3, \infty)$.
17. The solution of the inequality $3(2 - x) \geq 2(1 - x)$ for real x .
 A) $(-\infty, 4]$.
 B) $[-4, \infty)$
 C) $(-\infty, -4)$
 D) $(-4, \infty)$.
18. The solution of the inequality $x + \frac{x}{2} + \frac{x}{3} < 11$ for real x .
 A) $(-\infty, 6]$.
 B) $[6, \infty)$
 C) $(-\infty, 6)$
 D) $(6, \infty)$.

19. The solution of



- A) $(-\infty, 0]$. B) $[-\infty, 3)$ C) $(-4, 3)$ D) $(-\infty, 3)$.

20. For the figure given below, consider the following statements 1,2 and 3



Statement 1: The solution of the inequality $2 \leq x < 6$ for real x .

Statement 2: solution of the inequality $2 \leq x < \infty$ for real x .

Statement 3: solution of the inequality $-\infty < x \leq 6$ for real x .

- A) Statement 1 is true and Statement 2 and 3 are false
 B) Statement 1 and 3 are true but Statement 2 is false
 C) Statement 2 and 3 are true but Statement 1 is false
 D) All the Statements 1 ,2 and 3 are true.
21. If $7x + 3 < 5x + 9$. then the graph of the solutions on number line is

A)



B)



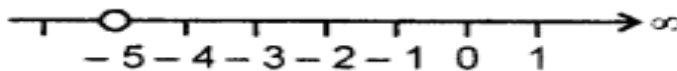
C)



D)

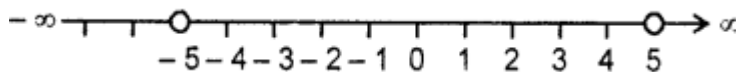


22. For the graph given below solution set for the real line



- A) $(-5, \infty)$. B) $[-5, \infty)$ C) $(-\infty, -5)$ D) $(-5, 1)$.

23. For the graph given below solution set for the real line



- A) $(-\infty, 5)$ B) $[-\infty, 5)$ C) $(-5, 5)$ D) $(-\infty, -5)$.

24. The solution of $-8 \leq 5x - 3 < 7$ is

- A) $-1 \leq x < 2$. B) $-1 < x < 2$ C) $-1 \leq x \leq 2$ D) $-1 < x \leq 2$

25. The number of pairs of consecutive odd natural numbers, both of which are Larger than 10, such that their sum is less than 40.

- A) 1. B) 2 C) 3 D) 4.

26. The number of pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.
 A) 1. B) 2 C) 3 D) 4.
27. Ravi obtained 70 and 75 marks in first two unit test. Find the minimum marks he should get in the third test to have an average of at least 60 marks.
 A) 30 B) 35 C) 40 D) 45.
28. The solution of $|x| < 1$ for real x.
 A) $[-1, 1]$. B) $(-\infty, -1] \cup [1, \infty)$ C) $(-1, 1)$ D) $(-\infty, -1) \cup (1, \infty)$.
29. The solution of $|x| > 1$ for real x.
 A) $[-1, 1]$. B) $(-\infty, -1] \cup [1, \infty)$ C) $(-1, 1)$ D) $(-\infty, -1) \cup (1, \infty)$.
30. The solution of $|x - 1| \leq 1$ for real x.
 A) $[0, 1]$. B) $[0, 2]$ C) $(0, 2)$ D) $(-2, 0)$.
31. **Statement 1:** The solution of $\frac{x-1}{4} \geq 3$, for real x is $[13, \infty)$
Statement 2: If $a \leq b$, then $ak \leq bk$ if $k > 0$
 A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is true and Statement 2 is true, Statement 2 is correct explanation for Statement 1
 C) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
 D) Statement 1 is false and Statement 2 is false.
32. **Assertion (A):** Solution of the system of inequalities $4x - 12 \geq 0$ and $2x - 7 \leq 5$ is $[3, 6]$.
Reason (R): If $4x - 12 \geq 0$ and $2x - 7 \leq 5$, then $x \geq 3$ and $x \leq 6$.
 A) A is false but R is true B) A is false and R is false
 C) A is true but R is false D) A is false and R is false
33. **Statement 1 :** Solution of linear inequality $-3x + 15 < -12$ is $x \in (-\infty, 9)$.
Statement 2 : If $a \leq b$, then $ak \geq bk$ if $k < 0$
 A) Statement 1 is true, and Statement 2 is false.
 B) Statement 1 is false, and Statement 2 is true.
 C) Statement 1 is true, and Statement 2 is true
 D) Statement 1 is false, and Statement 2 is false
34. Number of solutions of the inequality $5x + 3 < 18$, when x is a natural number is
35. Number of solutions of the inequality $-2 \leq 5x + 3 < 7$ is, when x is a natural number is
36. If $4x + 4 < 6x + 5$, then x belongs to the interval is (a, ∞) , then $a = \dots\dots\dots$
37. If $-a < -b$, then positive a and b carries the relation
 A) $a < b$. B) $-a > -b$ C) $a > b$ D) $-a > b$
38. If $a < b$ and k is a positive integer then $a - k \dots\dots b - k$
 A) $<$ B) $>$ C) \geq D) \leq .
39. If $x \geq y$, then $\frac{1}{x} \dots\dots \frac{1}{y}$
 A) $<$ B) $>$ C) \geq D) \leq .
40. If $A = \{x: -\infty < x \leq 1, x \in R\}$ and $B = \{x: -2 \leq x < \infty, x \in R\}$, then $A \cap B$ is
 A) $[-2, 1]$. B) $[-\infty, 1]$ C) $(-2, 1)$ D) $(-\infty, \infty)$

Two marks Questions:

1. 1) Solve $30x < 200$ when
 i) x is a natural number, ii) x is an integer. (k)
2. Solve $24x < 100$, when
 i) x is a natural number. ii) x is an integer. (k)
3. Solve $-12x > 30$, when
 i) x is a natural number. ii) x is an integer. (k)

4. Solve $5x - 3 < 3x + 1$ when
 i) x is an integer, ii) x is a real number. (k)
5. Solve $5x - 3 < 7$, when
 i) x is an integer. ii) x is a real number. (k)
6. Solve $3x + 8 > 2$, when
 i) x is an integer. ii) x is a real number. (k)

II. Solve following inequalities for real number x

- 1) $4x + 3 < 6x + 7$ (k) 2) $4x + 3 < 5x + 7$ (k) 3) $3x - 7 > 5x - 1$ (k)
- 4) $3(x - 1) \leq 2(x - 3)$ (k) 5) $3(2 - x) \geq 2(1 - x)$ (k) 6) $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ (U)
- 7) $x + \frac{x}{2} + \frac{x}{3} < 11$ (U) 8) $\frac{x}{3} > \frac{x}{2} + 1$ (U) 9) $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$ (U)
- 10) $\frac{1}{2} \left[\frac{3x}{5} + 4 \right] \geq \frac{1}{3}(x - 6)$ (U) 11) $2(2x + 3) - 10 < 6(x - 2)$ (U)
- 12) $37 - (3x + 5) \geq 9x - 8(x - 3)$ (U) 13) $\frac{x}{4} < \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$ (U)
- 14) $\frac{(2x-1)}{3} \geq \frac{(3x-2)}{4} - \frac{(2-x)}{5}$ (U) 5) $-8 \leq 5x = 3 < 7$ (A) 16) $-5 \leq \frac{5-3x}{2} \leq 8$ (A)
- 17) $2 \leq 3x - 4 \leq 5$ (A) 18) $6 \leq 3(2x - 4) < 12$ (A) 19) $-3 \leq 4 - \frac{7x}{2} \leq 18$ (A)
- 20) $-15 < \frac{3(x-2)}{5} \leq 0$ (A) 21) $-12 < 4 - \frac{3x}{-5} \leq 2$ (A) 22) $7 \leq \frac{(3x+11)}{2} \leq 11$ (A)

III. Solve the following inequalities and show the graph of the solution in each case on number line

- 1) $7x + 3 < 5x + 9$ (k) 2) $\frac{3x-4}{2} \geq \frac{x+1}{4} - 1$ (U) 3) $3x - 2 < 2x + 1$ (k)
- 4) $5x - 3 \geq 3x - 5$ (k) 5) $3(1 - x) < 2(x + 4)$ (k) 6) $\frac{x}{2} \geq \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$ (U)

IV

- Find the minimum marks he should get in the annual examination to have an average of at least 60 marks. (A)
- The marks obtained by a student of Class XI in first and second terminal examination are 62 and 48, respectively
- Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40. (A)
- Ravi obtained 70 and 75 marks in first two unit test. Find the minimum marks he should get in the third test to have an average of at least 60 marks. (A)
- To receive Grade 'A' in a course, one must obtain an average of 90 marks of more in five examinations (each of 100 marks). If Sunita's marks in first four examinations are 87, 92, 94 and 95, find minimum marks that Sunita must obtain in fifth examination to get grade 'A' in the course. (A)
- Find all pairs of consecutive odd positive integers both of which are smaller than 10 such that their sum is more than 11. (A)
- Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23. (A)

V. Solve the following system of inequalities and represent the solution graphically on the number line.

- $3x - 7 < 5 + x, 1 - 5x \leq 1$ (A)
- $5x + 1 > -24, 5x - 1 < 24$ (A)
- $2(x - 1) < x + 5, 3(x + 2) > 2 - x$ (A)
- $3x - 7 > 2(x - 6), 6 - x > 11 - 2x$ (A)
- $5(2x - 7) - 3(2x + 3) \leq 0, 2x + 19 \leq 6x + 47$ (A)

VI. Statement Problems:

13. In an experiment, a solution of hydrochloric acid is to be kept between 30° and 35° Celsius. What is the range of temperature in degree Fahrenheit if conversion formula is given by $C = \frac{5}{9}(F - 32)$, where C and F represent temperature in degree Celsius and degree Fahrenheit, respectively. (S)
14. A manufacturer has 600 liters of a 12% solution of acid. How many liters of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%? (S)
15. A solution is to be kept between 68° F and 77° F. What is the range in temperature in degree Celsius (C) if the Celsius/ Fahrenheit (F) conversion formula is given by $F = \frac{9}{5}C + 32$? (S)
16. A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 liters of the 8% solution, how many liters of the 2% solution will have to be added? (S)
17. How many liters of water will have to be added to 1125 liters of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content? (S)

CHAPTER-6 PERMUTATIONS AND COMBINATIONS

MCQ / FB

1. The number of 4 letter words, with or without meaning, which can be formed out of the letters of the word ROSE, where the repetition of the letters is not allowed.
(A)6 (B)12 (C)24 (D) 256 .
2. The number of 4 letter words, with or without meaning, which can be formed out of the letters of the word ROSE, where the repetition of the letters was allowed.
(A)6 (B)64 (C)24 (D) 256
3. Given 4 flags of different colors, then the number of different signals can be generated. If a signal requires the use of 2 flags one below the other
(A)6 (B)12 (C)24 (D) 4.
4. The number of 2 digit even numbers can be formed from the digits 1, 2, 3, 4, 5 if the digits can be repeated
(A)10 (B)8 (C)120 (D) 6.
5. The number of 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that repetition of the digits is allowed
(A)25 (B)120 (C)60 (D) 125.
6. The number of 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that repetition of the digits is not allowed
(A)25 (B)120 (C)60 (D) 125
7. The number of 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated
(A)108 (B)216 (C)36 (D) 60.
8. A coin is tossed 3 times and the outcomes are recorded. The number of possible outcomes
(A)2 (B)4 (C)6 (D) 8.
9. The value of $7! - 5!$ is
(A) 120 (B)5040 (C)4920 (D) 5160.
10. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, then x =
(A) 64 (B)49 (C)56 (D) 81.
11. If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$, then x =
(A) 64 (B)81 (C)100 (D) 72.
12. Which of the following is correct
(A) $3! + 4! = 4!$ (B) $\frac{8!}{6!2!} = 8$ (C) $\frac{7!}{5!} = 7! - 5!$ (D) ${}^n P_r = r! {}^n C_r$.
13. The value of ${}^6 P_3 - {}^5 P_3$ is
(A) 120 (B)100 (C)220 (D) 20.
14. The number of ways in which a Chairman and a Vice-Chairman can be chosen from amongst a group of 12 persons assuming that one person can not hold more than one position is
(A) 144 (B)120 (C)132 (D) 12.
15. The number of permutations of the letters of the word ALLAHABAD is
(A) $\frac{9!}{4!2!2!}$ (B) $\frac{9!}{4!2!}$ (C) $\frac{9!}{4!}$ (D) $\frac{7!}{4!2!}$.
16. The number of permutations of the letters of the word INSTITUTE is
(A) $\frac{9!}{2!2!}$ (B) $\frac{9!}{3!2!}$ (C) $\frac{9!}{3!}$ (D) $\frac{4!}{2!2!}$.
17. The number of ways of rearranging the letters of the word ROOT is
(A) 24 (B)12 (C)6 (D) 4.

18. The number of even numbers can be formed using all the digits 2, 3, 4, 5, 6 when repetition is not allowed
 (A) $5P_5$ (B) $3 \cdot 5P_5$ (C) $3 \cdot 4P_4$ (D) $3 \cdot 3P_3$.
19. 1. The number of permutations of n objects, where p objects are of the same kind and rest are all different = $n!/p!$
 2. The number of permutations of n objects, where P_1 objects are of one kind, P_2 are of second kind, ..., P_k are of k^{th} kind and the rest, if any, are of different is $\frac{n!}{P_1!P_2!\dots P_k!}$
 3. The number of permutations of n different objects taken r at a time, where repetition is not allowed, is ${}^n P_r$.
- Which of the above statements are correct?
 (A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) All 1, 2 and 3
20. The number of ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same color are indistinguishable
 (A) $\frac{9!}{4!3!2!}$ (B) $\frac{5!}{4!3!2!}$ (C) $\frac{6!}{4!3!2!}$ (D) $\frac{7!}{4!3!2!}$.
21. The number of 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed
 (A) 6561 (B) 3024 (C) 126 (D) 2024.
22. The number of 3-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed is
 (A) ${}^9 P_3$ (B) ${}^9 C_3$ (C) 3! (D) 9^3 .
23. The number of 4-digit numbers are there with no digit repeated is
 (A) ${}^{10} P_4$ (B) ${}^9 P_4$ (C) $3 \cdot {}^9 P_3$ (D) $9 \cdot {}^9 P_3$
24. The number lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5, if the repetition of the digits is not allowed is
 (A) 900 (B) 100 (C) 120 (D) 800
25. The number of words, with or without meaning, can be formed using all the letters of the word AGAIN, using each letter exactly once is
 (A) 120 (B) 60 (C) 30 (D) 100.
26. The number of words, with or without meaning, can be formed using all the letters of the word EQUATION, using each letter exactly once is
 (A) 8! (B) 9! (C) $\frac{8!}{2!}$ (D) 2024.
27. The number of permutations of the letters of the word DAUGHTER is
 (A) $\frac{8!}{2!2!}$ (B) $\frac{8!}{2!}$ (C) 8! (D) 7!
28. The number of permutations of the letters of the word EXAMINATION is
 (A) $\frac{11!}{2!2!2!}$ (B) $\frac{11!}{2!2!}$ (C) 11! (D) $\frac{11!}{6!}$
29. The number of words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if 4 letters are used at a time
 (A) 720 (B) 60 (C) 360 (D) 720.
30. Which of the following is incorrect
 (A) $\frac{{}^n P_r}{r!} = {}^n C_r$ (B) ${}^n C_r = {}^n C_{n-r}$ (C) ${}^n C_r + {}^n C_{r-1} = {}^{n+1} C_r$ (D) ${}^n C_n = {}^n P_n$
31. If ${}^n C_a = {}^n C_b$, then $n =$
 (A) a (B) b (C) $a - b$ (D) $a + b$.
32. If ${}^n C_8 = {}^n C_9$, then ${}^n C_{17}$ is
 (A) 17! (B) 1 (C) 17 (D) 18.
33. The number of ways of choosing 4 cards from a pack of 52 playing cards .
 (A) $({}^{13} C_1)^4$ (B) $4({}^{13} C_1)$ (C) ${}^{52} C_4$ (D) ${}^{13} C_4$.

34. The number of ways of choosing 4 cards from a pack of 52 playing cards , if four cards are of the same suit is
 (A) $(13C_1)^4$ (B) $4(13C_1)$ (C) $52C_4$ (D) $4(13C_4)$
35. The number of ways of choosing 4 cards from a pack of 52 playing cards ,if four cards are belong to four different suits is
 (A) $(13C_1)^4$ (B) $4(13C_1)$ (C) $52C_4$ (D) $13C_4$.
36. The number of ways of choosing 4 cards from a pack of 52 playing cards , if four cards are face cards t is
 (A) $12C_4$ (B) $52C_{12}$ (C) $52C_4$ (D) $4.12C_4$.
37. The number of ways of choosing 4 cards from a pack of 52 playing cards , two are red cards and two are black cards is
 (A) $(26C_2)^2$ (B) $4(13C_1)$ (C) $2^{26}C_4$ (D) $26C_4$.
38. The number of ways of choosing 4 cards from a pack of 52 playing cards , if cards are of the same color is
 (A) $(26C_2)^2$ (B) $4(13C_1)$ (C) $2(26C_4)$ (D) $26C_4$.
39. If ${}^nC_8 = {}^nC_2$, then nC_2 is
 (A) 90 (B) 10 (C) 45 (D) 36.
40. The number of chords can be drawn through 21 points on a circle
 (A) 110 (B) 210 (C) 208 (D) 410.
41. The number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls if each selection consists of 3 balls of each color.
 (A) 1000 (B) 3000 (C) 2000 (D) 4000.
42. The number of diagonals which can be drawn in a polygon of n sides
 (A) $\frac{n(n+3)}{2}$ (B) $\frac{n(n-1)}{2}$ (C) $\frac{n(n-2)}{2}$ (D) $\frac{n(n-3)}{2}$
43. If ${}^{15}C_{3r} = {}^{15}C_{3+r}$ then r =
 (A) 2 (B) 3 (C) 6 (D) $\frac{3}{2}$.
44. There are n points in a plane of which p points are collinear. How many lines can be formed from these points?
 (A) ${}^nC_2 - pC_2 - 1$ (B) ${}^nC_2 - pC_2$ (C) ${}^nC_2 - pC_2 + 1$ (D) ${}^nC_2 + pC_2 - 1$
45. The number of 4 letter words, with or without meaning, which can be formed out of the letters of the word BANK, where the repetition of the letters is not allowed is -----(U)
46. The number of squares can be created on a chessboard if there are 4 horizontal lines and 4 vertical lines is ----
47. The value of $1! - 0!$ is -----
48. If $\frac{100}{10!} = \frac{1}{8!} + \frac{x}{9!}$, then x is -----
49. Compute $\frac{12!}{(10!)(2!)}$ is -----
50. Evaluate $\frac{n!}{r!(n-r)!}$, when n = 5, r = 2. is -----
51. Match List I with List II

List I	List II
a) 5C_0	i) 20
b) 5P_2	ii) 10
c) 5C_2	iii) 1

Choose the correct answer from the options given below:

- A) a-i , b-ii, c-iii B) a-iii, b-ii, c-I C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii

52. Match List I with List II

List I	List II
a) ${}^{15}C_5$	i) ${}^{15}C_{10}$
b) ${}^{15}P_5$	ii) ${}^{15}C_5 + {}^{15}C_4$
c) ${}^{16}C_5$	iii) $5! {}^{15}C_5$

Choose the correct answer from the options given below:

- A) a-i , b-iii, c-ii B) a-iii, b-ii, c-I C) a-ii, b-i, c-iii D) a-iii, b-i, c-ii

53. **STATEMENT 1:** If ${}^nC_8 = {}^nC_2$, then ${}^nC_1 = 10$

STATEMENT 2: If ${}^nC_a = {}^nC_b$, then $a + b = n$.

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
(B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
(C) STATEMENT 1 is true and STATEMENT 2 is false.
(D) STATEMENT 1 is false and STATEMENT 1 is true

54. **STATEMENT 1:** The number of permutations of n different objects taken r at a time, where repetition is not allowed, is nP_r .

STATEMENT 2: The number of 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is allowed is 9^4 .

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
(B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
(C) STATEMENT 1 is true and STATEMENT 2 is false
(D) STATEMENT 1 is false and STATEMENT 1 is false.

55. **Assertion (A):** Ravi travels from Mumbai to Jammu in 7 different ways. But he is allowed to return to Mumbai by any way except the one he used earlier. The number of ways can he complete his journey is 42

Reason(R): There are 30 people in a group. If all shake hands with one another ,then number of handshakes are ${}^{30}C_2$.

- (A) Both Assertion (A) and Reason (R) are true .
(B) Both Assertion (A) and Reason (R) are false.
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

56. If ${}^nP_r = 3024$ and ${}^nC_r = 126$ then $r = \dots\dots$

57. There are 20 points in a plane, how many triangles can be formed by these points if 5 are colinear?

- A) 1130 B) 550 C) 1129 D) 1140.

58. In how many ways can we select 6 people out of 10, of which a particular person is not included?
 A) ${}^{10}C_4$ B) 9C_6 C) 9C_5 D) ${}^{10}C_6$
59. In how many different ways can five friends sit for a photograph of five chairs in a row?
 A) 120 ways B) 24 ways C) 240 ways D) 720 ways.
60. There are 20 chair patterns and ten table layouts available to a party planner. How many different ways can she create a set of tables and chairs for the party.
 A) 230 B) 200 C) 300 D) 400
61. The total number of ways of answering 5 objective questions, each questions having 5 choices is
 A) 5^4 B) 4^5 C) 10 D) 9
62. The total number of ways 4 INDIENS and 3 ENGLISHMEN and 2 AMERICAN can be seated in a row so that all Persons of the same nationality sit together.
 A) $4! 3! 2!$ B) $9!$ C) $3(4! 3! 2!)$ D) $3! 4! 3! 2!$
63. The value of ${}^6C_4 + {}^5C_3 + {}^5C_2$ is
 A) 35 B) 210 C) 15 D) 20.
64. The total number of ways of answering 10 true, false questions, is
 A) 10^2 B) 2^{10} C) 10 D) 20
65. The number of ways of choosing 2 cards from a pack of 52 playing cards, if cards are Ace is
 A) ${}^{52}C_2$ B) 4C_2 C) ${}^{12}C_2$ D) ${}^{48}C_2$.

Two marks questions

- Given 4 flags of different colors, how many different signals can be generated, if a signal requires the use of 2 flags one below the other? (U)
- How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that repetition of the digits is allowed? (U)
- How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that repetition of the digits is not allowed? (U)
- How many 4-letter codes can be formed using the first 10 letters of the English alphabet, if no letter can be repeated? (U)
- How many 5-digit telephone numbers can be formed using the digits 0 to 9 if each number starts with 67 and no digit appears more than once? (U)
- A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there? (U)
- Find the number of permutations of the letters of the word ALLAHABAD. (U)
- How many 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed? (U)
- In how many ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same color are indistinguishable? (A)
- How many 4-digit numbers are there with no digit repeated? (S)
- How many 3-digit even numbers can be made using the digits 1, 2, 3, 4, 6, 7, if no digit is repeated? (U)
- From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman assuming one person cannot hold more than one position? (U)
- How many words, with or without meaning, can be formed using all the letters of the word EQUATION, using each letter exactly once? (U)
- If ${}^nC_9 = {}^nC_8$, find ${}^nC_{17}$ (K)

15. A committee of 3 persons is to be constituted from a group of 2 men and 3 women. In how many ways can this be done? (U)
16. If ${}^nC_8 = {}^nC_2$, find nC_2 . (K)
17. How many chords can be drawn through 21 points on a circle? (A)
18. In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 girls?
19. In how many ways can one select a cricket team of eleven from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers? (A)
20. A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected. (A)
21. In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student? (S)
22. Find the number of different signals that can be generated by arranging at least 2 flags in order (one below the other) on a vertical staff, if five different flags are available. (A)
23. If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$, find x. (K)
24. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x. (K)
25. How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5 if the repetition of the digits is not allowed? (U)

Three marks questions

- Find the value of n such that ${}^np_5 = 42 \cdot {}^np_3$, $n \geq 4$ (K)
- Find r , if ${}^4p_r = 6 \cdot {}^5p_{r-1}$. (K)
- Find the value of n such that $\frac{{}^np_4}{{}^{n-1}p_4} = \frac{5}{3}$, (K)
- Find the number of different 8-letter arrangements that can be made from the letters of the word DAUGHTER so that (i) all vowels occur together (ii) all vowels do not occur together.
- Find n , if ${}^{n-1}p_3 : {}^np_4 = 1 : 9$. (K)
- Find r if ${}^5p_r = 2 \cdot {}^6p_{r-1}$. (K)
- In how many distinct permutations of the letters of the word MISSISSIPPI the four I's do not come together? (U)
- Determine the number of 5 card combinations out of a deck of 52 cards if each selection of 5 cards has exactly one king.
- How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that (i) Repetition of the digits is allowed? (ii) Repetition of the digits is not allowed?
- Find the number of 4-digit numbers that can be formed using the digits 1, 2, 3, 4, 5 if no digit is repeated. How many of these will be even?
- In how many ways can the letters of the word ASSASSINATION be arranged so that all the S's are together?
- How many 6-digit numbers can be formed from the digits 0, 1, 3, 5, 7 and 9 which are divisible by 10 and no digit is repeated?
- If the different permutations of all the letters of the word EXAMINATION are listed as in a dictionary, how many words are there in this list before the first word starting with E?
- How many words, with or without meaning, can be formed using all the letters of the word EQUATION at a time so that the vowels and consonants occur together.
- How many words, with or without meaning, each of 2 vowels and 3 consonants can be formed from the letters of the word DAUGHTER?
- How many numbers greater than 1000000 can be formed by using the digits 1, 2, 0, 2, 4, 2, 4? (A)
- How many words, with or without meaning, each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE? (A)

Five marks questions:

1. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these
(i) four cards are of the same suit, (ii) four cards belong to four different suits. (A)
2. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team
has (i) no girl ? (ii) at least one boy and one girl ? (iii) at least 3 girls ? (A)
3. A committee of 7 is to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of: (i) exactly 3 girls? (ii) at least 3 girls ?
(iii) at most 3 girls ? (A)
4. In an examination, a question paper consists of 12 questions divided into two parts i.e., Part I and Part II, containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions? (A)
5. 4 cards are chosen from a pack of 52 playing cards In how many of these
i) are face cards ii) two are red cards and two are black cards iii) cards are of the same color? (A)
6. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if. (i) 4 letters are used at a time, (ii) all letters are used at a time, (iii) all letters are used but first letter is a vowel? (U)
7. Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements,(i) do the words start with P (ii) do all the vowels always occur together
(iii) do the vowels never occur together (iv) do the words begin with I and end in P?
8. A committee of 3 persons is to be constituted from a group of 2 men and 3 women. In how many ways can this be done? How many of these committees would consist of 1 man and 2 women?
9. In how many ways can the letters of the word PERMUTATIONS be arranged if the
i) words start with P and end with S, (ii) vowels are all together,
iii) there are always 4 letters between P and S?

CHAPTER-7 BINOMIAL THEOREM

MCQ / FB

1. The number of non-zero terms in the expansion of $(a + b)^n$ is
(a) $n-1$ (b) $n+1$ (c) n (d) $n+2$.
2. The number of non-zero terms in the expansion of $(a + b)^6$ is
(a) 5 (b) 6 (c) 7 (d) 8
3. The coefficients ${}^n C_r$ occurring in the binomial theorem are known as
(a) coefficients (b) binomial coefficients (c) Combination (d) binomial term .
4. In the expansion of $(a+b)^n$, the sum of the indices of a and b is
(a) $n-1$ (b) $n+1$ (c) n (d) $n+2$.
5. In the expansion of $(a - b)^n$, stated as
(a) $\sum_{k=0}^n a^{n-k} b^k$ (b) $-\sum_{k=0}^n a^{n-k} b^k$ (c) $\sum_{k=0}^n (-a)^{n-k} b^k$ (d) $\sum_{k=0}^n a^{n-k} (-b)^k$
6. The coefficient of x^k in the expansion of $(x + 1)^n$
(a) $n C_k$ (b) $n - 1 C_k$ (c) $n C_{k-1}$ (d) $n - 1 C_{k-1}$
7. The sum of all the coefficients in the binomial expansion of $(x + 1)^n$
(a) 2^n (b) 2^{n-1} (c) n (d) 2^{n+1}
8. The sum of all the coefficients in the binomial expansion of $(x - 1)^n$
(a) 2^n (b) 2^{n-1} (c) n (d) 0.
9. The sum of all the binomial coefficients in expansion of $(a + b)^n$
(a) 2^n (b) 2^{n-1} (c) n (d) 2^{n+1}
10. In the expansion of $(1+x)^n$ the sum of coefficients of odd powers of x is
(a) 0 (b) $2^n - 1$ (c) 2^n (d) 2^{n-1}
11. In the expansion of $(1+x)^n$ the sum of coefficients of even powers of x is
(a) 0 (b) $2^n - 1$ (c) 2^n (d) 2^{n-1}
12. The value of $10 C_1 + 10 C_2 + 10 C_3 + \dots + 10 C_{10}$ is
(a) 1024 (b) 512 (c) 1023 (d) 256.
13. The value of $10 C_0 - 10 C_1 + 10 C_2 - 10 C_3 + \dots + 10 C_{10}$ is
(a) 1024 (b) 512 (c) 0 (d) 256
14. The value of $10 C_1 + 10 C_3 + 10 C_5 + \dots + 10 C_9$ is
(a) 1024 (b) 512 (c) 1023 (d) 256
15. $\sum_{k=0}^n 3^k n C_k =$
(a) 2^n (b) 3^n (c) 4^n (d) n
16. The value of $n C_0 + 2.n C_1 + 4.n C_2 + 8.n C_3 + \dots + 2^n . n C_n$ is
(a) 2^n (b) 3^n (c) 4^n (d) n
17. The value of $1 + 3.20 C_1 + 9.20 C_2 + 27.20 C_3 + \dots + 3^{20}$ is
(a) 2^{20} (b) 3^{20} (c) 4^{20} (d) 20^2
18. The number of terms in the expansion of $(2x - 3y)^6$ is =
19. The sum of the binomial coefficients of the first and the last term of $(a + b)^n = \dots$
20. The real part of $(1 + i)^4$ is =.....
21. The number of terms in $(1 + 2x + x^2)^{60}$ is
22. The number of terms in $(1 + x + x^2)^5$ is
23. $6^n - 5n$ always leaves remainder when divided by 25 is

- 24. STATEMENT 1:** The largest coefficient in the expansion of $(1 + x)^8$ is $8C_5$
STATEMENT 2: The greatest coefficient will always occur in the middle term.
 (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 1 is true

25. Assertion (A): If the coefficient of 3rd term in the expansion of $(1 + x)^n$ is 10, then $n = 5$

Reason(R): The coefficient of r^{th} term in the expansion of $(1 + x)^n$ is ${}^nC_{r-1}$.

- (A) Both Assertion (A) and Reason (R) are true .
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.
- 26.1.** The total number of terms in the expansion $(1 + x)^{10} + (1 - x)^{10}$ after simplification will be 6.
2. The total number of terms in the expansion $(1 + x)^{10}$ is 11.
3. $(r+1)^{\text{th}}$ term in the expansion $(1 + x)^n$ is $x^r {}^nC_r$.
 Which of the above statements are correct?
 (A) 1 and 2 but not 3 (B) 1 and 3 but not 3 (C) 3 only (D) All 1, 2 and 3.

27. STATEMENT 1: $(1.1)^{10000}$ is greater than 1000

STATEMENT 2: $(1.1)^{10000} = (1 + 0.1)^{10000}$

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 1 is true
- 28.** In the expansion of $(1 + ax)^n$, $n \in N$ the coefficient of x and x^2 are 8 and 24 respectively, then
 (a) $a = 2, n = 4$ (b) $a = 4, n = 2$ (c) $a = 2, n = 3$ (d) $a = 3, n = 4$.

29. Match List I with List II

List I	List II
a) coefficient of x^2 in $(1 + x)^6$	i) -15
b) coefficient of x^2 in $(1 - x)^6$	ii) 15
c) The number of terms in $(1 + x)^6 - (1 - x)^6$	iii) 3

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii (B) a-iii, b-ii, c-I (C) a-ii, b-i, c-iii (D) a-i, b-iii, c-ii.
- 30.** If $(a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$
 and $(a + b)^6 = a^6 + 6a^5b + la^4b^2 + ma^3b^3 + na^2b^4 + 6ab^5 + b^6$, l, m and n are respectively
 (a) 15, 15, 15 (b) 20, 15, 15 (c) 15, 20, 15 (d) 20, 15, 20.

TWO /THREE MARKS QUESTIONS:

1. Using Binomial Theorem evaluate i)(96)³ ii) (98)⁵ iii)(99)⁵ iv)(102)⁵ v)(101)⁴
2. Expand i) $\left(\frac{2}{x} - \frac{x}{2}\right)^5$ ii) $\left(\frac{x}{3} + \frac{1}{x}\right)^5$ iii) $(2x - 3)^6$ iv) $(1 - 2x)^5$, v) $\left(x + \frac{1}{x}\right)^5$ vi) $\left(x^2 + \frac{3}{x}\right)^4$
3. Find an approximation of (0.99)⁵ using the first three terms of its expansion. (K)
4. Show that $9^{n+1} - 8n - 9$ is divisible by 64, whenever n is a positive integer. (A)
5. Using Binomial theorem, prove that $6^n - 5n$ always leaves remainder 1 when divided by 25. (S)
6. Find *a* if the 17th and 18th terms of the expansion $(2 + a)^{50}$ are equal. (U)
7. Find a positive value of m for which the coefficient of x^2 in the expansion $(1 + x)^m$ is 6 (U)
8. In the expansion of $(1 + a)^{m+n}$, prove that coefficients of a^m and a^n are equal. (A)
9. Which is larger $(1.01)^{100000}$ or 10,000? (K)
10. Prove that $\sum_{r=0}^n 3^r \cdot n C_r = 4^n$. (K)
11. Find the value of $(a^2 + \sqrt{a^2 - 1})^4 + (a^2 - \sqrt{a^2 - 1})^4$. (A)
12. Find $(a + b)^4 - (a - b)^4$. Hence, evaluate $(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$. (S)
13. Find $(x + 1)^6 + (x - 1)^6$.
14. Find $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6$.
15. Expand using Binomial Theorem $\left(1 + \frac{x}{2} - \frac{2}{x}\right)^4$, $x \neq 0$.
16. If a and b are distinct integers, prove that $a - b$ is a factor of $a^n - b^n$, whenever n is a positive integer.

CHAPTER-8
SEQUENCES AND SERIES

MCQ /FB

1. The 20th term of the sequence defined by $a_n = (n-1)(2-n)(3+n)$ is
(A) 7856 (B) 7866 (C) -7866 (D) -7856.
2. The 4th term of the sequence defined by $a_1 = 1, a_n = a_{n-1} + 2, n \geq 2$ is
(A) 3 (B) 5 (C) 7 (D) 9.
3. The first three terms of the sequences defined by $a_n = \frac{n-3}{4}$ is
(A) $-\frac{1}{2}, -\frac{1}{4}, 1$ (B) $-\frac{1}{2}, \frac{1}{4}, 0$ (C) $-\frac{1}{2}, -\frac{1}{4}, 0$ (D) $-\frac{1}{2}, \frac{1}{4}, -1$.
4. The 9th term of the sequence defined by $a_n = (-1)^{n-1}n^3$ is
(A) 3^6 (B) 3^3 (C) -3^3 (D) -3^6
5. The 5th term of the sequence defined by $a_1 = a_2 = 2, a_n = a_{n-1} - 1, n > 2$ is
(A) -1 (B) 0 (C) 1 (D) -2.
6. The 4th term of the sequence defined by $a_1 = a_2 = 1, a_n = a_{n-1} + a_{n-2}, n > 2$ is
(A) 2 (B) 3 (C) 5 (D) 8.
7. The value of $\frac{a_{n+1}}{a_n}$, if $n = 5$ of the sequence defined by $a_1 = a_2 = 1, a_n = a_{n-1} + a_{n-2}, n > 2$ is
(A) $\frac{5}{8}$ (B) $\frac{8}{5}$ (C) $\frac{13}{8}$ (D) $\frac{5}{3}$.
8. The sum of the first five terms of the series of the sequence defined by $a_1 = -1, a_n = a_{n-1}/n, n \geq 2$ is
(A) $-\frac{206}{120}$ (B) $\frac{206}{120}$ (C) $-\frac{205}{120}$ (D) $\frac{205}{120}$.
9. The 20th term of the sequences defined by $a_n = \frac{n(n-2)}{n+3}$ is
(A) $\frac{180}{23}$ (B) $\frac{360}{23}$ (C) $\frac{380}{3}$ (D) $\frac{400}{3}$.
10. The 7th term of the sequences defined by $a_n = \frac{n^2}{2^n}$ is
(A) $\frac{49}{64}$ (B) $\frac{7}{128}$ (C) $\frac{14}{128}$ (D) $\frac{49}{128}$.
11. If 3, n, 8 are the three consecutive terms of the Fibonacci sequence, then the value of n is
(A) 1 (B) 2 (C) 4 (D) 5.
12. If a = the first term, r = the common ratio, l = the last term, n = the numbers of terms, and S_n = the sum of first n terms of a GP. If $r = 1$, then $S_n =$
(A) an (B) $\frac{a(1-r^n)}{1-r}$ (C) $\frac{a(r^n-1)}{r-1}$ (D) $\frac{a}{1-r}$
13. If 0.01, 0.0001, 0.000001, are in GP, then its common ratio is
(A) 10 (B) $\frac{1}{10}$ (C) $\frac{1}{100}$ (D) 100.
14. The 10th terms of the sequence 5, 25, 125, ... is
(A) 5^9 (B) 5^{10} (C) 5^8 (D) 5^{11} .
15. The n^{th} term of the G.P, 2, 8, 32, ... is 131072, then n is
(A) 9 (B) 8 (C) 14 (D) 16.
16. In a G.P., the 3rd term is 24 and the 6th term is 192. then common ratio is
(A) 2 (B) 6 (C) 4 (D) 8.
17. The first term of a G.P. whose 6th term is 192 and the common ratio is 2
(A) 2 (B) 6 (C) 4 (D) 8.
18. A person has 2 parents, 4 grandparents, 8 great grandparents, and so on. then the number of his ancestors during the ten generations preceding his own is
(A) 1023 (B) 1024 (C) 2048 (D) 2046.

19. If 1, G₁, G₂, G₃, 256 are in G.P, then G₂ is
 (A) 2 (B) 4 (C) 16 (D) 8.
20. If A and G be A.M. and G.M. of two given positive real numbers a and b , then
 (A) $A \leq G$ (B) $A < G$ (C) $A > G$ (D) $A \geq G$.
21. The values of x , the numbers $-\frac{2}{7}, x - \frac{7}{2}$ are in G.P.
 (A) 1 (B) -1 (C) 4 (D) 7.
22. The n^{th} term of the sequences 2, $2\sqrt{2}$, 4.....is 128, then n is
 (A) 7 (B) 12 (C) 13 (D) 14.
23. The sum to n term of the G.P., 3, $3^2, 3^3, \dots$ is 120, then n is
 (A) 2 (B) 3 (C) 4 (D) 5.
24. In the G.P. 2, $2\sqrt{2}$, 4... if $a_n = 128$, then the value of n is
 (A) 11 (B) 12 (C) 13 (D) 14
25. The sum to n term of the progressions x^3, x^5, x^7, \dots (if $x \neq 1$)
 (A) nx^3 (B) $\frac{x^3(1-x^{2n})}{1-x^3}$ (C) $\frac{x^3(1-x^{2n})}{1-x^2}$ (D) $\frac{x^3}{1-x^2}$
26. Two numbers between 3 and 81 so that the resulting sequence is G.P.
 (A) 6 and 36 (B) 9 and 18 (C) 9 and 27 (D) 27 and 54.
27. A.M and G.M. of roots of a quadratic equation are 8 and 5, respectively, then the quadratic equation is
 (A) $x^2 + 13x + 40 = 0$ (B) $x^2 - 16x + 25 = 0$
 (C) $x^2 + 16x + 25 = 0$ (D) $x^2 - 16x - 25 = 0$.
28. The 20th term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 + \dots + n$ terms.
 (A) 840 (B) 1680 (C) 1600 (D) 420
29. The value of $\sum_{k=1}^5 (3 + 2^k)$ is
 (A) 77 (B) 62 (C) 124 (D) 72.
30. The 3rd term of the sequence $a_n = (-1)^n (n - 1)^3$ (K)
31. If 3, n , 8 are the three consecutive terms of the Fibonacci sequence, then the value of n is (K)
32. The fifth term of the G.P. 2, 6, 18, is ----- (K)
33. The common ratio of the G.P. 2, $2\sqrt{3}$, 6, is ----- (K)
34. The arithmetic mean of the numbers 6 and 10 is ----- (K)
35. The geometric mean of the numbers 4 and 9 is ----- (K)
36. The 4th term of the sequence $a_n = 4n - 3$ is -----
37. The 4th term of the sequence $a_n = \frac{n^2}{2^n}$ is -----
38. **STATEMENT 1:** The 3rd term of a GP is 9, then the product of its first 5 terms is 3^{10} .
STATEMENT 2: First 5 terms in GP are $\frac{a}{r^2}, \frac{a}{r}, a, ar, ar^2$, then their product is a^5 .
 (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 2 is false.
39. **Assertion (A):** Sequence 1, 1, 2, 3, 4, is a Fibonacci sequence.
Reason (R): The sequence defined by $a_1 = a_2 = 1, a_n = a_{n-1} + a_{n-2} \quad n > 2$ is a Fibonacci Sequence.
 (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.

40. 1. If the first term of a geometric sequence is 7 and the common ratio is 2, then its 5th term is 224
 2. The nth term of a geometric progression is ar^{n-1}
 3. In a GP common ratio $r = \frac{a_n}{a_{n-1}}$

Which of the above statements are correct?

- (A) 1 and 2 but not 3 (B) 1 and 3 but not 3 (C) 3 only (D) All 1, 2 and 3.

41. **STATEMENT 1:** Let $a_1, a_2, a_3, a_4, \dots$ be a GP and $a_i > 0$ and $a_1 + a_2 = 4$ and $a_3 + a_4 = 16$, then $r = 2$.

STATEMENT 2: In GP $a_3 + a_4 = r^2(a_1 + a_2)$

- (A) Both STATEMENT 1 and 2 are true
 (B) Both STATEMENT 1 and 2 are false.
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 1 is true.

42. Match List I with List II

List I	List II
a) sum to n term of a GP, $r=1$	i) $\frac{a}{1-r}$
b) sum to infinite term of the GP	ii) $\frac{a(1-r^n)}{1-r}$
c) sum to n term of a GP, $r \neq 1$	iii) an

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii (B) a-iii, b-ii, c-i (C) a-ii, b-i, c-iii (D) a-i, b-iii, c-ii.

43. In the G.P. 3, 6, 12, ... Match List I with List II

List I	List II
a) common ratio	i) 45
b) 6 th term of the G.P	ii) 2
c) sum to 4 term of the G.P	iii) 96

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii (B) a-ii, b-iii, c-i (C) a-ii, b-i, c-iii (D) a-i, b-iii, c-ii.

44. **STATEMENT 1:** If $-\frac{2}{3}, x, -\frac{3}{2}$ are in GP, then the value of x is ± 1 .

STATEMENT 2: If a, b, c are in GP, then b is geometric mean of a and c.

- (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 2 is false.

45. A sequence is called _____ if $a_{n+1} = a_n * r$.

- A) Arithmetic progression (B) Geometric Progression
 C) Fibonacci sequence (D) None of these.

46. The sum of series $1 + \frac{1}{2} + \frac{1}{4} + \dots$ up to 6 terms.

- A) $\frac{63}{32}$ (B) $\frac{32}{63}$ (C) $\frac{26}{53}$ (D) $\frac{53}{26}$

47. The age of three children's α, β, γ are in a G.P and the sum of their age is 7 and the product is 8. What is the difference between α and β age?
 (A) 2 (B) $\frac{1}{2}$ (C) 4 (D) 2 or $\frac{1}{2}$
48. The ratio between 7th term to that of 5th term for the GP with the common ratio of 2 is
 (A) 2 : 1 (B) 4 : 1 (C) 1 : 4 (D) 1 : 2
49. The 5th term of a geometric progression is 81 and the common ratio is 3. What is the first term?
 (A) 3 (B) 9 (C) 27 (D) 1.
50. If the first term and second term of a geometric sequence is 5 and 15 respectively, what is the 5th term
 (A) 81 (B) 1215 (C) 135 (D) 405
51. If the 3rd term of a geometric progression is 18 and the 6th term is 486, then the common ratio is
 A) 2 B) 3 C) 4 D) 5
52. If the sum of the first n terms of a sequence is given by $S_n = n^2 + 2n$, then the common ratio is
 A) 2 B) 3 C) 4 D) 5
53. Which of the following is the explicit formula for the geometric progression 5, 10, 20, 40,
 A) 2×5^n B) $2 \times 5^{n-1}$ C) 5×2^n D) $5 \times 2^{n-1}$
54. A girl puts 1 grain of rice in the first square of an 8 by 8 chess board. In the subsequent square, she puts twice that of the previous square, and she continues until she fills all the squares. How many total grains does she need?
 A) 2^{64} B) 2^{64-1} C) $2^{64} - 1$ D) 64!
55. If $a_1, a_2, a_3, \dots, a_n$ are in AP and also GP, then
 A) common difference $a = 1$ and common ratio $r = 1$
 B) common difference $a = 0$ and common ratio $r = 1$
 C) common difference $a = 1$ and common ratio $r = 0$
 D) common difference $a = 0$ and common ratio $r = 0$

Two / Three mark questions

- Find the first three terms of the sequence $a_n = (-1)^{n-1} 5^{n+1}$ (K)
- Find the first three terms of the sequence $a_n = \frac{n(n^2+5)}{4}$ (K)
- Find the sum of the first three terms of the sequence defined by $a_1 = 3, a_n = 3a_{n-1} + 2$ (when $n > 1$). (K)
- In a G.P., the third term is 24 and the 6th term is 192. Find the 10th term. (U)
- Find the sum of first n terms and the sum of first 5 terms of the geometric series $1 + \frac{2}{3} + \frac{4}{9} + \dots$ (U)
- In the G.P. $3, \frac{3}{2}, \frac{3}{4}, \dots$ if $S_n = \frac{3069}{512}$, find the value of n . (U)
- In the G.P. $3, 3^2, 3^3, \dots$ if $S_n = 120$, find the value of n . (U)
- In the G.P. $2, 2\sqrt{2}, 4, \dots$ if $a_n = 128$, find the value of n . (U)
- In the G.P. $\sqrt{3}, 3, 3\sqrt{3}, \dots$ if $a_n = 729$, find the value of n . (U)
- In the G.P. $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$ if $a_n = \frac{1}{729}$, find the value of n . (U)
- Find the values of x , if the numbers $\frac{-2}{7}, x, \frac{-7}{2}$ are in G.P. Also find the common ratios (U)
- The sum of first three terms of a G.P. is $\frac{13}{12}$ and their product is -1. Find the common ratios (U)
- The sum of first three terms of a G.P. is $\frac{39}{10}$ and their product is 1. Find the common ratios (U)

14. Find the 3 numbers to be inserted between 1 and 256 such that the resulting sequence is an G.P. (U)
15. Find the 3 numbers to be inserted between 1 and 243 such that the resulting sequence is an G.P. (U)
16. Find the 12th term of the G.P. whose 8th term is 192 and common ratio is 2. (U)
17. Find the 3 numbers to be inserted between 1 and 256 such that the resulting sequence is an G.P. (U)
18. The 5th, 8th and 11th terms of a G.P. are p, q and s respectively. Show that $q^2=ps$. (A)
19. The 4th term of a G.P. is square of its second term, and the first term is -3. Determine its 7th term. (U)
20. The sum of first three terms of a G.P. is 16 and the sum of next three terms is 128. Determine the first term and the common ratio. (A)
21. Given a G.P with $a=729$ and 7th term is 64, Determine S_7 . (U)
22. If the 4th, 10th and 16th terms of a G.P. are x, y and z respectively. Prove that x, y, z are in G.P. (A)
23. Show that the products of the corresponding terms of the sequence, $ar, ar^2, \dots, ar^{n-1}$ and $A, AR, AR^2, \dots, AR^{n-1}$ form a G.P. and find the common ratio. (U)
24. Find the sum of the products of the corresponding terms of the sequence 2,4,8,16,32 and 128, 32, 8, 2, $\frac{1}{2}$. (U)
25. If the first and nth term of a G.P. are a and b, respectively, and if P is the product of first n terms, Prove that $P^2 = (ab)^n$. (S)
26. If a, b, c and d are in G.P. show that $(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2$. (S)
27. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of 8th hour?
28. What will Rs 500 amounts to in 10 years after its deposit in a bank which pays annual interest rate of 10% compounded annually? (A)
29. The sum of some terms of G.P is 315 whose first term and the common ratio are 5 and 2 respectively. Find the last term and the number of terms. (U)
30. The first term of a G.P is 1. The sum of third and fifth term is 90. Find the common ratio of G.P. (U)
31. A man deposited Rs 10000 in a bank at the rate of 5% simple interest annually. Find the amount in 15th year since he deposited the amount and also calculate the total amount after 20 years. (A)
32. A manufacturer reckons that the value of a machine, which costs him Rs 15625, will depreciate each year by 20%. Find the estimated value at the end of 5 years. (A)
33. Find four numbers forming a G.P. in which the third term is greater than the first term by 9, and the second term is greater than the fourth by 18.
34. Show that the ratio of the sum of first n terms of a G.P. to the sum of terms from $(n+1)^{th}$ to $(2n)^{th}$ term is $\frac{1}{r^n}$.
35. If f is a function satisfying $f(x + y) = f(x).f(y)$ for all $x, y \in \mathbb{N}$ such that $f(1)=3$ and $\sum_{x=1}^n f(x) = 120$, find the value of n.

Four mark questions

1. If A and G respectively represents the Arithmetic mean and Geometric mean of two positive real numbers, then show that $A \geq G$. (S)
2. If A.M. and G.M. of two positive numbers 'a' and 'b' are 10 and 8, respectively, find the numbers. (A)
3. In a G.P. if sum of the first two terms is -4 and the fifth term is 4 times the third term. Find the first terms of the G.P.

4. Find four numbers forming a G.P. in which the third term is greater than the first term by 9, and the second term is greater than the fourth by 18. (S)
5. If m^{th} , p^{th} and q^{th} terms of a G.P are x , y and z respectively. Prove that $x^{p-q} y^{q-m} z^{m-p} = 1$ (S)
6. If A.M. and G.M. of roots of a quadratic equation are 8 and 5, respectively, then obtain the quadratic equation. (S)
7. Find the sum of n terms of the sequence $7, 77, 777, 7777, \dots$ to n terms.
8. Find the sum of the series up to n terms $5 + 55 + 555 + \dots$
9. Find the sum of the series up to n terms $0.6 + 0.66 + 0.666 + \dots$
10. If A and G be A.M. and G.M., respectively between two positive numbers,
11. prove that the numbers are $A \pm \sqrt{(A + G)(A - G)}$.

CHAPTER-9 STRAIGHT LINES

MCQ /FB

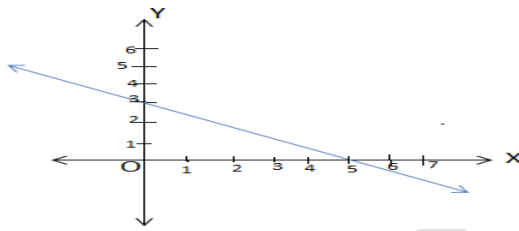
1. Which of the following is incorrect
(A) The slope of a line whose inclination is 90° is not defined.
(B) The slope of x - axis is zero.
(C) The slope of y - axis is not defined.
(D) The slope m of the line through the points (x_1, y_1) and (x_2, y_2) is given by $m = \frac{x_2 - x_1}{y_2 - y_1}$.
2. Which of the following is incorrect?
(A) Two non vertical lines l_1 and l_2 are parallel if and only if their slopes are equal.
(B) Two non-vertical lines are perpendicular to each other if and only if their slopes are negative reciprocals of each other,
(C) Three points A, B, C are collinear, if and only if slope of AB = slope of BC.
(D) Equation of the horizontal line having distance a from the x -axis is either $x = a$ or $x = -a$.
3. Which of the following correct, if a line its slope is negative?
(A) θ is acute angle (B) θ is an obtuse angle
(C) Either the line is x -axis or it parallel to x -axis
(D) Either the line is y -axis or it parallel to y -axis
4. The line if its slope is zero is
(A) Either the line is y -axis or it parallel to y -axis (B) θ is an obtuse angle
(C) Either the line is x -axis or it parallel to x -axis (D) θ is an acute angle
5. The slope of the line through the points $(3, -2)$ and $(-1, 4)$ is
(A) $\frac{2}{3}$ (B) $\frac{3}{2}$ (C) $-\frac{3}{2}$ (D) not defined.
6. The slope of the line through the points $(3, -2)$ and $(7, -2)$ is
(A) 0 (B) 4 (C) -1 (D) not defined.
7. The slope of the line through the points $(3, -2)$ and $(3, 4)$ is
(A) 0 (B) 4 (C) -1 (D) not defined.
8. The slope of the line making inclination is 60° with positive direction of x -axis is
(A) $\frac{2}{\sqrt{3}}$ (B) $\sqrt{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\frac{\sqrt{3}}{2}$.
9. Line through the points $(-2, 6)$ and $(4, 8)$ is perpendicular to the line through the points $(8, 12)$ and $(x, 24)$, then the value of x .
(A) 0 (B) 4 (C) -1 (D) $\frac{1}{4}$.
10. The slope of the line which makes angle 30° with positive direction of y axis measured anticlockwise
(A) $\sqrt{3}$ (B) $-\sqrt{3}$ (C) 1 (D) $\frac{1}{\sqrt{3}}$.
11. The value of x for which the points $(x, -1)$, $(2, 1)$ and $(4, 5)$ are collinear
(A) 2 (B) -2 (C) 1 (D) -1 .
12. The angle between the x -axis and the line joining the points $(3, -1)$ and $(4, -2)$.
(A) 45° (B) 135° (C) -45° (D) -135°
13. If three points $(h, 0)$, (a, b) and $(0, k)$ lie on a line, then
(A) $\frac{a}{h} + \frac{b}{k} = 1$ (B) $\frac{a}{h} - \frac{b}{k} = 1$ (C) $\frac{h}{a} + \frac{k}{b} = 1$ (D) $\frac{h}{a} - \frac{k}{b} = 1$.
14. Equation of the line parallel to x -axis and passing through $(-2, 3)$ is
(A) $x = 3$ (B) $x = -2$ (C) $y = 2$ (D) $y = 3$.
15. Equation of the line parallel to y -axis and passing through $(-2, 3)$ is
(A) $x = 3$ (B) $x = -2$ (C) $y = 2$ (D) $y = 3$.

16. Equation of the line passing through $(-2,3)$ with slope -4 is
 (A) $4x + y - 11 = 0$ (B) $4x + y + 5 = 0$ (C) $x + 4y - 11 = 0$ (D) $+4y + 5 = 0$.
17. Equation of the line through the points $(1,-1)$ and $(3,5)$ is
 (A) $y = 3x + 4$ (B) $y = 3x - 4$ (C) $3x + y - 4 = 0$ (D) $3x + y + 4 = 0$.
18. Equation of the passing through $(0, 0)$ and slope m is
 (A) $y = mx + c$ (B) $x = my + c$ (C) $y = mx$ (D) $x = my$.
19. Equation of the lines for which $\tan \theta = 1/2$ where θ is the inclination of the line and y-intercept is 4 is
 (A) $x - 2y + 8 = 0$ (B) $y = x + 8$ (C) $x + 2y + 8 = 0$ (D) $-x + 2y + 4 = 0$.
20. Equation of the line passing through the point $(2,3)$ with inclined with x-axis at an angle of 45° is
 (A) $x - y + 5 = 0$ (B) $x - y - 1 = 0$ (C) $x + y + 8 = 0$ (D) $x - y + 1 = 0$.
21. The Equations for x and y axes are
 (A) $x = 1, y = 1$ (B) $y = 1$ (C) $x = 0$ and $y = 0$ (D) $x = 1$ and $y = 0$.
22. The equation of the line passing through the point $(2, 3)$ with slope 2 is
 (A) $2x + y - 1 = 0$ (B) $2x - y + 1 = 0$ (C) $2x - y - 1 = 0$ (D) $2x + y + 1 = 0$
23. Equation of the line intersecting the x-axis at a distance of 3 units to the left of origin with slope -2 is
 (A) $2x - 2y - 6 = 0$ (B) $y = 2x + 6$ (C) $2x - y + 6 = 0$ (D) $2x + y + 6 = 0$.
24. A line cutting off intercept -3 from the y-axis and slope of tangent is $\frac{3}{5}$, its equation
 (A) $5y - 3x + 15 = 0$ (B) $3y - 5x + 15 = 0$ (C) $5y - 3x - 15 = 0$ (D) None of these
25. The values of k for which the line $(k-3)x - (4-k^2)y + k^2 - 7k + 6 = 0$ is parallel to the y-axis
 (A) 4 (B) ± 2 (C) 3 (D) 6 or 1.
26. Perpendicular distance from the origin to line $\sqrt{3}x + y + k = 0$ is 5 units, then k is
 (A) 6 (B) 10 (C) 5 (D) -10
27. The vertices of ΔPQR are $P(2, 1)$, $Q(-2, 3)$ and $R(4, 5)$, then equation of the median through the vertex R.
 (A) $3x + 4y - 8 = 0$ (B) $3x + 4y + 8 = 0$ (C) $3x - 4y + 8 = 0$ (D) $3x - 4y - 8 = 0$.
28. The slope of the line $ax + by + c = 0$
 (A) $\frac{a}{b}$ (B) $-\frac{a}{b}$ (C) $-\frac{c}{b}$ (D) $\frac{c}{b}$
29. The slope of the line $3x - 4y + 10 = 0$ is
 (A) $-\frac{3}{4}$ (B) $\frac{3}{4}$ (C) $-\frac{10}{3}$ (D) $\frac{5}{2}$.
30. The x-intercept of the line $3x - 4y + 10 = 0$ is
 (A) $5/2$ (B) $-10/3$ (C) $3/4$ (D) 2 .
31. The y-intercept of the line $3x - 4y + 10 = 0$ is
 (A) $5/2$ (B) $-10/3$ (C) $3/4$ (D) 2 .
32. Slope of a line which cuts off intercepts of equal lengths on axes is
 (A) -1 (B) 0 (C) 2 (D) $\sqrt{3}$
33. The inclination of the line $x - y + 3 = 0$ with the positive direction of x-axis is
 (A) 45° (B) 135° (C) -45° (D) -135°
34. The values of k for which the line $(k-3)x - (4-k^2)y + k^2 - 7k + 6 = 0$ is parallel to the x-axis,
 (A) 4 (B) ± 2 (C) 3 (D) 6 or 1.
35. The values of k for which the line $(k-3)x - (4-k^2)y + k^2 - 7k + 6 = 0$ is passing through the origin.
 (A) 4 (B) ± 2 (C) 3 (D) 6 or 1.

36. The two lines $ax + by = c$ and $a'x + b'y = c'$ are perpendicular if
 (A) $aa' + bb' = 0$ (B) $ab' = ba'$ (C) $ab + a'b' = 0$ (D) $\frac{a}{a'} = \frac{b}{b'} = \frac{c}{c'}$
37. The two lines $ax + by = c$ and $a'x + b'y = c'$ are parallel if
 (A) $\frac{a}{a'} = \frac{b}{b'}$ (B) $aa' = bb'$ (C) $aa' + bb' = 0$ (D) $\frac{a}{a'} = \frac{b}{b'} = \frac{c}{c'}$
38. The perpendicular distance of the point P (1, -3) from the line $2y - 3x = 4$ is
 (A) 13 (B) $\frac{7}{13}\sqrt{13}$ (C) $\sqrt{13}$ (D) None of these
39. The distance of the point (-1, 1) from the line $12(x + 6) = 5(y - 2)$.
 (A) 13 (B) 5 (C) $\frac{55}{13}$ (D) $\frac{60}{13}$
40. The distance between the lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$ is
 (A) $\frac{2}{5}$ (B) $\frac{5}{2}$ (C) $\frac{12}{25}$ (D) $\frac{12}{5}$
41. The equation of the straight line passing through the point (3, 2) and perpendicular to the line $y = x$ is
 (A) $x - y = 5$ (B) $x + y = 5$ (C) $x + y = 1$ (D) $x - y = 1$
42. The distance between the lines $y = mx + c_1$ and $y = mx + c_2$ is
 (A) $\frac{c_1 - c_2}{\sqrt{m^2 + 1}}$ (B) $\frac{|c_1 - c_2|}{\sqrt{1 + m^2}}$ (C) $\frac{c_2 - c_1}{\sqrt{1 + m^2}}$ (D) 0
43. Equation of the line passing through (1, 2) and parallel to $y = 3x - 1$ is
 (A) $y + 2 = x + 1$ (B) $y + 2 = 3(x + 1)$ (C) $y - 2 = 3(x - 1)$ (D) $y - 2 = x - 1$
44. The equation of the straight line passing through the point (1, 2) and perpendicular to the line $x + y + 1 = 0$ is
 (A) $y - x + 1 = 0$ (B) $y - x - 1 = 0$ (C) $y - x + 2 = 0$ (D) $y - x - 2 = 0$
45. The distance between parallel lines $15x + 8y - 34 = 0$ and $15x + 8y + 31 = 0$
 (A) $\frac{65}{17}$ (B) $\frac{3}{17}$ (C) 5 (D) $\frac{65}{19}$
46. Find the distance between P (x_1, y_1) and Q (x_2, y_2) when PQ is parallel to the y -axis
 (A) y_2 (B) x_2 (C) $y_2 - y_1$ (D) $x_2 - x_1$
47. Find the distance between P (x_1, y_1) and Q (x_2, y_2) when PQ is parallel to the x -axis.
 (A) y_2 (B) x_2 (C) $y_2 - y_1$ (D) $x_2 - x_1$
48. The slope of the x - axis is
49. If a line makes an inclination of $\frac{\pi}{3}$ with the positive direction of x -axis, then the slope of the line is
50. The slope of the line which makes angle $\frac{\pi}{4}$ with positive direction of y -axis is...
51. The slope of the line passing through the points (2, 3) and (-5, 8) is.....
52. The slope of the line parallel to the line passing through the points (-2, 5) and (4, 9) is ...
53. The slope of the line perpendicular to the line passing through the points (6, 3) and (4, 8) is
54. The equation of the horizontal line passing through the point (3, 5) is $y = \dots$
55. The equation of the vertical line passing through the point (-4, 8) is $x = \dots$
56. The equation of the horizontal line intercepting the y - axis 3 units above the origin is $y = \dots$
57. The equation of the horizontal line intercepting the y - axis 6 units below the origin is $y = \dots$
58. The equation of the vertical line intercepting the x - axis 1 units right of the origin is $x = \dots$
59. The equation of the vertical line intercepting the x - axis 5 units left of the origin is $x = \dots$
60. The equation of x axis is
61. The equation of y axis is
62. The slope of the line $2x + 7y + 9 = 0$ is
63. The x -intercept of the line $5x - 3y = 6$ is

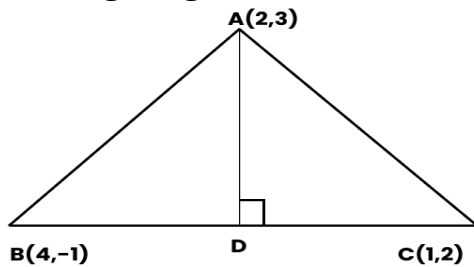
64. The y-intercept of the line $8x - y + 6 = 0$ is

65. Equation of line in the figure is



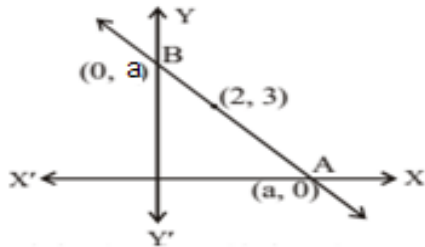
- A) $5x + 3y = 15$
- B) $3x + 5y = 15$
- C) $3x + 5y + 15 = 0$
- D) $5x + 3y + 15 = 0$

66. For the figure given below the slope of altitude AD is



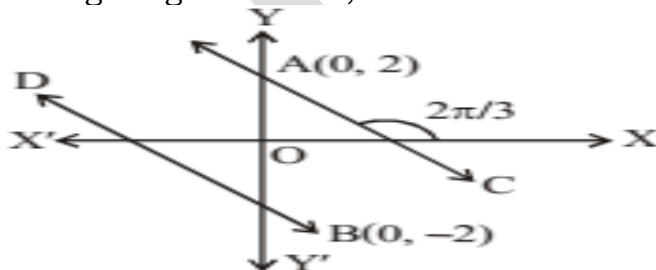
- A) 1
- B) -1
- C) $-\frac{5}{3}$
- D) $\frac{3}{5}$

67. For the figure given below the equation of line AB is



- A) $x + y = 5$
- B) $x + y = 2$
- C) $x + y = 1$
- D) $x + y = 3$

68. For the figure given below, consider the following statements 1 and 2

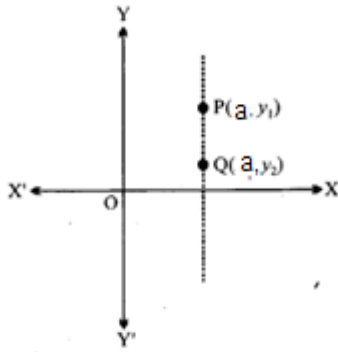


Statement 1: The slope of the line AC $= -\sqrt{3}$

Statement 2: The equation of line DB is $y = -\sqrt{3}(x + 2)$

- A) Statement 1 is true and Statement 2 is false
- B) Statement 1 is false and Statement 2 is true
- C) Both Statement 1 and 2 are true
- D) Both Statement 1 and 2 are false.

69. For the figure given below, consider the following statements 1,2 and 3



Statement 1: Distance $PQ = |y_1 - y_2|$

Statement 2: The equation of line PQ is $x=a$.

Statement 3: The slope of the line $PQ = 0$.

- A) Statement 1 is true and Statement 2 and 3 are false.
 B) Statement 1 and 2 are true but Statement 3 is false.
 C) Statement 1 and 3 are true but Statement 2 is false.
 D) Statement 2 and 3 are true but Statement 1 is false
70. **Statement I:** The point (0,2) is at 2 units distance from X-axis above the origin
Statement II: The point (2,0) is at 2 units distance from the Y- axis left of origin
 (A) Both statements are true
 (B) Statement I is true and statement II is false
 (C) Statement I is false and statement II is true
 (D) Both statements are false.
71. The two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where $b_1, b_2 \neq 0$ are
Statement I: Parallel if $\frac{a_1}{a_2} = \frac{b_1}{b_2}$
Statement II: Perpendicular if $a_1 \cdot a_2 - b_1 b_2 = 0$
 (A) Both I and II are true (B) only I is true
 (C) only II is true (D) Both I and II are false
72. **STATEMENT 1:**
 Equation of vertical line to the right of y-axis at 5 units from y-axis is $x = 5$
STATEMENT 2: Equation of y-axis is $x=0$. Vertical line is parallel to y-axis
 (A) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
 (B) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
 (C) STATEMENT 1 is true and STATEMENT 2 is false.
 (D) STATEMENT 1 is false and STATEMENT 2 is false.
73. **Assertion (A):** If x-intercept of a line is 4 and its y-intercept is 2 then the equation of line is $x+2y-4=0$
Reason(R): If x-intercept of a line is a and y-intercept of line is b so, equation of line is $\frac{x}{a} + \frac{y}{b} = 1$.
 (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.

74. If $3x + 4y + 60 = 0$ equation of a straight line. Match List I with List II

List I	List II
a) The slope of the line	i) 12
b) The y-intercept of the line	ii) $-\frac{3}{4}$
c) The distance of the point (0, 0) from the line	iii) -15

Choose the correct answer from the options given below:

A) a-iii, b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii.

75. 1. If area of triangle formed by three points is zero then the three points must be collinear.

2. If a line is parallel to x-axis then its inclination is 90°

3. If a line is parallel to y-axis then its inclination is zero.

Which of the above statements are correct?

(A) 1 and 2 but not 3 (B) 1 and 3 but not 3 (C) 1 only (D) All 1, 2 and 3.

Two mark questions

- Find the slope of a line, which passes through origin, and the midpoint of the line segment joining the points (0, -4) and (8, 0). (U)
- Line through the points (-2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24). Find the value of x. (U)
- The line through the points (h, 3) and (4, 1) is perpendicular to the line $7x + 9y + 19 = 0$. Find the value of h. (U)
- Line through the points (5, -6) and (7, -3) is parallel to the line through the points (x, 8) and (5, 24). Find the value of x. (U)
- Find the value of x for which the points (x, -1), (2, 1) and (4, 5) are collinear. (K)
- Find the value of k for which the points (1, k), (3, 1) and (4, -1) are collinear. (K)
- Find the angle between the x-axis and the line joining the points (3, -1) and (4, -2). (A)
- Find the angle between the lines $x - \sqrt{3}y + 5 = 0$ and $\sqrt{3}x - y + 7 = 0$. (K)
- Find the angle between the lines $x - y + 9 = 0$ and $x + y + 7 = 0$. (K)
- Find the angle between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1$. (K)
- Find the tangent of the angle between the lines $2x + 3y - 8 = 0$ and $5x - y + 7 = 0$. (K)
- Find the equation of the line passing through the point (-2, 3) with slope -4. (K)
- Find the equation of the line passing through the point (-4, 3) with slope $\frac{1}{2}$. (K)
- Find the equation of the line passing through the point (0, 0) with slope 8. (K)
- Find the equation of the line passing through the point (-2, -9) and inclined with x axis at an angle 45° . (U)
- Find the equation of the line passing through the point (2, $2\sqrt{3}$) and inclined with x axis at an angle 75° . (U)
- Find the equation of the line intersecting x axis at distance 3 units to the left of origin with slope -2. (U)
- Find the equation of the line intersecting y axis at a distance 2 units above the origin and making an angle 30° with positive direction of x axis. (U)
- Find the equation of the line passing through the points (1, -1) and (3, 5). (K)
- Find the equation of the line passing through the points (-1, 1) and (2, -4). (K)
- Find the equation of the line with slope 2 and y-intercept 3. (K)
- Find the equation of the line for which $\tan\theta = \frac{1}{2}$, where θ is the inclination of the line and y-intercept $\frac{-3}{2}$. (K)

23. Find the equation of the line with slope $\frac{-1}{3}$ and x- intercept -3. (U)
24. Find the equation of the line, which makes intercepts -3 and 2 on the x and y axes respectively. (K)
25. Find the equation of the median of the triangle PQR through the vertex R whose vertices are given by P(2,1), Q(-2,3), R(4,5). (U)
26. Find the equation of the line passing through (-3, 5) and perpendicular to the line through the points (2,5) and (-3,6). (U)
27. The perpendicular from the origin to a line meets it at the point (-2, 9), find the equation of the line. (A)
28. Show that the points (3,0), (-2, -2) and (8,2) are collinear. (U)
29. Find the equation of the line parallel to the line $3x-4y+2 = 0$ and passing through the point (-2,3) (U)
30. Find the equation of the line perpendicular to the line $6x+5y+2 = 0$ and passing through the point (5, 2). (U)
31. Find the equation of the line perpendicular to the line $3x-5y+9 = 0$ and passing through the point (-1,8). (U)
32. Find the equation of the line perpendicular to the line $x-7y+5 = 0$ and having x-intercept 3. (U)
33. Find the equation of the line parallel to the line $5x+3y+1 = 0$ and having y-intercept 8. (U)
34. Reduce the equation $6x+3y-5=0$ into slope-intercept form and find the slope and y-intercept of the line. (U)
35. Reduce the equation $3x-4y-5=0$ into slope-intercept form and find the slope and y-intercept of the line. (U)
36. Reduce the equation $x+7y = 0$ into slope-intercept form and find the slope and y-intercept of the line. (U)
37. Reduce the equation $3x+2y-12=0$ into intercept form and find the values of x and y intercepts. (U)
38. Reduce the equation $4x-3y=6$ into intercept form and find the values of x and y intercepts. (U)
39. Find the distance of the point (-1,1) from the line $12x-5y+82=0$. (K)
40. Find the distance of the point (3, -5) from the line $3x-4y-26=0$. (K)
41. Find the distance between the parallel lines $3x-4y+7=0$ and $3x-4y+5=0$. (K)
42. Find the distance between the parallel lines $15x+8y-34=0$ and $15x+8y+30 = 0$. (K)
43. Find the equation of right bisector(perpendicular bisector) of the line segment joining the points(3,4) and (-1,2). (A)
44. Find the point of intersection of the lines $2x+3y-7 = 0$ and $x-4y+7 = 0$. (U)

Three mark questions

- If the angle between two lines is $\pi/4$ and slope of one of the lines is $1/2$ find the slope of the other line.
- The slope of a line is double of the slope of another line. If tangent of the angle between them is $1/3$, find the slopes of the lines.
- Find the equation of the line which cuts off equal intercepts on the coordinate axes and passes through the point (2,3).
- Find equation of the line passing through the point (2, 2) and cutting off intercepts on the axes whose sum is 9.
- The perpendicular from the origin to a line meets it at the point (-2, 9), find the equation of the line.
- If P(a,b) is the midpoint of line segment between the axes . Show that equation of the line is $\frac{x}{a} + \frac{y}{b} = 1$
- Point R (h, k) divides a line segment between the axes in the ratio 1: 2. Find equation of the line.

8. Find the points on the x -axis, whose distances from the line $\frac{x}{3} + \frac{y}{4} = 1$ are 4 units
9. The line through the points $(h, 3)$ and $(4, 1)$ intersects the line $7x + 9y - 19 = 0$. at right angle. Find the value of h .
10. Two lines passing through the point $(2, 3)$ intersects each other at an angle of 60° . If slope of one line is 2, find equation of the other line.
11. Find the coordinates of the foot of perpendicular from the point $(-1, 3)$ to the line $3x - 4y - 16 = 0$.
12. The perpendicular from the origin to the line $y = mx + c$ meets it at the point $(-1, 2)$. Find the values of m and c
13. In the triangle ABC with vertices A $(2, 3)$, B $(4, -1)$ and C $(1, 2)$, find the equation and length of altitude from the vertex A.
14. Find the equation of the line which cuts off equal intercepts on the coordinate axes and passes through the point $(2, 3)$.
15. If P $(2, 4)$ is the midpoint of line segment between the axes, find the equation of the line. (A)
16. In the triangle ABC with vertices A $(2, 3)$, B $(4, -1)$ and C $(1, 2)$, find the equation of the altitude from the vertex A. (U)
17. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b , then show that $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2}$
18. Find the equations of the lines, which cut-off intercepts on the axes whose sum and product are 1 and -6 , respectively.
19. Find the equation of a line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point, where it meets the y -axis.
20. Find the value of p so that the three lines $3x + y - 2 = 0$, $px + 2y - 3 = 0$ and $2x - y - 3 = 0$ may intersect at one point
21. Find the equation of the lines through the point $(3, 2)$ which make an angle of 45° with the line $x - 2y = 3$.
22. Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1, 2)$ along the line $2x - y = 0$.

Five mark questions

1. Derive an expression for the acute angle between two lines having slopes m_1 and m_2 and hence find the acute angle between the lines $x + y - 6 = 0$ and $x - y - 5 = 0$. (U)
2. Derive the equation of the line having slope 'm' and passing through the point (x_0, y_0) and hence find the equation of the line having slope 3 and passing through the point $(3, -1)$. (U)
3. Derive the equation of the line passing through the points (x_1, y_1) and (x_2, y_2) hence find the equation of the line passing through the points $(4, 7)$ and $(-3, 8)$. (U)
4. Derive the equation of the line having slope 'm' and y -intercept 'c' and hence find the equation of the line having slope -2 and y -intercept 4. (U)
5. Derive the equation of the line having x and y -intercept values as 'a' and 'b' respectively and hence find the equation of the line having x and y -intercept values as 2 and 6 respectively.
6. Derive an expression for the perpendicular distance between a point and a line. (U)

CHAPTER - 10 CONIC SECTIONS

MCQ /FB

1. If α be the angle between axis and generator of the cone .Let β be the angle made by the intersecting plane with the vertical axis of the cone, then which of the following is incorrect
 - A) When $\beta > 90^\circ$, the section is a *circle*
 - B) When $\alpha < \beta < 90^\circ$, the section is an *ellipse*
 - C) When $\beta = \alpha$; the section is a *parabola*
 - D) When $0 \leq \beta < \alpha$; the section is a *hyperbola*
2. When the plane cuts at the vertex of the cone . If α be the angle between axis and generator of the cone .Let β be the angle made by the intersecting plane with the vertical axis of the cone, then which of the following is incorrect
 - A) When $\alpha < \beta \leq 90^\circ$, then the section is a point
 - B) When $\beta = \alpha$, the plane contains a generator of the cone and the section is a straight line
 - C) When $0 \leq \beta < \alpha$, the section is a pair of intersecting straight lines
 - D) When $\beta = 90^\circ$ the section is a *circle*.
3. Which of the following is incorrect
 - (A) A circle is the set of all points in a plane that are equidistant from a fixed point in the plane.
 - (B) parabola is the set of all points in a plane that are equidistant from a fixed line and a fixed point in the plane
 - (C) An *ellipse* is the set of all points in a plane, the difference of whose distances from two fixed points in the plane is a constant.
 - (D) A hyperbola is the set of all points in a plane, the difference of whose distances from two fixed points in the plane is a constant.
4. Which of the following is incorrect
 - A) The equation of a circle with centre (h, k) and the radius r is $(x - h)^2 + (y - k)^2 = r^2$.
 - B) The equation of the parabola with focus at $(a, 0)$ $a > 0$ and directrix $x = -a$ is $y^2 = 4ax$.
 - C) The equation of an ellipse with foci on the x -axis is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
 - D) The equation of a hyperbola with foci on the x -axis is $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$.
5. Which of the following is incorrect
 - A) Length of the latus rectum of the parabola $y^2 = 4ax$ is $4a$.
 - B) Length of the latus rectum of the parabola $x^2 = 4ay$ is $2a$.
 - C) Length of the latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $\frac{2b^2}{a}$
 - D) Length of the latus rectum of a hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is $\frac{2b^2}{a}$.
6. Which of the following is correct
 - A) When the axis of symmetry is along the x -axis the parabola opens to the right if $a < 0$
 - B) When the axis of symmetry is along the x -axis the parabola opens to the left if $a > 0$
 - C) When the axis of symmetry is along the y -axis the parabola opens upwards if $a < 0$
 - D) When the axis of symmetry is along the y -axis the parabola opens downwards if $a < 0$
7. Equation of the circle with centre at $(0,0)$ and radius r .
 - A) $x^2 + y^2 = r^2$
 - B) $(x - 1)^2 + (y - 1)^2 = r^2$
 - C) $(x + 1)^2 + (y + 1)^2 = r^2$
 - D) $x^2 + y^2 = 1$.
8. Equation of the circle with centre at $(-3,2)$ and radius 4.
 - A) $x^2 + y^2 + 6x - 4y + 3 = 0$
 - B) $x^2 + y^2 - 6x + 4y - 3 = 0$
 - C) $x^2 + y^2 - 6x + 4y + 3 = 0$
 - D) $x^2 + y^2 + 6x - 4y - 3 = 0$

9. Equation of the circle with centre at (1,1) and radius $\sqrt{2}$.
 A) $x^2 + y^2 - 2x - 2y = 0$ B) $x^2 + y^2 - 2x - 2y + 2 = 0$
 C) $x^2 + y^2 + 2x + 2y = 0$ D) $x^2 + y^2 + 2x + 2y + 2 = 0$
10. Equation of the circle with centre at (0,2) and radius 2.
 A) $x^2 + y^2 - 4y = 4$ B) $x^2 + y^2 - 4x + 4 = 0$
 C) $x^2 + y^2 - 4y = 0$ D) $x^2 + y^2 - 4x + 4 = 0$
11. The radius of a circle with centre (2,2) and passes through the point (4,5).
 A) 13 B) $\sqrt{13}$ C) 5 D) $\sqrt{5}$
12. The centre of the circle with radius 5 whose centre lies on x- axis and passes through the point (2,3).
 A) (6, 6) B) (-2, 0) & (6, 0) C) (4, 0) D) (5, 0)
13. The centre and radius of the circles $(x + 5)^2 + (y - 3)^2 = 36$
 A) (5, -3) , 6 B) (-5, 3) , 6 C) (5, -3) , 36 D) (-5, 3) , 36
14. The centre and radius of the circles $x^2 + y^2 - 4x - 8y - 45 = 0$
 A) (-2, -4) , 5 B) (2, 4) , 5 C) (-2, -4) , 25 D) (2, 4) , $\sqrt{65}$.
15. The centre and radius of the circles $2x^2 + 2y^2 - x = 0$
 A) $(\frac{1}{4}, 0)$, $\frac{1}{4}$ B) $(\frac{1}{4}, 0)$, $\frac{1}{16}$ C) $(0, \frac{1}{4})$, $\frac{1}{4}$ D) $(\frac{1}{2}, 0)$, $\frac{1}{4}$
16. Which of the following is correct
 A) The point (-2.5, 3.5) lie inside the circle $x^2 + y^2 = 25$
 B) The point (-2.5, 3.5) lie outside the circle $x^2 + y^2 = 25$
 C) The point (-2.5, 3.5) lie on the circle $x^2 + y^2 = 25$
 D) The point (-2.5, 3.5) lie inside the circle $x^2 + y^2 = 16$.
17. The coordinates of the focus and the equation of the directrix of the parabola $y^2 = 8x$.
 A) (2, 0) , $x = 2$ B) (2, 0) , $x = -2$ C) (0, 2) , $y = 2$ D) (0, 2) , $y = -2$.
18. The length of the latus rectum of the parabola $y^2 = -9x$
 A) 9 B) -9 C) $\frac{9}{4}$ D) $\frac{9}{2}$.
19. The coordinates of the focus and the length of the latus rectum of the parabola $x^2 = -16y$.
 A) (-4, 0) , 16 B) (0, 4) , 16 C) (4, 0) , 16 D) (0, -4) , 16.
20. The axis and the length of the latus rectum of the parabola $x^2 = 6y$.
 A) $x = 0$ and 6 B) $y = 0$ and 6 C) $x = 0$ and $\frac{6}{4}$ D) $y = 0$ and $\frac{6}{4}$.
21. The equation of the parabola with vertex at (0, 0) and focus at (0, 2) is
 A) $x^2 = 4y$ B) $x^2 = 8y$ C) $y^2 = 8x$ D) $y^2 = 4x$.
22. The equation of the parabola with focus (6,0); directrix $x = -6$ is
 A) $x^2 = -24y$ B) $x^2 = 24y$ C) $y^2 = 24x$ D) $y^2 = -24x$.
23. The equation of the parabola with vertex (0,0) passing through (1,2) and axis is along x-axis.
 A) $x^2 = \frac{1}{2}y$ B) $x^2 = 4y$ C) $y^2 = 2x$ D) $y^2 = 4x$.
24. The coordinates of the foci and length of major axis of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$.
 A) $(\pm 4, 0)$ and 10 B) $(\pm 5, 0)$ and 10 C) $(0, \pm 4)$ and 10 D) $(0, \pm 3)$ and 10
25. The coordinates of the vertices and the length of minor axis of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$
 A) $(\pm 4, 0)$ and 6 B) $(\pm 5, 0)$ and 6 C) $(0, \pm 3)$ and 6 D) $(0, \pm 4)$ and 6
26. The the eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$
 A) $\frac{4}{5}$ B) $\frac{4}{3}$ C) $\frac{18}{5}$ D) $\frac{3}{4}$.

27. The latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$
 A) $\frac{4}{5}$ B) $\frac{10}{3}$ C) $\frac{18}{5}$ D) $\frac{25}{3}$.
28. The coordinates of the foci of the ellipse $16x^2 + y^2 = 16$
 A) $(\pm\sqrt{15}, 0)$ B) $(0, \pm\sqrt{15})$ C) $(0, \pm\sqrt{17})$ D) $(\pm\sqrt{17}, 0)$
29. The coordinates of the vertices of the ellipse $16x^2 + y^2 = 16$
 A) $(\pm 4, 0)$ B) $(0, \pm 4)$ C) $(0, \pm 1)$ D) $(\pm 1, 0)$
30. The length of major axis and the minor axis of the ellipse $16x^2 + y^2 = 16$
 A) 8 and 2 B) 2 and 8 C) 8 and 1 D) 1 and 8 .
31. The eccentricity of the ellipse $16x^2 + y^2 = 16$
 A) $\frac{\sqrt{15}}{4}$ B) $\sqrt{15}$ C) $\frac{\sqrt{17}}{4}$ D) $\frac{1}{2}$.
32. The length of latus rectum of the ellipse $16x^2 + y^2 = 16$
 A) 1/2 B) 16 C) 32 D) 8 .
33. The equation of the ellipse, with Ends of major axis $(\pm 3, 0)$, ends of minor axis $(0, \pm 2)$
 A) $\frac{x^2}{16} + \frac{y^2}{36} = 1$ B) $\frac{x^2}{36} + \frac{y^2}{16} = 1$ C) $\frac{x^2}{9} + \frac{y^2}{4} = 1$ D) $\frac{x^2}{4} + \frac{y^2}{9} = 1$
34. The coordinates of the foci and the vertices of the hyperbolas: $\frac{x^2}{9} - \frac{y^2}{16} = 1$
 A) $(\pm 5, 0)$ and $(\pm 4, 0)$ B) $(\pm 5, 0)$ and $(\pm 3, 0)$
 C) $(0, \pm 5)$ and $(\pm 4, 0)$ D) $(0, \pm 5)$ and $(0, \pm 4)$
35. The eccentricity of the hyperbolas: $\frac{x^2}{9} - \frac{y^2}{16} = 1$
 A) $\frac{5}{4}$ B) $\frac{5}{3}$ C) $\frac{18}{4}$ D) $\frac{32}{3}$.
36. The length of latus rectum of the hyperbolas: $\frac{x^2}{9} - \frac{y^2}{16} = 1$
 A) $\frac{5}{4}$ B) $\frac{5}{3}$ C) $\frac{18}{4}$ D) $\frac{32}{3}$.
37. The coordinates of the foci of the hyperbolas: $16y^2 - x^2 = 16$
 A) $(\pm\sqrt{15}, 0)$ B) $(0, \pm\sqrt{15})$ C) $(0, \pm\sqrt{17})$ D) $(\pm\sqrt{17}, 0)$
38. The coordinates of the vertices of the hyperbolas: $16y^2 - x^2 = 16$
 A) $(\pm 4, 0)$ B) $(0, \pm 4)$ C) $(0, \pm 1)$ D) $(\pm 1, 0)$
39. The eccentricity of the hyperbolas: $16y^2 - x^2 = 16$
 A) $\frac{\sqrt{17}}{4}$ B) $\sqrt{17}$ C) $\frac{\sqrt{15}}{4}$ D) $\sqrt{15}$.
40. The latus rectum of the hyperbolas: $16y^2 - x^2 = 16$
 A) 16 B) 8 C) $\frac{1}{2}$ D) $\frac{1}{4}$.
41. The eccentricity of the an *equilateral hyperbola* is
 A) 2 B) $\sqrt{2}$ C) $\frac{\sqrt{5}}{2}$ D) $\sqrt{3}$.
42. The eccentricity is never less than one
 A) *circle* B) *parabola* C) *ellipse* D) *hyperbola* .
43. The equation of the parabola which is symmetric about the *y*-axis, and passes through the point $(2, -3)$.
 A) $3x^2 = 4y$ B) $4x^2 = -3y$ C) $3x^2 = -4y$ D) $3y^2 = -4x$
44. The length of the minor axis of the ellipse, whose length of the major axis is 20 and foci are $(0, \pm 5)$.
 A) 75 B) $10\sqrt{3}$ C) $5\sqrt{3}$ D) 10 .
45. The length of the minor axis of the ellipse, whose Vertices $(\pm 5, 0)$ and foci $(\pm 4, 0)$
 A) 6 B) 3 C) 4 D) 8

46. The equation for the ellipse whose ends of major axis $(\pm 3, 0)$ and ends of minor axis $(0, \pm 2)$
 A) $\frac{x^2}{9} + \frac{y^2}{4} = 1$ B) $\frac{x^2}{4} + \frac{y^2}{9} = 1$ C) $\frac{x^2}{6} + \frac{y^2}{4} = 1$ D) $\frac{x^2}{3} + \frac{y^2}{4} = 1$
47. The equation for the ellipse whose ends of major axis $(0, \pm 5)$ and ends of minor axis $(\pm 1, 0)$
 A) $\frac{x^2}{25} + \frac{y^2}{1} = 1$ B) $\frac{x^2}{1} + \frac{y^2}{25} = 1$ C) $\frac{x^2}{25} + \frac{y^2}{4} = 1$ D) $\frac{x^2}{2} + \frac{y^2}{25} = 1$
48. The equation for the hyperbola whose Vertices $(\pm 2, 0)$ and foci $(\pm 3, 0)$
 A) $\frac{x^2}{4} - \frac{y^2}{9} = 1$ B) $\frac{x^2}{4} - \frac{y^2}{5} = 1$ C) $\frac{x^2}{5} - \frac{y^2}{4} = 1$ D) $\frac{y^2}{4} - \frac{x^2}{5} = 1$
49. The equation for the hyperbola whose Vertices $(0, \pm 5)$ and foci $(0, \pm 8)$
 A) $\frac{x^2}{25} - \frac{y^2}{64} = 1$ B) $\frac{y^2}{25} - \frac{x^2}{64} = 1$ C) $\frac{x^2}{25} - \frac{y^2}{39} = 1$ D) $\frac{y^2}{25} - \frac{x^2}{39} = 1$
50. The equation for the hyperbola whose Foci $(\pm 5, 0)$ and the transverse axis is of length 8
 A) $\frac{x^2}{16} - \frac{y^2}{9} = 1$ B) $\frac{y^2}{9} - \frac{x^2}{16} = 1$ C) $\frac{x^2}{16} - \frac{y^2}{25} = 1$ D) $\frac{y^2}{25} - \frac{x^2}{16} = 1$
51. The equations of the hyperbola whose Foci $(0, \pm 13)$ and the conjugate axis is of length 24.
 A) $\frac{x^2}{25} - \frac{y^2}{144} = 1$ B) $\frac{y^2}{144} - \frac{x^2}{25} = 1$ C) $\frac{x^2}{144} - \frac{y^2}{25} = 1$ D) $\frac{y^2}{25} - \frac{x^2}{144} = 1$
52. **Statement 1:** The eccentricity of hyperbola $9x^2 - 16y^2 = 144$ is $\frac{5}{4}$
Statement 2: The eccentricity of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is $\frac{\sqrt{a^2+b^2}}{a}$.
 (A) Statement 1 is true and Statement 2 is false.
 (B) Statement 1 is false and Statement 2 is false.
 (C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 (D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
53. **Statement 1:** The equation of circle which pass through $(5, 9)$ and center at $(2, 5)$ is $(x - 2)^2 + (y - 5)^2 = 25$
Statement 2: Equation of circle with center at (a, b) and radius r units is $(x-a)^2 + (y-b)^2 = r^2$.
 A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
54. **Statement 1:** The center of ellipse is same as a vertex.
Statement 2: An ellipse has two vertices and two foci.
Statement 3: Length of major axis of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $2a$.
 A) Statement 1 is true and Statement 2 and 3 are false.
 B) Statement 1 and 2 are true but Statement 3 is false.
 C) Statement 1 and 3 are true but Statement 2 is false.
 D) Statement 2 and 3 are true but Statement 1 is false

55. **Assertion (A):** When the axis of symmetry is along the x -axis the parabola opens to the right if $a < 0$

Reason (R): When the axis of symmetry is along the y -axis the parabola opens downwards if $a > 0$

- (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.

56. The equation of the parabola is $y^2 = -4x$

Statement I: length of the latus rectum is - 4

Statement II: The directrix of the parabola is $x = 1$

- (A) Both I and II are true (B) only I is true
 (C) only II is true (D) Both I and II are false

57. **1.** Latus rectum of a parabola is a line segment perpendicular to the axis of the parabola, through the focus and whose end points lie on the parabola.

2. The eccentricity of a hyperbola is the ratio of the distances from the centre of the hyperbola to one of the foci and to one of the vertices of the hyperbola.

3. An *ellipse* is the set of all points in a plane, the difference of whose distances from two fixed points in the plane is a constant.

Which of the above statements are correct?

- (A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3.

58. For the figure given below, consider the following statements 1 and 2

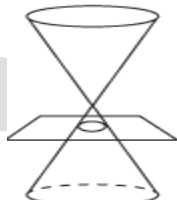


Figure 1



Figure 2



Figure 3

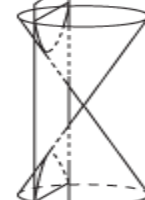


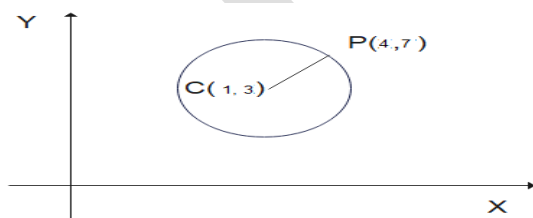
Figure 4

Statement I: Figure 1 ellipse and figure 2 parabola

Statement II: Figure 1 circle and figure 2 hyperbola

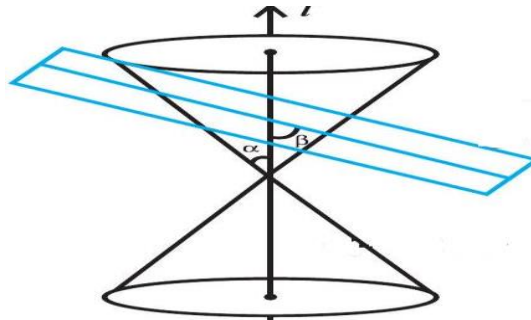
- (A) Both I and II are true (B) only I is true
 (C) only II is true (D) Both I and II are false

59. For the figure given below, radius is



- A) 25 (B) $\sqrt{125}$ (C) 5 (D) $\sqrt{5}$

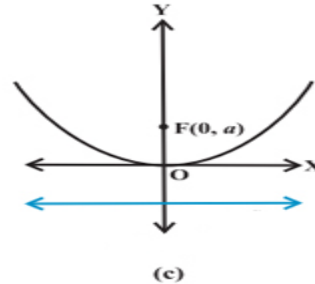
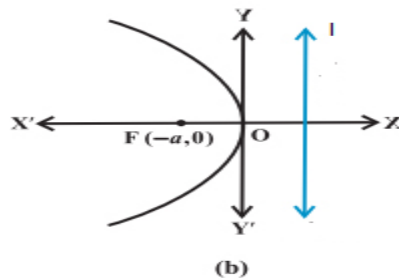
60. For the figure given below



which of the following is incorrect

- A) When $\beta = 90^\circ$, the section is a *circle* B) When $\alpha < \beta < 90^\circ$, the section is an *ellipse*
 C) When $\beta = \alpha$; the section is a *parabola* D) When $0 \geq \beta > \alpha$; the section is a *hyperbola*.

61. For the figure given below, consider the following statements 1 and 2

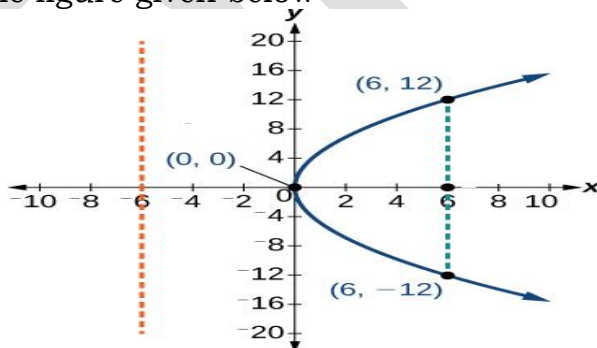


Statement I: Figure (b) equation of parabola is $y^2 = -4ax$

Statement II: Figure (c) equation of parabola is $x^2 = -4ay$

- (A) Both I and II are true (B) only I is true
 (C) only II is true (D) Both I and II are false

62. For the figure given below



which of the following is correct

- A) directrix $x = 6$ B) vertex (0,0) and length of the latus rectum is 6
 C) equation of parabola is $y^2 = 16x$ D) axis is $y=0$ and focus (0,6)

63. The equation of the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$.

Match List I with List II

List I	List II
a) The length of major axis	i) 4
b) The length of minor	ii) 6
c) The length of latus rectum	iii) 9

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii.

64. Match Column I and Column II

Column I	Column II
a) Equation of an equilateral hyperbola.	i) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
b) Equation of an ellipse with centre of the origin and major axis along the x-axis	ii) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$
c) Standard equations of hyperbolas	iii) $\frac{x^2}{a^2} - \frac{y^2}{a^2} = 1$

Choose the correct answer from the options given below:

A) a-iii , b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-iii, c-ii.

65. The area of circle which pass through (1, 3) and center at (1, 0) is
66. Length of latus rectum of parabola $y^2 = 4ax$ which passes from (3,2) is
67. Chord AB is diameter of circle with centre (4,2).If point A (3,2) and point B (5,k), then k is... ..
68. If length of latus rectum of an ellipse is half then minor axis ,then its eccentricity is
69. length of the conjugate axis of $12x^2 - 3y^2 = -36$ is
70. If ratio of major and minor axis of ellipse is 5:3 then eccentricity $e =$

Two marks questions

- Find the centre and radius of the following equation of the circles
 - $x^2 + y^2 + 8x + 10y - 8 = 0$.
 - $x^2 + y^2 - 8x + 10y - 12 = 0$.
 - $x^2 + y^2 - 4x - 8y - 45 = 0$.
 - $2x^2 + 2y^2 - x = 0$. (U)
- Find the coordinates of the focus, axis, and the equation of the directrix of the parabola $y^2 = 8x$. (U)
- Find the coordinates of the focus and the equation of the directrix of the parabola $y^2 = 12x$. (U)
- Find the coordinates of the focus and the equation of the directrix of the parabola $y^2 = 10x$. (U)
- Find the coordinates of the focus, and latus rectum of of the parabola $y^2 = -8x$. (U)
- Find the coordinates of the focus, axis, and latus rectum of of the directrix of the parabola $x^2 = 6y$. (U)
- Find the coordinates of the axis, and the equation of the directrix of the parabola $x^2 = -16y$. (U)
- Find the coordinates of the axis, and the equation of the directrix of the parabola $x^2 = -9y$. (U)
- Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $y^2 = 8x$.
- Find the equation of the directrix and latus rectum of the parabola $y^2 = 12x$. (U)
- Find the equation of the directrix and latus rectum of the parabola $y^2 = 10x$. (U)
- Find the coordinates of the focus, and latus rectum of the parabola $y^2 = -8x$.(U)
- Find the coordinates of the focus, and latus rectum of the parabola $x^2 = 6y$. (U)
- Find the foci and Latus rectum of the ellipse $\frac{x^2}{4} + \frac{y^2}{25} = 1$. (U)
- Find the eccentricity and Latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{100} = 1$. (U)
- Find the foci and eccentricity of the ellipse $\frac{x^2}{100} + \frac{y^2}{400} = 1$. (U)
- Find the eccentricity and Latus rectum of the ellipse $9x^2 + 4y^2 = 36$. (U)
- Find the foci and Latus rectum of the ellipse $36x^2 + 4y^2 = 144$. (U)
- Find the length of major axis and minor axis of the ellipse $16x^2 + y^2 = 16$. (U)

20. Find the vertices, and eccentricity of the ellipse $4x^2 + 9y^2 = 36$. (U)
21. Find the equation of the ellipse given that Vertices($\pm 5,0$) and foci($\pm 4,0$). (U)
22. Find the equation of the ellipse given that Vertices($\pm 13,0$) and foci($\pm 5,0$). (U)
23. Find the equation of the ellipse given that Vertices($\pm 6,0$) and foci($\pm 4,0$). (U)
24. Find the equation of the ellipse given that Vertices($0, \pm 13$) and foci($0, \pm 5$). (U)
25. Find the equation of the ellipse given that Length of major axis is 26 and foci ($\pm 5,0$). (U)
26. Find the equation of the ellipse given that Length of major axis is 20 and foci($0, \pm 5$). (U)
27. Find the equation of the ellipse given that Length of major axis is 16 and foci($0, \pm 6$). (U)
28. Find the equation of the ellipse given that Foci($\pm 3,0$) and length of semi major axis is 4. (U)
29. Find the foci and the eccentricity of the latus rectum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$. (U)
30. Find the foci and the length of the latus rectum of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$. (U)
31. Find the foci and the eccentricity of the hyperbola $16x^2 - 9y^2 = 576$. (U)
32. Find the eccentricity and the length of the latus rectum of the hyperbola $\frac{y^2}{9} - \frac{x^2}{27} = 1$.
33. Find the foci, vertices and the length of the latus rectum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$.
34. Find the foci, vertices and the length of the latus rectum of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ (U)
35. Find the vertices and the length of the latus rectum of the hyperbola $16x^2 - 9y^2 = 576$.
36. Find the foci and vertices the hyperbola $\frac{y^2}{9} - \frac{x^2}{27} = 1$. (U)
37. Find the vertices and the length of the latus rectum of the hyperbola $9y^2 - 4x^2 = 36$.
38. Find the vertices and the length of the latus rectum of the hyperbola $5y^2 - 9x^2 = 36$. (U)
39. Find the vertices and the length of the latus rectum of the hyperbola $49y^2 - 16x^2 = 784$. (U)
40. Find the foci, vertices and the length of the latus rectum of the hyperbola $y^2 - 16x^2 = 16$. (U)
41. Find the equation of the hyperbola given that Vertices ($\pm 2,0$)and foci($\pm 3,0$). (U)
42. Find the equation of the hyperbola given that Vertices ($0, \pm 5$)and foci($0, \pm 8$). (U)
43. Find the equation of the hyperbola given that Vertices ($0, \pm 3$) and foci ($0, \pm 5$). (U)
44. Find the equation of the hyperbola given that Foci ($\pm 5,0$) and the transverse axis is of length 8. (U)
45. Find the equation of the hyperbola given that Foci ($0, \pm 13$) and conjugate axis is of length 24. (U)
46. Find the equation of the hyperbola given that Foci ($\pm 3\sqrt{5}, 0$)and latus rectum is of length 8. (U)
47. Find the equation of the hyperbola given that Foci ($\pm 4,0$)and the latus rectum is of length 12(U)
48. Find the equation of the hyperbola given that Vertices($\pm 7,0$), $e = \frac{4}{3}$. (U)
49. Find the equation of the hyperbola given that Foci($0, \pm\sqrt{10}$), passing through (2, 3). (U)
50. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.

Three marks questions

1. Find the equation of the circle which passes through (2, -2) and (3, 4) and whose centre lies on the line $x + y = 2$. (U)
2. Find the equation of the circle which passes through (4, 1) and (6, 5) and whose centre lies on the line $4x + y = 16$. (U)
3. Find the equation of the circle which passes through (2, 3) and (-1, 1) and whose centre lies on the line $x - 3y - 11 = 0$. (U)
4. Find the equation of the circle with radius 5 whose centre lies on x-axis and passes through the point (2, 3).

5. Find the equation of the circle passing through (0, 0) and making intercepts 'a' and 'b' on the coordinate axes. (U)
6. Find the coordinates of the focus, the equation of the directrix and latus rectum of the parabola $x^2 = -16y$. (U)
7. Find the coordinates of the focus, , the equation of the directrix and latus rectum of the parabola $x^2 = -9y$. (U)
8. Find the equation of the parabola given that vertex (0, 0), passing through (2, 3) and axis is along x-axis. (U)
9. Find the equation of the parabola given that vertex (0, 0), passing through (5, 2) and symmetric with respect to y-axis. (U)
10. Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. (U)
11. Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$. (U)
12. Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. (U)
13. Find the foci, eccentricity and Latus rectum of the ellipse $\frac{x^2}{49} + \frac{y^2}{36} = 1$. (U)
14. Find the foci, eccentricity and Latus rectum of the ellipse $16x^2 + y^2 = 16$. (U)
15. Find the foci, eccentricity and Latus rectum of the ellipse $4x^2 + 9y^2 = 36$. (U)
16. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. (U)
17. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$. (U)
18. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. (U)
19. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{49} + \frac{y^2}{36} = 1$. (U)
20. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{4} + \frac{y^2}{25} = 1$. (U)
21. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{100} = 1$. (U)
22. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $\frac{x^2}{100} + \frac{y^2}{400} = 1$. (U)
23. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $9x^2 + 4y^2 = 36$. (U)
24. Find the vertices, length of major axis, minor axis, and eccentricity of the ellipse $36x^2 + 4y^2 = 144$. (U)
25. Find the equation of the ellipse given that Centre at (0, 0), major axis on the x-axis and passing through the points (4, 3) and (-1, 4). (U)
26. Find the equation of the ellipse given that Centre at (0, 0) , major axis on the x-axis and passing through the points (4, 3) and (6,2). (U)
27. Find the equation of the ellipse given that Centre at (0, 0), major axis on the y-axis and passing through the points (3, 2) and (1, 6). (U)
28. Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $9y^2 - 4x^2 = 36$. (U)
29. Find the foci , the eccentricity and the length of the latus rectum of the hyperbola $5y^2 - 9x^2 = 36$. (U)

30. Find the foci, the eccentricity and the length of the latus rectum of the hyperbola $49y^2 - 16x^2 = 784$. (U)
31. Find the foci, the eccentricity and the length of the latus rectum of the hyperbola $y^2 - 16x^2 = 16$. (S)

Six marks questions

1. Define the Ellipse and derive the equation of the ellipse in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. ($a > b$) (K)
2. Define the Hyperbola and derive the equation of the hyperbola in the form $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. (K)
3. Define the Parabola and derive the equation of the parabola in the form $y^2 = 4ax$. Find the length of the Latus Rectum. (K)

CHAPTER 11

Introduction to three Dimensional Geometry

MCQ /FB

- The three coordinate planes divide the space into eight parts is called is
(a) Quadrants (b) Octants (c) Eighths (d) None of these
- The coordinates of any point on the x -axis will be as
(a) $(0,x,0)$ (b) $(0,y,z)$ (c) $(x,0,0)$ (d) $(0,0,x)$
- The coordinates of any point in the YZ -plane will be as
(a) $(x,y,0)$ (b) $(0,y,z)$ (c) $(x,0,0)$ (d) $(x,0,z)$
- Any point on y -axis is of the form
(a) $(x,y,0)$ (b) $(0,y,0)$ (c) $(0,y,z)$ (d) $(x,0,z)$
- Any point on z -axis is of the form
(a) $(x,0,0)$ (b) $(0,y,0)$ (c) $(0,0,z)$ (d) $(x,y,0)$
- The coordinates of any point in the XY -plane is
(a) $(x,y,0)$ (b) $(0,y,z)$ (c) $(x,0,0)$ (d) $(x,0,z)$
- The coordinates of any point in the XZ -plane is
(a) $(x,y,0)$ (b) $(0,y,z)$ (c) $(x,0,0)$ (d) $(x,0,z)$
- A point is on the x -axis, then its y -coordinate is
(a) x (b) y (c) 0 (d) z
- A point is on the x -axis, then its z -coordinate is
(a) x (b) y (c) 0 (d) z
- A point is in the XZ -plane, then its y -coordinate is
(a) x (b) y (c) 0 (d) z
- The x -axis and y -axis taken together determine a plane known as
(a) xy -plane (b) yz -plane (c) zx -plane (d) z -plane
- The perpendicular distance from the point $P(x, y, z)$ to xy -plane is
(a) x (b) y (c) z (d) $\sqrt{x^2 + y^2}$
- The perpendicular distance from the point $P(6, 7, 8)$ to zx -plane is
(a) 8 (b) 7 (c) 6 (d) 10
- If $P(2,4,5)$ point in the space and PF perpendicular xy -plane, then coordinate of point F is
(a) $(0,0,5)$ (b) $(0,4,5)$ (c) $(2,0,5)$ (d) $(2,4,0)$
- The locus of a point for which $y=0, z=0$?
(a) equation of x -axis (b) equation of y -axis (c) equation of z -axis (d) none of these
- The x -axis is the intersection of two planes
(a) xy and xz (b) yz and zx (c) xy and yz (d) none of these.
- Equation of x -axis is considered as
(a) $x=0, y=0$ (b) $y=0, z=0$ (c) $z=0, x=0$ (d) none of these
- The shortest distance of the point (a,b,c) from the x -axis is
(a) $\sqrt{(a^2 + b^2)}$ (b) $\sqrt{(b^2 + c^2)}$ (c) $\sqrt{(c^2 + a^2)}$ (d) $\sqrt{(b^2 + c^2 + a^2)}$
- The octant in which the points $(-3,1,2)$ lie.
(a) I octant (b) II octant (c) III octant (d) IV octant
- The octant in which the points $(-3,1,-2)$ lie.
(a) V octant (b) VI octant (c) VII octant (d) VIII octant
- The octant in which the points $(-2,-4,-7)$ lie.
(a) V octant (b) VI octant (c) VII octant (d) VIII octant
- The octant in which the points $(-3, -1, 6)$ lie.
(a) I octant (b) II octant (c) III octant (d) IV octant

23. From which of the following the distance of the point (1,2,3) is $\sqrt{10}$
 (a)Origin (b)x-axis (c) y-axis (d)z-axis
24. Perpendicular distance of the point (3,4,5) from the y-axis, is
 (a) $\sqrt{34}$ (b) $\sqrt{41}$ (c) 4 (d) 5
25. The distance between the points (1,-3,4) and (-4,1,2) is
 (a) $\sqrt{29}$ (b) $\sqrt{45}$ (c) $\sqrt{17}$ (d) 7
26. The distance between the points (2, 3, 5) and (4, 3, 1) is
 (a) $\sqrt{6}$ (b) $\sqrt{108}$ (c) $\sqrt{20}$ (d) $\sqrt{56}$
27. The distance between the points (2, -1, 3) and (-2, 1, 3).is
 (a) $\sqrt{20}$ (b) $\sqrt{18}$ (c) $\sqrt{6}$ (d) $\sqrt{56}$
28. The distance of the point (3, 4, 5) from the origin.is
 (a) $5\sqrt{2}$ (b) $5\sqrt{3}$ (c) $\sqrt{5}$ (d) $\sqrt{12}$
29. The coordinates of the centroid of a triangle whose vertices are (2,-3, 1), (1, 0, -1) and (3, 6, 0).
 (a) (2,1,1) (b) (2,1,0) (c) (2,3,0) (d) (2,-1,0)
30. The centroid of a triangle ABC is at the point (1, 1, 1). If the coordinates of A and B are (3, -5, 7) and (-1, 7, -6), respectively, find the coordinates of the point C.
 (a) (1,1,2) (b) (3,1,2) (c) (1,2,2) (d) (1,-1,2)
31. The distance of the point (1,2,3) from the coordinate axes are
 (a) $\sqrt{5}, \sqrt{10}, \sqrt{13}$ (b) 1,2,3 (c) 5,10,13 (d) 3,4,5.
32. Coordinates of the point on X-axis at distance 4 units from origin will be
 (a) (0,4,0) (b) (0,4,4) (c) (4,0,0) (d) (0,0, 4)
33. A point is on negative direction of Y-axis at 5 units from origin will be
 (a) (0,5,0) (b) (0,-5,0) (c) (5,0,5) (d) (-5,0, -5)
34. **Statement 1:** The perpendicular distance from the point P(6, 7, 8) to zx- plane is 7
Statement 2 : The shortest distance of the point (a, b, c) from the x-axis is $\sqrt{b^2 + c^2}$
 A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement
 D) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
35. **Statement 1:** The point (-5,4,3) lie in II Octant.
Statement 2 : The x-coordinate is negative but y and z coordinates are positive. point lie in octant II.
 a) Statement 1 is true and Statement 2 is false.
 b) Statement 1 is false and Statement 2 is false.
 c) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
 d) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
36. **Statement 1:**The point (4, 0, 0) lie on yz-plane.
Statement 2:a point with y and z coordinate zero and x-coordinate having non-zero value must lie on x-axis.
 a) Both statements are true (b) Statement I is true and statement II is false
 c) Statement I is false and statement II is true (d) Both statements are false

37. **Assertion (A):** The point (4, 2, 0) lie on xy-plane.

Reason(R): In 3d coordinate system, a point with z-coordinate zero and x & y coordinate having non-zero value must lie on XY.

- a) Both Assertion (A) and Reason (R) are true .
- b) Both Assertion (A) and Reason (R) are false.
- c) Assertion (A) is true and Reason (R) is false.
- d) Assertion (A) is false and Reason (R) is true.

38. **1.** The distance of point (2, 3, 5) from X-Y plane is $\sqrt{13}$ units.

2. The distance of point (2, 3, 5) from Y-Z plane is 2 units.

3. The point (1, 5, 7) lies in first octant .

Which of the above statements are correct?

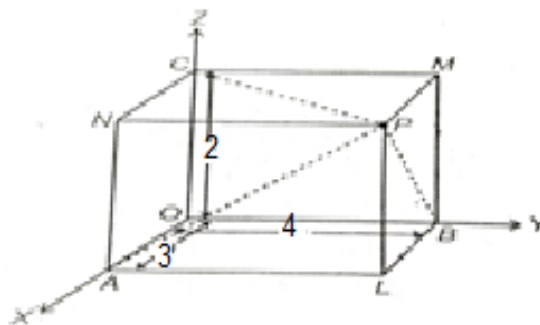
- (a) 1 and 2 but not 3
- (b) 1 and 3 but not 3
- (c) 3 only
- (d) All 1, 2 and 3.

39. **Statement 1:** A point is in XY plane. Its distance measured parallel to X axis is 10 units and that of parallel to Y axis is 20 units. Then its coordinates is (10,20,0).

Statement 2: The coordinates of any point in the XZ-plane is (0,b,c).

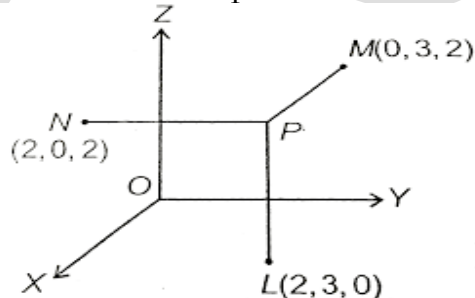
- a) Both STATEMENT 1 and 2 are true and STATEMENT 2 is the correct explanation of the STATEMENT 1
- b) Both STATEMENT 1 and 2 are true and STATEMENT 2 is not the correct explanation of the STATEMENT 1
- c) STATEMENT 1 is true and STATEMENT 2 is false.
- d) STATEMENT 1 is false and STATEMENT 1 is true.

40. For the figure given below coordinates of point P is



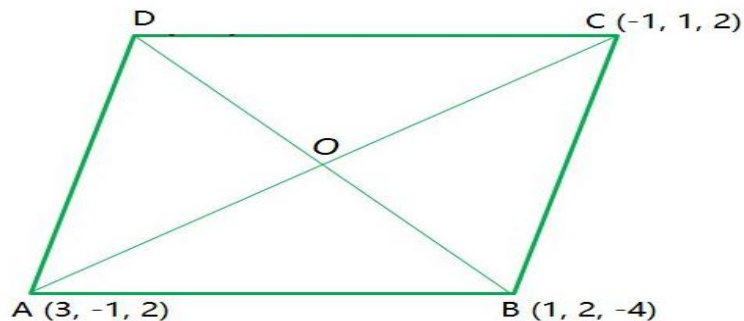
- (a) (2,4,3)
- (b) (3,4,2)
- (c) (4,3,2)
- (d) (4,2,3)

41. For the figure given below coordinates of point P is



- (a) (2,3,2)
- (b) (2,2,3)
- (c) (2,3,3)
- (d) (2,2,2)

42. For the figure given below, consider the following statements 1 and 2



Statement 1: The coordinates of point D is (1,-2,8)

Statement 2: The length of diagonal is $AB = 20$

- A) Statement 1 is true and Statement 2 is false
 - B) Statement 1 is false and Statement 2 is true
 - C) Both Statement 1 and 2 are true
 - D) Both Statement 1 and 2 are false.
43. The three coordinate planes divide the space into ----- parts (K)
44. A point is on the X-axis. Then its y is ----- (U)
45. A point is in the XZ plane, then its y coordinate is ----- (U)
46. The point (1,-2,-3) lie in ----- octants (K)
47. The distance of the point (3, 4, 5) from the origin is ----- (K)
48. If the distance of the point (2, 1, k) from the origin is 3, then k is ----- (K)
49. The coordinates of the centroid of a triangle whose vertices are (2,-3, 1), (1, 0, -1) and (3, 6, 0). is ----- (K)
50. If the origin is the centroid of the triangle PQR with vertices P (2a, 2, 6), Q (-4, 3b, -10) and R(8, 7, 2c).

Match Column I and Column II

Column I	Column II
a) value of a	i) -3
b) value of b	ii) -2
c) value of c	iii) 2

Choose the correct answer from the options given below:

- A) a-iii , b-i, c-ii
- B) a-ii, b-iii, c-i
- C) a-ii, b-i, c-iii
- D) a-i, b-iii, c-ii.

Two marks questions:

1. Find the distance between the points P (1,-3,4) and Q (-4,1,2). (K)
2. Find the coordinates of the centroid of a triangle whose vertices are (3,-2, 1), (2, 3, -1) and (4, 5, 0).
3. The centroid of a triangle ABC is at the point (1, 1, 1). If the coordinates of A and B are (3, -5, 7) and (-1, 7, -6), respectively, find the coordinates of the point C.
4. Find the distance between the points (1,-3,4) and (-4,1,2) .
5. Find the distance between the points (2, -1, 3) and (-2, 1, 3).

Three marks questions:

1. Derive the Distance between Two Points P(x_1, y_1, z_1) and Q (x_2, y_2, z_2)
2. Find the equation of the set of points P such that its distances from the points A (3, 4,-5) and B (-2, 1, 4) are equal.

3. Find the equation of the set of points P such that $PA^2 + PB^2 = K^2$, where A and B are the points (3, 4, 5) and (-1, 3, -7) respectively.
4. Show that the points P (-2, 3, 5), Q (1, 2, 3) and R (7, 0, -1) are collinear.
5. Are the points A(3,6,9), B(10,20,30) and C(25,-41,5), the vertices of a right angled triangle
6. Show that the points (-1,2,1),(1,-2,5),(4,-7,8) and (2,-3,4) are the vertices of a parallelogram.
7. Show that the points (0,7,-10),(1,6,-6) and (4,9,-6) are the vertices of an isosceles triangle.
8. Find the equation of the set of points P, the sum of whose distances from A (4, 0, 0) and B (-4, 0, 0) is equal to 10.
9. Show that the points (0, 7, 10), (-1, 6, 6) and (-4, 9, 6) are the vertices of a right angled triangle.
10. Show that the points A (1, 2, 3), B (-1, -2, -1), C (2, 3, 2) and D (4, 7, 6) are the vertices of a parallelogram ABCD, but it is not a rectangle.
11. If the origin is the centroid of the triangle PQR with vertices P (2a, 2, 6), Q (-4, 3b, -10) and R(8, 14, 2c), then find the values of a, b and c.
12. If A and B be the points (3, 4, 5) and (-1, 3, -7), respectively, find the equation of the set of points P such that $PA^2 + PB^2 = k^2$, where k is a constant.
13. Find the equation of the set of points P, the sum of whose distances from A (4, 0, 0) and B (-4, 0, 0) is equal to 10
14. centroid of a triangle ABC is (1, 1, 1). If the coordinates of A and B are (3,-5, 7) and (-1, 7,-6) respectively, find the coordinates of the point C. (S)
15. Find the coordinates of the point which trisect the line segment joining the points P(4,2,-6) and Q(10,-16,6). (S)

CHAPTER -12 LIMITS AND DRIVATIVES

MCQ /FB

1. If $f(x) = \sin x$, then $\lim_{x \rightarrow \frac{\pi}{2}} f(x)$ is
 (A) 0 (B) 1 (C) -1 (D) 2.
2. If $f(x) = x + \cos x$, then $\lim_{x \rightarrow 0^+} f(x)$ is
 (A) 0 (B) 1 (C) -1 (D) 2.
3. $\lim_{x \rightarrow 0} \left(\frac{1}{x^2}\right)$ is
 (A) 1 (B) 0 (C) 1 (D) Limit does not exists.
4. $\lim_{x \rightarrow a} (a_0 + a_1x + a_2x^2 + \dots + a_{n-1}x^{n-1} + a_nx^n)$ is
 (A) a (B) f(a) (C) 0 (D) $a_n a^n$.
5. $\lim_{x \rightarrow 1} (x^4 - x^2 + 1)$ is
 (A) -1 (B) 0 (C) 1 (D) 2.
6. $\lim_{x \rightarrow 3} (x(x+1)) =$
 (A) 12 (B) 9 (C) 6 (D) 3
7. $\lim_{x \rightarrow -1} (x^{10} + x^9 + x^8 + x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x + 1)$ is
 (A) 11 (B) 0 (C) 1 (D) -1.
8. $\lim_{x \rightarrow 1} \left(\frac{x^2+1}{x+100}\right)$ is
 (A) $\frac{1}{50}$ (B) $\frac{2}{101}$ (C) $\frac{1}{100}$ (D) $\frac{3}{101}$.
9. If $f(x) = \begin{cases} x-2, & x < 0 \\ x+2, & x > 0 \end{cases}$, then $\lim_{x \rightarrow 0} f(x)$ is
 (A) 0 (B) 2 (C) -2 (D) Limit does not exists.
10. If $f(x) = \begin{cases} x-2, & x < 0 \\ x+2, & x > 0 \end{cases}$, then $\lim_{x \rightarrow 0^+} f(x)$ is
 (A) 0 (B) 2 (C) -2 (D) Limit does not exists.
11. If $f(x) = \begin{cases} x+2, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then $\lim_{x \rightarrow 0^-} f(x)$ is
 (A) 0 (B) 2 (C) -2 (D) Limit does not exists.
12. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin x}{x}$ is equal to
 (A) 1 (B) $\frac{\pi}{2}$ (C) 0 (D) $\frac{2}{\pi}$.
13. $\log_{x \rightarrow \pi} \left(x - \frac{22}{7}\right)$ is
 (A) 0 (B) $\pi - \frac{22}{7}$ (C) 1 (D) π .
14. $\lim_{x \rightarrow -1} \left(\frac{x^{10} + x^5 + 1}{x-1}\right)$ is
 (A) $\frac{1}{2}$ (B) 0 (C) $-\frac{1}{2}$ (D) Limit does not exists.
15. $\lim_{x \rightarrow 1} \left(\frac{ax^2 + bx + c}{cx^2 + bx + a}\right) =$
 (A) $a + b + c$ (B) 0 (C) 1 (D) $-1/2$.
16. $\lim_{x \rightarrow 0} \left(\frac{\cos x}{\pi - x}\right)$ is
 (A) $\frac{1}{\pi}$ (B) 0 (C) 1 (D) Limit does not exists.

17. $\lim_{x \rightarrow 0} (x \sec x)$ is
 (A) 1 (B) 0 (C) -1 (D) Limit does not exist.
18. $\lim_{r \rightarrow 1} (\pi r^2)$ is
 (A) π (B) 0 (C) 1 (D) Limit does not exist.
19. $\lim_{x \rightarrow 4} \left[\frac{4x+3}{x-2} \right]$ is
 (A) $\frac{19}{4}$ (B) $\frac{19}{2}$ (C) 0 (D) Limit does not exist
20. $\lim_{x \rightarrow 0} \left[\frac{\sin ax}{bx} \right]$ is
 (A) $\frac{b}{a}$ (B) 1 (C) 0 (D) $\frac{a}{b}$
21. $\lim_{x \rightarrow 0} \left[\frac{\tan x}{x} \right]$ is
 (A) 0 (B) 1 (C) $\frac{\pi}{2}$ (D) Limit does not exist.
22. The derivative at $x = 2$ of the function $f(x) = 3x$.
 (A) 2 (B) 6 (C) 3 (D) 0.
23. The derivative of $f(x) = 3$ at $x = 0$
 (A) 3 (B) 1 (C) 6 (D) 0.
24. The derivative of $f(x) = 10x$ w. r. t x
 (A) $10x$ (B) x (C) 10 (D) 0.
25. The derivative of $f(x) = \frac{1}{x}$ w. r. t x
 (A) $\frac{1}{x}$ (B) $\frac{-1}{x^2}$ (C) $-x^2$ (D) $-x$.
26. The derivative of $f(x) = x^2$ w. r. t x
 (A) x (B) $2x$ (C) x^2 (D) 0.
27. The derivative of $f(x) = x$ at $x = 100$
 (A) 100 (B) 99 (C) 1 (D) 0.
28. The derivative of $f(x) = 6x^{100} - x^{55} + x$ w. r. t x
 (A) $6x^{99} - x^{54} + 1$ (B) $600x^{99} - 55x^{54} + 1$
 (C) $600x^{99} - 55x^{54} + x$ (D) $600x^{99} + 55x^{54} - 1$
29. The derivative of $f(x) = 99x$ at $x = 100$
 (A) 100 (B) 99 (C) 1 (D) 9900
30. The derivative of $f(x) = 1 + x + x^2 + \dots + x^{50}$ at $x = 1$.
 (A) 50 (B) 1200 (C) 1 (D) 1275.
31. The derivative of $f(x) = \left(2x - \frac{3}{2} \right)$ w. r. t x
 (A) x (B) $2x$ (C) $\frac{1}{2}$ (D) 2.
32. The derivative of $f(x) = x^{-3}(5 + 3x)$ w. r. t. x
 (A) $-15x^{-4} - 6x^{-3}$ (B) $-15x^{-4}$ (C) $-10x^{-3}$ (D) $-15x^{-2} - 10x^{-1}$.
33. The derivative of $f(x) = (-x)^{-1}$ w. r. t x
 (A) $\frac{1}{x^2}$ (B) $\frac{-1}{x^2}$ (C) $-x^2$ (D) $-x$.
34. $\lim_{x \rightarrow 2} \frac{\frac{1}{x+1} - \frac{1}{2}}{x+2}$ equals
 (A) -1 (B) $\frac{1}{4}$ (C) $\frac{-1}{4}$ (D) -1/8.
35. $\lim_{x \rightarrow 0} \frac{\sin ax}{b}$ equals
 (A) 0 (B) $\frac{a}{b}$ (C) $\frac{b}{a}$ (D) 1
36. $\lim_{x \rightarrow 5^-} f(x)$, where $f(x) = |x - 5|$
 (A) 0 (B) 5 (C) 1 (D) does not exist

37. If $y = 4\sqrt{x}$ then $\frac{dy}{dx} =$
 (A) $x^{-1/2}$ (B) $\frac{1}{2}x^{-1/2}$ (C) $2x^{1/2}$ (D) $2x^{-1/2}$
38. $\lim_{x \rightarrow 2} \frac{x^3 - 2^3}{x - 2}$ equals
 (A) 3 (B) 12 (C) 8 (D) 4.
39. $\lim_{x \rightarrow -2} \frac{x^5 + 32}{x + 2}$ equals
 (A) 16 (B) 80 (C) 64 (D) does not exist

40. **Statement 1:** $\lim_{x \rightarrow -3} \left(\frac{\frac{1}{x+3}}{x+3} \right) = \frac{-1}{9}$

Statement 2: $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n a^{n-1}$.

- A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
41. **Assertion (A):** $\lim_{x \rightarrow 0} \left[\frac{x}{\sin x} \right] = 1$. Is

Reason (R): $\lim_{x \rightarrow a} \left[\frac{f(x)}{g(x)} \right] = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)}$

- (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.

42. If $f(x) = \begin{cases} \frac{|x|}{x}, & x < 0 \\ \frac{|x|}{x}, & x > 0 \end{cases}$

Statement I: $\lim_{x \rightarrow 0^+} f(x)$ is -1

Statement II: $\lim_{x \rightarrow 0^-} f(x)$ is 1

- (A) Both I and II are true (B) only I is true
 (C) only II is true (D) Both I and II are false
43. 1. Limit of sum of two functions is sum of the limits of the functions
 2. Limit of product of two functions is product of the limits of the functions
 3. Limit of a function at a point is the common value of the left and right hand limits, if they coincide.

Which of the above statements are correct?

- (A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3

44. 1. The derivative of a function f at a is defined by $f'(a) = \lim_{h \rightarrow 0} \left(\frac{f(a+h) - f(a)}{h} \right)$
 2. Derivative of a function f at any point x is defined by $f'(x) = \lim_{h \rightarrow 0} \left(\frac{f(x+h) - f(x)}{h} \right)$

3. For functions u and v $\frac{d(uv)}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$

Which of the above statements are correct?

- (A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3

45. **Statement 1:** The derivative of $f(x) = \sqrt[5]{x^2}$ w. r. t x is $\frac{2}{5} (\sqrt[5]{x^3})^{-1}$

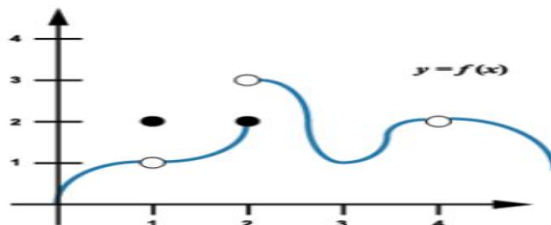
Statement 2: The derivative of $\frac{1}{x^n}$ w. r. t x is $-\frac{n}{x^{n+1}}$

- A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
46. **Assertion (A):** The derivative of $f(x) = x$ at $x = 1$ is 0.
Reason(R): The derivative of x^{-n} w. r. t x is $-nx^{-n-1}$
 (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.
47. Match Column I and Column II

Column I	Column II
a) $\lim_{x \rightarrow 0} \left[\frac{x}{\cos x} \right]$.	0
b) The derivative of $ x $ at $x = -2$	ii) -1
c) The derivative of the function $2x$ at $x = 1$	iii) 2

Choose the correct answer from the options given below:

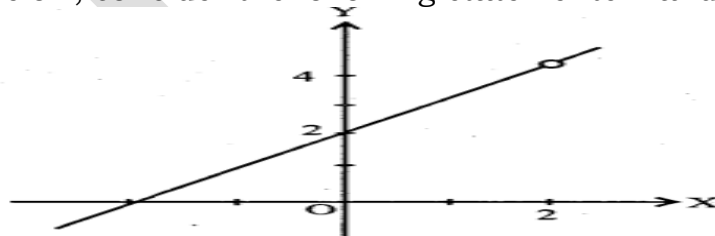
- A) a-iii , b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-ii, c-iii.
48. For the figure given below, consider the following statements 1 and 2



Statement 1: The given function limit exists at $x = 1, x = 2$ and $x = 4$

Statement 2: $\lim_{x \rightarrow 2} f(x)$ is 2

- A) Statement 1 is true and Statement 2 is false
 B) Statement 1 is false and Statement 2 is true
 C) Both Statement 1 and 2 are true D) Both Statement 1 and 2 are false
49. For the figure given below, consider the following statements 1 and 2

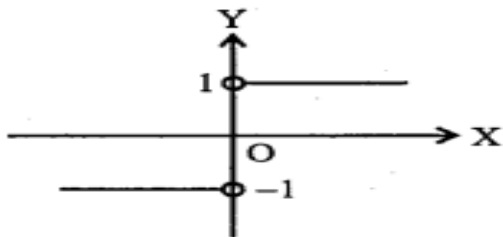


Statement 1: $\lim_{x \rightarrow 0} f(x)$ is 2

Statement 2: $\lim_{x \rightarrow 2} f(x)$ does not exist.

- A) Statement 1 is true and Statement 2 is false
 B) Statement 1 is false and Statement 2 is true
 C) Both Statement 1 and 2 are true D) Both Statement 1 and 2 are false

50. For the figure given below, consider the following statements 1 and 2



Statement 1: $\lim_{x \rightarrow 0^-} f(x) = 1$

Statement 2: $\lim_{x \rightarrow 0^+} f(x) = -1$.

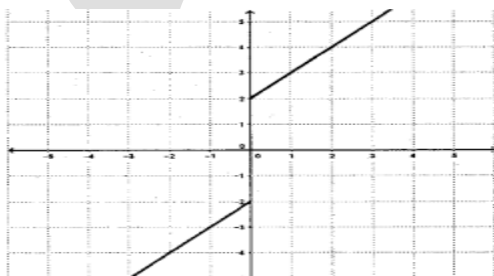
A) Statement 1 is true and Statement 2 is false

B) Statement 1 is false and Statement 2 is true

C) Both Statement 1 and 2 are true

D) Both Statement 1 and 2 are false

51. For the figure given below



which of the following is correct

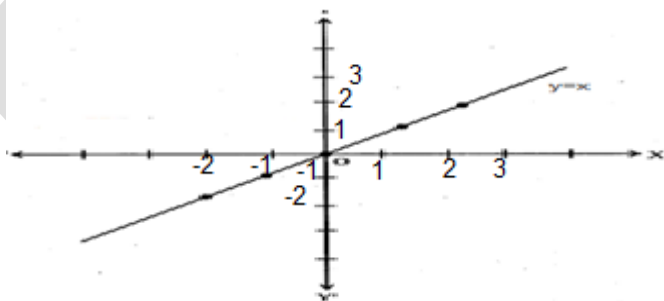
A) $\lim_{x \rightarrow 0^-} f(x) = 0$

B) $\lim_{x \rightarrow 0^+} f(x) = 0$

C) $\lim_{x \rightarrow 0} f(x) = 0$.

D) $\lim_{x \rightarrow 0} f(x)$ does not exist

52. For the figure given below



which of the following is incorrect

A) $\lim_{x \rightarrow 1} (y) = 1$

B) $\lim_{x \rightarrow 2} (y) = 2$

C) $\lim_{x \rightarrow -1} (y) = 0$.

D) $\lim_{x \rightarrow -2} (y) = -2$

53. The derivative of the function $f(x) = x^3 - 27$ at $x = -1$ is

54. $\lim_{x \rightarrow 0} \left[\frac{x}{\tan x} \right] = \dots\dots\dots$

55. $\lim_{x \rightarrow 0} \left[\frac{\sin x}{x} \right]^3 = \dots\dots\dots$

56. $\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2x + 4}{4x^2 + 2x + 2} \right) = \dots\dots\dots$

57. $\lim_{x \rightarrow 0} (x \operatorname{cosec} x) = \dots\dots\dots$

58. The derivative of $f(x) = 10$ at $x = 10$ is

59. The derivative of $f(x) = x^k$ w.r.t x is $kx^{-\frac{1}{2}}$, then $k = \dots\dots\dots$

60. Match Column I and Column II

Column I	Column II
a) $\frac{d9\sin x}{dx}$.	i) $-9\sec^2 x$
b) $\frac{d-9\ln x}{dx}$	ii) $-9x^{-10}$
c) $\frac{dx^{-9}}{dx}$	iii) $9\cos x$

Choose the correct answer from the options given below:

A) a-iii , b-i, c-ii

B) a-ii, b-iii, c-i

C) a-ii, b-i, c-iii

D) a-i, b-ii, c-iii.

Two marks questions:

1. Evaluate $\lim_{x \rightarrow 2} \left[\frac{3x^2 - x - 10}{x^2 - 4} \right]$

2. Evaluate $\lim_{x \rightarrow 3} \left[\frac{x^4 - 81}{2x^2 - 5x - 3} \right]$

3. Evaluate $\lim_{x \rightarrow -2} \left[\frac{\frac{1}{x} + \frac{1}{2}}{x + 2} \right]$

4. Evaluate $\lim_{x \rightarrow 2} \left[\frac{x^3 - 4x^2 + 4x}{x^2 - 4} \right]$

5. Evaluate $\lim_{x \rightarrow 2} \left[\frac{x^2 - 4}{x^3 - 4x^2 + 4x} \right]$

6. Evaluate $\lim_{x \rightarrow 2} \left[\frac{x^3 - 2x^2}{x^2 - 5x + 6} \right]$

7. Evaluate $\lim_{x \rightarrow 1} \left[\frac{x^{15} - 1}{x^{10} - 1} \right]$

8. Evaluate $\lim_{x \rightarrow 0} \left[\frac{(x+1)^5 - 1}{x} \right]$

9. Evaluate $\lim_{z \rightarrow 1} \left[\frac{z^{1/3} - 1}{z^{1/6} - 1} \right]$

10. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\sqrt{1+x} - 1}{x} \right]$

11. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\sin 4x}{\sin 2x} \right]$

12. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\sin ax}{\sin bx} \right]$

13. Evaluate $\lim_{x \rightarrow \pi} \left[\frac{\sin(\pi - x)}{\pi(\pi - x)} \right]$

14. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\cos 2x - 1}{\cos x - 1} \right]$

15. Evaluate $\lim_{x \rightarrow 0} \left[\frac{ax + x \cos x}{b \sin x} \right]$

16. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\sin ax + bx}{ax + \sin bx} \right]$

17. Evaluate $\lim_{x \rightarrow 0} [\operatorname{cosec} x - \cot x]$

18. Evaluate $\lim_{x \rightarrow 0} \left[\frac{1 - \cos x}{x} \right]$.

Three marks questions:

1. Find $\lim_{x \rightarrow 0} f(x)$ and $\lim_{x \rightarrow 1} f(x)$, where $f(x) = \begin{cases} 2x + 3, & x \leq 0 \\ 3(x + 1), & x > 0 \end{cases}$

2. Find $\lim_{x \rightarrow 1} f(x)$, where $f(x) = \begin{cases} x^2 - 1, & x \leq 1 \\ -x^2 - 1, & x > 1 \end{cases}$

3. Find $\lim_{x \rightarrow 0} f(x)$, where $f(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

4. Suppose $f(x) = \begin{cases} a + bx, & x < 1 \\ 4, & x = 1 \\ b - ax, & x > 1 \end{cases}$
and if $\lim_{x \rightarrow 1} f(x) = f(1)$ what are possible values of a and b?
5. Evaluate $\lim_{x \rightarrow 1} \left[\frac{x-2}{x^2-x} - \frac{1}{x^3-3x^2+2x} \right]$
6. Evaluate $\lim_{x \rightarrow 0} \left[\frac{\sqrt{4+x}-2}{x} \right]$.
7. Find the derivative of $f(x) = x^2$, from first principal.
8. Find the derivative of $f(x) = \frac{1}{x}$, from first principal.
9. Find the derivative of $f(x) = \sin x$, from first principal.
10. Find the derivative of $f(x) = \cos x$, from first principal.
11. Find the derivative of $f(x) = \tan x$, from first principal.
12. Find the derivative of $f(x) = x^3 - 27$, from first principal.
13. Find the derivative of $f(x) = (x-1)(x-2)$, from first principal.
14. Find the derivative of $f(x) = \frac{1}{x^2}$, from first principal.
15. Find the derivative of $f(x) = \frac{x+1}{x-1}$, from first principal.
16. Find the derivative of $f(x) = \sin^2 x$, w.r.t x.
17. Find the derivative of $6x^{100} - x^{55} + x$, w.r.t x.
18. Find the derivative of $f(x) = x^5(3 - 6x^{-9})$, w.r.t x.
19. Find the derivative of $f(x) = x^{-4}(3 - 4x^{-5})$, w.r.t x.
20. Find the derivative of $f(x) = \sin x \cos x$
21. Find the derivative of (i) $f(x) = x + \frac{1}{x}$, (ii) $f(x) = \sin x + \cos x$ (iii) $f(x) = x \sin x$ from first principal.
22. Find the derivative of $f(x) = \sec x$ w.r.t x.
23. Find the derivative of $f(x) = 5 \sec x + 4 \cos x$ w.r.t x.
24. Find the derivative of $f(x) = \operatorname{cosec} x$ w.r.t x.
25. Find the derivative of $f(x) = 3 \cot x + 5 \operatorname{cosec} x$ w.r.t x.
26. Find the derivative of $f(x) = 5 \sin x - 6 \cos x + 7$ w.r.t x.
27. Find the derivative of $f(x) = 2 \tan x - 7 \sec x$ w.r.t x.
28. Find the derivative of $f(x) = \cot x$ w.r.t x.
29. Find the derivative of $f(x) = \sin 2x$ w.r.t x.
30. Find the derivative of $f(x) = (ax^2 + \sin x)(p + q \cos x)$ w.r.t x.
31. Find the derivative of $f(x) = \sec x + \operatorname{cosec} x$ w.r.t x.

Four marks questions:

- Find the derivative of $f(x) = (5x^3 + 3x - 1)(x - 1)$
- Find the derivative of $f(x) = x^{-3}(5 + 3x)$
- Find the derivative of $f(x) = \frac{x+1}{x-1}$
- Find the derivative of $f(x) = \frac{2x+3}{x-2}$
- Find the derivative of $f(x) = \frac{x^5 - \cos x}{\sin x}$
- Find the derivative of $f(x) = \frac{\sin x}{x + \cos x}$
- Find the derivative of $f(x) = \frac{a+b \sin x}{c+d \cos x}$
- Find the derivative of $f(x) = \frac{x}{1 + \tan x}$
- Find the derivative of $f(x) = \frac{2}{x+1} - \frac{x^2}{3x-1}$
- Find the derivative of $f(x) = \frac{\sin x + \cos x}{\sin x - \cos x}$

11. Find the derivative of $f(x) = \frac{4x + \sin x}{3x + 7\cos x}$

12. Find the derivative of $f(x) = \frac{\sec x - 1}{\sec x + 1}$

13. Find the derivative of $f(x) = \frac{\sin(x+a)}{\cos x}$

Five marks questions:

1. Prove that $\lim_{x \rightarrow 0} \left[\frac{\sin x}{x} \right] = 1$, where x in radian.

2. Prove that ,for any positive integer n , $\lim_{x \rightarrow 0} \left[\frac{x^n - a^n}{x - a} \right] = na^{n-1}$, and hence

evaluate $\lim_{x \rightarrow 1} \left[\frac{x^{15} - 1}{x^{10} - 1} \right]$

CHAPTER -13 STATISTICS

MCQ/FB

1. The Mean, Median, and Mode are called
 - A) Measures of Dispersion
 - B) Measure of central tendency
 - C) Measure of variability
 - D) Co-efficient of variation.
2. Range is the one of the
 - A) Measures of Dispersion
 - B) Measure of central tendency
 - C) Variation
 - D) None of these.
3. If $x_1, x_2, x_3, \dots, x_n$ are n observations, then mean is
 - A) $\left(\frac{n+1}{2}\right)^{th}$ observation
 - B) $\left(\frac{n}{2}\right)^{th}$ observation
 - C) $\frac{\sum x_i}{n}$
 - D) $x_n - x_1$
4. The mean of the scores given as 6, 7, 10, 12, 13, 4, 8, 12.
 - A) 12
 - B) 9
 - C) 8
 - D) 10.
5. Mean of the first n natural Numbers is
 - (A) $\frac{n+1}{2}$
 - (B) $\frac{n(n+1)}{2}$
 - (C) $\frac{n^2-1}{2}$
 - (D) $\frac{1-n^2}{n}$
6. If $x_1, x_2, x_3, \dots, x_n$ are n observations in ascending order. If the number of observations is odd, then the median is
 - A) $\left(\frac{n}{2}\right)^{th}$ observation
 - B) $\left(\frac{n+3}{2}\right)^{th}$ observation
 - C) $\left(\frac{n+2}{2}\right)^{th}$ observation
 - D) $\left(\frac{n+1}{2}\right)^{th}$ observation.
7. Median for the data 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21. is
 - (A) 8
 - (B) 10
 - (C) 9
 - (D) 9.5
8. Range, Mean deviation, Quartile deviation, Standard deviation are commonly used as
 - (A) Measures of central tendency
 - (B) Measures of the nature of variates
 - (C) Measures of dispersion
 - (D) Measures of the size of the variates.
9. The mean of the absolute values of the deviations of the observations from central value 'a' is
 - (A) Range
 - (B) Quartile deviation
 - (C) Mean deviation
 - (D) Standard deviation.
10. Mean deviation for n observations $x_1, x_2, x_3, \dots, x_n$ from their mean \bar{x} is given by
 - (A) $\sum_{i=1}^n (x_i - \bar{x})$
 - (B) $\frac{1}{n} \sum_{i=1}^n |x_i - \bar{x}|$
 - (C) $\sum_{i=1}^n (x_i - \bar{x})^2$
 - (D) $\frac{1}{N} \sum_{i=1}^n (x_i - \bar{x})$
11. Mean deviation about mean for the following data a, a, a,.....a (n times). Is
 - (A) a
 - (B) na
 - (C) $\frac{a}{n}$
 - (D) 0
12. Mean of the squares of the deviations from mean is
 - (A) Standard deviation
 - (B) Quartile deviation
 - (C) Mean deviation
 - (D) Variance
13. The mean deviation of the data 5,7,9,11,13,15 from mean is
 - A) 2
 - B) 2.57
 - C) 3
 - D) 3.75
14. The positive square-root of the mean of the squares of the deviations from mean is
 - (A) Standard deviation
 - (B) Quartile deviation
 - (C) Mean deviation
 - (D) Variance
15. Let $x_1, x_2, x_3, \dots, x_n$ be n observations and \bar{x} be their arithmetic mean. The formula for the standard deviation is given by
 - (A) $\sum (x_i - \bar{x})^2$
 - (B) $\frac{\sum (x_i - \bar{x})}{n}$
 - (C) $\sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$
 - (D) $\sqrt{\frac{\sum x_i^2}{n} + \bar{x}^2}$

16. If $x_1, x_2, x_3, \dots, x_n$ are n observations with mean \bar{x} , mean of the following n observations $(x_1 + a), (x_2 + a), \dots, (x_n + a)$ is
- (A) $\bar{x} + a$ (B) $\bar{x} - a$ (C) $\frac{\bar{x}}{n} + a$ (D) $\frac{x_n + a}{n}$
17. The sum of Mean deviation from the mean is
- (A) less than the sum of the mean deviation from the median
 (B) more than the sum of the mean deviation from the median
 (C) equal to the sum of the mean deviation from the median
 (D) None of these.
18. If $\sum (x_i - \bar{x})^2$ is small, this indicates that the observations $x_1, x_2, x_3, \dots, x_n$ are
- (A) close to the mean \bar{x} and there is a lower degree of dispersion
 (B) close to the mean \bar{x} and there is a higher degree of dispersion
 (C) not close to the mean \bar{x} and there is a higher degree of dispersion
 (D) None of these.
19. If each observation is multiplied by a constant k , the variance of the resulting observations becomes
- (A) k times the original variance (B) k^2 times the original variance
 (C) original variance (D) $k +$ times the original variance
20. If each observation is adding (or subtracting) a positive number k , the variance of the resulting observations becomes
- (A) k times the original variance (B) k^2 times the original variance
 (C) original variance (D) $k +$ original variance
21. The variance of n observations is σ^2 , if each observation is multiplied by k , then new variance is
- A) $k^2 \sigma^2$ B) $k \sigma^2$ C) $k \sigma$ D) None of these.
22. The variance of 20 observations is 5. If each observation is increased by 2, then the new variance of the resulting observations is
- (A) 7 (B) 20 (C) 5 (D) 10
23. If the sum of squares of the deviations of 10 observations taken from their mean is 4.9, then their Standard Deviation is
- (A) 4.9 (B) 0.7 (C) 0.5 (D) 5.3
24. The variance of 20 observations is 5. If each observation is multiplied by 2, then the new variance of the resulting observations is
- (A) 7 (B) 20 (C) 5 (D) 10
25. The mean of 100 observations is 50 and their standard deviation is 5. The sum of all squares of the observations is
- (A) 50000 (B) 250000 (C) 252500 (D) 255000
26. Let x_1, x_2, x_3, x_4, x_5 be the observation with mean m and standard deviation s . The standard deviation of the observations $kx_1, kx_2, kx_3, kx_4, kx_5$
- A) $k+s$ B) $\frac{s}{k}$ C) ks D) s
27. Variance for first 10 natural numbers is
- (A) 99 (B) $\frac{99}{12}$ (C) 9.9 (D) $\frac{100}{12}$
28. Most powerful measure of dispersion is
- A) Mean deviation about mean B) Mean deviation about median
 C) Standard deviation D) Variance

29. The variance is
 (A) Positive square of Standard deviation
 (B) Square of the Mean deviation about mean
 (C) Square root of Mean deviation
 (D) Square of standard deviation
30. The standard deviation of certain data is 4, then the variance is
 (A) 2 (B) 4 (C) 8 (D) 16
31. A study in Statistics that helps to interpret the variability of data is known's as
 (A) Standard Deviation (B) The measurer of Central tendency
 (C) The measurer of dispersion (D) None of the above
32. **Statement 1.** In absolute Measure of Dispersion, the Square root of variation is known as Standard Deviation
Statement 2 . The Arithmetic average of the Absolute Deviation of a series called Mean Deviation
Statement 3 . Variance measure of dispersion ignores the signs of deviations
 Which of the above statements are correct?
 (A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3
33. **Statement 1:** There is a set of 5 numbers with variance = 10. If each number is divided by 2, then the new Variance is 2.5.
Statement 2: if each observation is multiplied by a constant k , the variance of the resulting observations becomes k^2 times the original variance.
 A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1
34. **Assertion (A):** There is a set of 10 observation s with variance = 20. If each observation is subtracted by 5, then the new Variance is 15
Reason(R): Adding (or subtracting) a positive number to each observation of a group does not affect the variance.
 (A) Both Assertion (A) and Reason (R) are true.
 (B) Both Assertion (A) and Reason (R) are false.
 (C) Assertion (A) is true and Reason (R) is false.
 (D) Assertion (A) is false and Reason (R) is true.
35. **Statement 1:** The mean of 10 observations were calculated as 35, by a student who took by mistake 40 instead of 60 for one observation. The correct mean is 37.
Statement 2: Let $x_1, x_2, x_3, \dots, x_n$ be n observations. Then mean $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$
 A) Statement 1 is true and Statement 2 is false.
 B) Statement 1 is false and Statement 2 is false.
 C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
 D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1

36. **Statement I:** The Range of 6 observations 60, 70, 30, 80, 65, 55. is 50

Statement II: Range of a series = Maximum value – Minimum value

Which of the above statements are correct?

- (A) Both I and II are true (B) only I is true
(C) only II is true (D) Both I and II are false

37. **Assertion (A):** The mean deviation about the mean for the 8 observations 13, 9, 7, 11, 16, 4, 8, 12 with Mean 10 is 3

Reason(R): $M.D.(a) = \frac{\text{Sum of absolute values of deviations from central value } a}{\text{Number of observations}}$

- (A) Both Assertion (A) and Reason (R) are true.
(B) Both Assertion (A) and Reason (R) are false.
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

38. **1.** The measure of dispersion which uses only two observations is Range.

2. The measure of dispersion which uses all observations is Mean deviation.

Which of the above statements are correct?

- (A) Both I and II are true (B) only I is true
(C) only II is true (D) Both I and II are false

39. The exact Mean deviation of the values 12, 15, and 18 is _____

40. The sum of the deviations from mean (\bar{x}) is zero. The mean deviation about the mean is _____

41. The sum of the absolute values of the deviations from mean of 8 observations is 32. The mean deviation about the mean is _____

42. The mean deviation for the 10 observations is 5 and every observations are decreased by 2, then mean Deviation of new observation is _____

43. The mean deviation from median for 6, 6, 6, 6, 6 is _____

44. Mean and Standard deviation of 10 observations are 40 and 4 respectively, then sum of squares of the Observations is _____

45. The deviation taken from median are -6, -2, 3, 4, 5. The mean deviation from median is _____

46. The variance of 19, 21, 23, 25 and 27 is 8. The variance of 14, 16, 18, 20 and 22 is _____

47. If the maximum value in a series is 25 and its range is 15, the maximum value of the series is _____

48. Standard deviation of 3 observations a, b and c are 2.5, then a+3, b+3 and c+3 is _____

49. If 2, 5, 8, 12, 13 are 5 observations.

Match Column I and Column II

Column I	Column II
a) Mean	i) 0
b) mean deviation	ii) 8
c) sum of the values of the deviations	iii) 3.6

Choose the correct answer from the options given below:

- A) a-iii, b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-ii, c-iii.

50. If $x_1, x_2, x_3, \dots, x_n$ are n observations. Match Column I and Column II

Column I	Column II
a) Variance	i) $\sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$
b) mean deviation	ii) $\frac{1}{n} \sum_{i=1}^n x_i - \bar{x} $
c) Standard deviation	iii) $\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$

Choose the correct answer from the options given below:

- A) a-iii , b-i, c-ii B) a-ii, b-iii, c-i C) a-ii, b-i, c-iii D) a-i, b-ii, c-iii.

TWO MARKS QUESTION:

- Write the mean of the given data: 6, 7, 10, 12, 13, 4, 8, 12. (U)
- Write the mean of the given data: 4, 7, 8, 9, 10, 12, 13, 17. (U)
- Write the mean of the given data: 38,70,48,40,42,55,63,46,54,44. (U)
- Compute the variance and Standard deviation of the following observations of marks of 5 students. Class: marks out of 25: 8, 12, 13, 15, 22. (U)
- Co-efficient of variation and the standard deviation of certain distribution is 60 and 21 respectively. Find the arithmetic mean of the arithmetic mean. (A)
- Find the variance of 6, 8, 10, 12, 14. (U)
- The standard deviation of certain data is 4. Find the variance. (U)
- The mean of 200 scores is 48 and their standard deviation n is 3. Find the sum and sum of the squares of scores. (A)
- Find the variance and standard deviation of the five observations: 11, 14,15,17,18 (U)
- Find the mean and variance for the following data: 2, 4,5,6,7,8,17. (U)
- Find the mean and variance for the following data:6,8,10,12,14,16,18,20,22,24. (U)
- The scores of a batsmen in 10 matches are 38,70,48,34,42,55,63,46,54,44. Find standard deviation and variance. (A)
- Find the mean and variance for the following data: 6, 7, 10, 12, 13, 4, 8, 12. (U)
- Find the mean deviation about the mean for the following data:6,7,10,12,13,4,8,12.(U)
- Find the mean deviation about the mean for the following data:12,3,18,17,4,9,17,19,20,15,8,17,2,3,16,11,3,1,0.5.
- Find the mean deviation about the mean for the following data:4,7,8,9,10,12,13,17. (U)
- Find the mean deviation about the mean for the following data:38,70,48,40,42,55,63,46,54,44. (U)

FIVE MARKS QUESTION:

- Find the mean deviation about the median for the following data:13,17,16,14,11,13,10,16,11,18,12,17. (U)
- Find the mean deviation about the median for the following data:36,72,46,60,45,53,46,51,49. (U)
- Find the mean deviation about the median for the following data:3,9,5,3,12,10,18,4,7,19,21. (U)
- Find the mean deviation about the mean for the following data: (U)

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

5. Find the mean deviation about the median for the following data: (A)

x_i	3	6	9	12	13	15	21	22
f_i	3	4	5	2	4	5	4	3

6. Find the mean deviation about the mean for the following data: (A)

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	2	3	8	14	8	3	2

7. Calculate the mean deviation about median for the following data: (A)

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	6	7	15	16	4	2

8. Find the mean deviation about the mean for the following data: (A)

x_i	5	10	15	20	25
f_i	7	4	6	3	5

9. Find the mean deviation about the mean for the following data: (A)

x_i	10	30	50	70	90
f_i	4	24	28	16	8

10. Find the mean deviation about the median for the following data: (A)

x_i	5	7	9	10	12	15
f_i	8	6	2	2	2	6

11. Find the mean deviation about the mean for the following data: (A)

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	2	3	8	14	8	3	2

12. Find the mean deviation about the median for the following data: (A)

x_i	15	21	27	30	35
f_i	3	5	6	7	8

13. Find the mean deviation about the mean for the following data: (A)

Income per day	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
No. of persons	4	8	9	10	7	5	4	3

14. Find the mean deviation about the mean for the following data: (A)

Height in cms	95-105	105-115	115-125	125-135	135-145	145-155
Number of boys	9	13	26	30	12	10

15. Find the mean deviation about the median for the following data: (A)

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Girls	6	8	14	16	4	2

16. Calculate the mean deviation about median age for the age distribution of 100 persons given be Find the mean deviation about the mean for the following data: (A)

Age	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Number	5	6	12	14	26	12	16	9

17. Find the variance and standard deviation for the following data: (A)

x_i	4	8	11	17	20	24	32
f_i	3	5	9	5	4	3	1

18. Calculate the mean, variance and standard deviation for the following distribution: (A)

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

19. Find the Variance of the following data: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 (A)

20. Find the standard deviation for the following data: (A)

x_i	3	8	13	18	23
f_i	7	10	15	10	6

21. Find the mean and variance for First n natural numbers. (S)

22. Find the mean and variance for first 10 multiples of 3. (A)

23. Find the mean and variance for the following data: (A)

x_i	6	10	14	18	24	28	30
f_i	2	4	7	12	8	4	3

24. Find the mean and variance for the following data: (A)

x_i	92	93	97	98	102	104	109
f_i	3	2	3	2	6	3	3

25. Find the mean and standard deviation using short-cut method: (A)

x_i	60	61	62	63	64	65	66	67	68
f_i	2	1	12	29	25	12	10	4	5

26. Calculate the mean, variance and standard. (A)

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

27. Find the mean, variance for the following frequency distributions : (A)

Class	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequency	2	3	5	10	3	5	2

28. Find the mean, variance for the following frequency distributions : (A)

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	15	16	6

29. Find the mean, Variance and standard deviation . (A)

Height in ms	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115
Number of boys	3	4	7	7	15	9	6	6	3

CHAPTER-14

Probability

MCQ/FB

- Two coins are tossed once. The number of possible outcomes.
(A) 2 B) 4 C) 8 D) 6 .
- If E is an event "Number of tails is atleast one" associated with a sample space "two coins are tossed once". The number of outcomes in E is
A) 4 B) 3 C) 2 D) 1 .
- If E is an event "Second toss is not head" associated with a sample space "two coins are tossed once". The number of outcomes in E is
A) 4 B) 3 C) 2 D) 1 .
- If E is an event "Number of tails is atleast two" associated with a sample space "two coins are tossed once". The event E is
A) {TT} B) {HT, TH, TT} C) {HH, HT, TH, TT} D) ϕ .
- The number of simple events corresponding to the sample space "two coins are tossed once" is
A) 1 B) 2 C) 3 D) 4 .
- Which of the following is incorrect
A) An event which has one sample points of a sample space is called impossible event.
B) An event which has all sample point of a sample space is called sure event.
C) Let two events A and B associated with sample space S is said to be mutually exclusive events if $A \cap B = \phi$.
D) Events E_1, E_2, \dots, E_n are said to Mutually exhaustive events if $E_1 \cup E_2 \cup \dots \cup E_n = S$, where S is the sample space.
- Which of the following event is simple event
A) a number less than 7 B) a number greater than 7
C) an even number greater than 4 D) a number not less than 3.
- If sample space $S = \{1,2,3,4,5,6\}$ and events $A = \{2,4,6\}$ and $B = \{1,3,5\}$, then events A and B are
A) Mutually exhaustive but not exclusive events
B) Mutually exclusive but not exhaustive events
C) Mutually exclusive and exhaustive events
D) None of these
- A die is rolled. Let E be the event "die shows 4" and F be the event "die shows even Number", then E and F are
A) Mutually exhaustive but not exclusive events
B) Mutually exclusive but not exhaustive events
C) Mutually exclusive and exhaustive events
D) Neither mutually exclusive nor exhaustive events
- Which of the following is incorrect
A) *Complementary event or 'not event'*: The set A or $S - A$.
B) *Event A or B*: The set $A \cup B$
C) *Event A and B*: The set $A \cap B$
D) *Event A and not B*: The set $B - A$
- Let S be the sample space of a random experiment. The probability P is a real valued function whose domain is
A) Set of real number B) $[0, 1]$
C) Power set of S D) Set of integers.

12. Let S be the sample space of a random experiment. The probability P is a real valued function whose range is

- A) Set of real number B) $[0, 1]$ C) Power set of S D) Set of integers.

13. If A is any event associated with a sample space S then

- A) $0 \leq P(A) \leq 1$ B) $0 < P(A) < 1$ C) $P(A) \geq 1$ D) $P(A) \leq 0$.

14. If A and B are mutually exclusive events, then

- A) $P(A \cup B) = 1$ B) $P(A \cap B) = 0$
 C) $P(\text{not } A) = 1 - P(B)$ D) $P(A \cap B) = P(A) + P(B)$.

15. If A and B are mutually exhaustive events, then

- A) $P(A \cup B) = 1$ B) $P(A \cap B) = 0$
 C) $P(\text{not } A) = 1 - P(B)$ D) $P(A \cap B) = P(A) + P(B)$.

16. Which of the following is incorrect

- A) If A and B are any two events then $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 B) $P(A') = 1 - P(A)$
 C) $P(A \cap B') = P(A) - P(A \cap B)$
 D) $P(A' \cap B') = 1 + P(A \cup B)$

17. Which of the following cannot be valid assignment of probabilities for outcomes of sample spaces $S = \{\omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6\}$

Assignment	ω_1	ω_2	ω_3	ω_4	ω_5	ω_6
A)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
B)	$\frac{1}{8}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$-\frac{1}{4}$	$-\frac{1}{3}$
C)	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{3}{2}$
D)	0.1	0.2	0.3	0.4	0.5	0.6

18. If $\frac{2}{11}$ is the probability of an event A , what is the probability of the event 'not A '.

- A) $\frac{10}{11}$ B) $\frac{9}{11}$ C) $\frac{11}{9}$ D) $\frac{11}{10}$.

19. Given $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$. Then $P(A \text{ or } B)$, if A and B are mutually exclusive events.

- A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) $\frac{4}{5}$ D) $\frac{1}{5}$.

20. If $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{2}$ and $P(A \text{ and } B) = \frac{1}{8}$, then $P(A \text{ or } B)$ is

- A) $\frac{3}{4}$ B) $\frac{7}{8}$ C) $\frac{5}{8}$ D) $\frac{1}{4}$

21. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$. Then $P(\text{not } A)$

- A) 0.58 B) 0.52 C) 0.72 D) 0.90.

22. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$, then $P(A \text{ or } B)$ is

- A) 0.74 B) 0.90 C) 1.6 D) 0.64.

23. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.35$, then $P(A \text{ but not } B)$ is

- A) 0.34 B) 0.19 C) 0.88 D) 1.13

24. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.35$, then $P(B \text{ but not } A)$ is

- A) 0.34 B) 0.19 C) 0.88 D) 1.13

25. Events E and F are such that $P(\text{not } E \text{ or not } F) = 0.25$, then $P(E \text{ and } F)$ is

- A) 0 B) 1 C) 0.75 D) 0.25

44. If $S = \{w_1, w_2, w_3, w_4\}$ is the sample space of an experiment, then find the value of $P(w_1) + P(w_2) + P(w_3) + P(w_4) = \text{----}$ (U)

45. If $S = \{w_1, w_2, w_3, w_4\}$ is the sample space of an experiment and $P(w_1) = \frac{1}{4}$, $P(w_2) = \frac{1}{3}$, $P(w_3) = \frac{1}{6}$, then $P(w_4) = \text{----}$ (U)

46. The probability of an impossible event is

47. The probability of a sure event is

48. If $P(A) = \frac{1}{3}$ and $P(\text{not } A) = \frac{x}{6}$, then x is

49. **Statement 1:** A die has two faces each with number '1', three faces each with number '3' and one face with number '5'. If die is rolled once, then $P(3)$ is $\frac{1}{2}$.

Statement 2: Number of outcomes favorable is 3 and total possible outcomes is 6.

- (A) Both statements are true
- (B) Statement I is true and statement II is false
- (C) Statement I is false and statement II is true
- (D) Both statements are false

50. **Statement 1:** A card is drawn from a well shuffled deck of 52 playing cards. The probability that the card drawn is an ace of hearts is $\frac{1}{52}$.

Statement 2: Out of 52 playing cards 4 ace cards .

- (A) Both statements 1 and 2 are true
- (B) Statement 1 is true and statement 2 is false
- (C) Statement 1 is false and statement 2 is true
- (D) Both statements 1 and 2 are false

51. **Assertion (A):** The probability of drawing a red or a card with a face from a deck of 52 cards is $\frac{8}{13}$

Reason (R): The total favorable cards: 26 (red cards) + 12 (face cards) - 6 (red face cards) = 32 favorable cards.

- (A) Both Assertion (A) and Reason (R) are true.
- (B) Both Assertion (A) and Reason (R) are false.
- (C) Assertion (A) is true and Reason (R) is false.
- (D) Assertion (A) is false and Reason (R) is true.

52. A bag contains 5 green and 3 blue balls. Two balls are picked at random.

1. The probability that both are of the same colour $= \frac{{}^5C_2 + {}^3C_2}{{}^8C_2}$

2. The probability that both are of the different colours $= \frac{{}^5C_2 \times {}^3C_2}{{}^8C_2}$

3. Number of ways in which 2 balls can be picked = 8C_2

Which of the above statements are correct?

- (A) 1 and 2 only
- (B) 2 and 3 only
- (C) 1 and 3 only
- (D) 1, 2 and 3

53. **Statement 1:** The probability of getting a king or ace from the deck of 52 cards is $\frac{2}{13}$

Statement 2: The probability of getting a king or ace =

$\frac{\text{Total number of king or ace from the deck of cards}}{\text{Total number of cards}}$

Total number of cards

- A) Statement 1 is true and Statement 2 is false.
- B) Statement 1 is false and Statement 2 is false.
- C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1
- D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1

54. **Statement 1:** The limit of probability is -1 to 1

Statement 2: A number is selected from numbers 1 to 25 . The probability that it is a prime number is $\frac{9}{25}$

A) Statement 1 is true and Statement 2 is false.

B) Statement 1 is false and Statement 2 is false.

C) Statement 1 is true and Statement 2 is true, Statement 2 is a correct explanation for Statement 1

D) Statement 1 is true and Statement 2 is true, Statement 2 is not a correct explanation for Statement 1

55. Ravi visits three cities (A, B, and C) in a random order. Match Column I and Column II

Column I	Column II
a) Probability that A first and B last?	i) $\frac{1}{2}$
b) Probability that A before B	ii) $\frac{2}{3}$
c) Probability that A either first or second	iii) $\frac{1}{6}$

Choose the correct answer from the options given below:

A) a-iii, b-i, c-ii

B) a-ii, b-iii, c-i

C) a-ii, b-i, c-iii

D) a-i, b-ii, c-iii.

56. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.35$

Match Column I and Column II

Column I	Column II
a) $P(A')$	i) $\frac{23}{50}$
b) $P(A \cup B)$	ii) $\frac{22}{25}$
c) $P(A \cap B)'$	iii) $\frac{13}{20}$

Choose the correct answer from the options given below:

A) a-iii, b-i, c-ii

B) a-ii, b-iii, c-i

C) a-ii, b-i, c-iii

D) a-i, b-ii, c-iii.

57. A die is thrown. Match Column I and Column II

Column I	Column II
a) Probability that number more than 6 will appear	i) 1
b) Probability that number less than 6 will appear	ii) 0
c) Probability that prime number will appear	iii) $\frac{1}{2}$

Choose the correct answer from the options given below:

A) a-iii, b-i, c-ii

B) a-ii, b-iii, c-i

C) a-ii, b-i, c-iii

D) a-i, b-ii, c-iii.

58. Match Column I and Column II

Column I	Column II
a) $P(A')$	i) $P(S)$
b) $P(A' \cup A)$	ii) $1 - P(A)$
c) $P(A' \cap A)$	iii) $P(\emptyset)$

Choose the correct answer from the options given below:

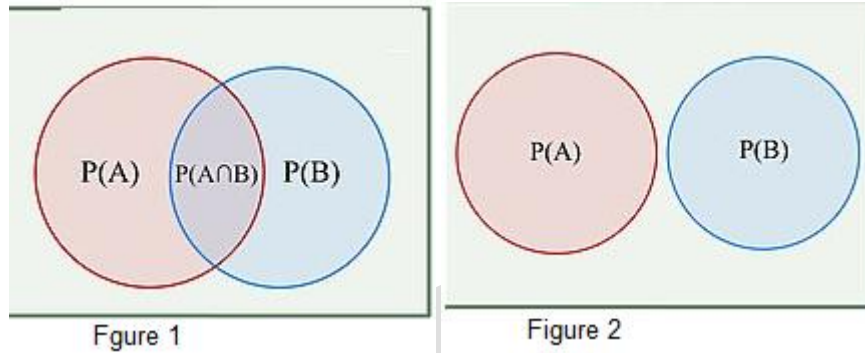
A) a-iii, b-i, c-ii

B) a-ii, b-iii, c-i

C) a-ii, b-i, c-iii

D) a-i, b-ii, c-iii.

59. For the figure given below, consider the following statements 1 and 2

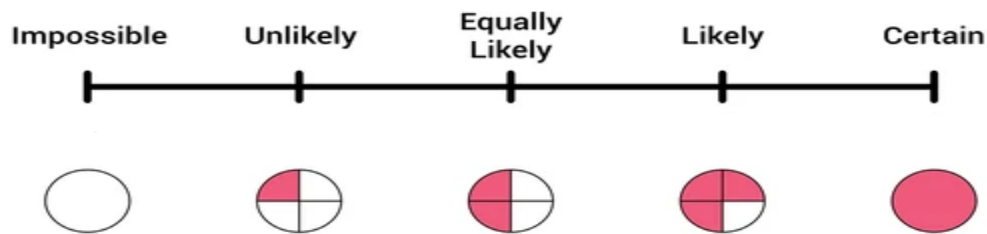


Statement 1: From figure 1, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Statement 2: From figure 2, A and B are mutually exclusive events

- A) Statement 1 is true and Statement 2 is false
- B) Statement 1 is false and Statement 2 is true
- C) Both Statement 1 and 2 are true
- D) Both Statement 1 and 2 are false

60. For the figure given below.



- 1. $P(\text{Unlikely}) = \frac{3}{4}$
- 2. $P(\text{Equally likely}) = \frac{1}{2}$
- 3. $P(\text{Likely}) = \frac{1}{4}$

Which of the above statements are correct?

- (A) 2 only
- (B) 2 and 3 only
- (C) 1 and 3 only
- (D) 1, 2 and 3

Two Mark Questions

1. Consider the experiment of rolling a die. Let A be the event 'getting a prime number', B be the event 'getting an odd number'. Write the sets representing the events (i) A or B (ii) A and B (iii) A but not B (iv) 'not A' (v) neither A nor B. **(S)**
2. A die is rolled. Let E be the event, "die shows 4" and F be the event, "die shows even number". Write the events E and F. Check whether E and F mutually exclusive. **(S)**
3. A die is rolled. Let E be the event, "die shows a prime" and F be the event, "die shows a multiple of 3". Write the events E and F. Check whether E and F mutually exclusive. **(S)**
4. A coin is tossed twice. Write the events, A: "at least one head appears", B: "at most one tail appears". Check whether they are exhaustive events. **(S)**
5. A coin is tossed thrice. Write the events, A: "no head appears", B: "at least two head appears". Check whether the events are mutually exclusive. **(S)**
6. A die is thrown describe the events A: a number less than 7 and C: a multiple of 3. Find $A - C$.
7. A die is thrown describe the events A: a number less than 7 and B: a number greater than 7 find $A \cup B$ & $A \cap B$.

8. A die is thrown describe the events E: an even number greater than 4 and F: a number not less than 3, $E \cap F$ and $E \cap F'$. (S)
9. Three coins are tossed simultaneously. Write the events
(i) A: "getting 3 heads" (ii) B: "getting a tail on two coins". Are they mutually exclusive? (S)
10. Three coins are tossed once. Write the events A: "a tail shows on the first coin" and B: "at least one head shows". Check whether the events A and B are exhaustive. (S)
11. Three coins are tossed. Write two events which are mutually exclusive. (U)
12. Three coins are tossed. Write three events which are mutually exclusive and exhaustive. (S)
13. Three coins are tossed. Write two events which are not mutually exclusive. (U)
14. Three coins are tossed. Write two events which are mutually exclusive but not exhaustive. (U)
15. Consider the random experiment "rolling a die once". Write the events, A: "an even number greater than 4 appears" and B: "a number not less than 3 appears". Check whether they are mutually exclusive. (S)
16. Two dice are thrown. The events A, B and C are as follows:
A: getting an even number on the first die.
B: getting an odd number on the first die.
C: getting the sum of the numbers on the dice ≤ 5 .
Describe the events (i) A' (ii) not B (iii) A or B (iv) A and B (v) A but not C (vi) B or C (vii) B and C (viii) $A \cap B' \cap C'$
17. Given $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$. Find $P(A \text{ or } B)$, if A and B are mutually exclusive events. (U)
18. Given $P(A) = \frac{2}{7}$ and $P(B) = \frac{3}{7}$. If A and B are mutually exclusive events, find $P(A \text{ or } B)$. (U)
19. A die is thrown. Find the probability of the event: "A prime number will appear". (U)
20. A die is thrown. Find the probability of the event: "An even number less than 4 will appear". (U)
21. A die is thrown. Find the probability of the event: "A number not less than 3 will appear". (U)
22. A coin is tossed twice. What is the probability that at least one tail occurs? (S)
23. A coin is tossed twice. What is the probability that at most one head occurs? (S)
24. Three coins are tossed at once. Find the probability of getting at least two heads? (S)
25. Two dice are thrown. Find the probability of the event, "the sum of the numbers which come up on the dice is even". (S)

Three Mark Question

- Two dice are thrown. Then write the event, "the sum of the numbers which come up on the dice is greater than 8". Also find the probability of the event. (S)
- A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. find the probability that the sum of numbers that turn up is 3. (S)
- A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. find the probability that the sum of numbers that turn up is 12. (S)
- A letter is chosen at random from the word 'ASSASSINATION'. Find the probability that letter is (i) a vowel (ii) a consonant (S)
- Four cards are drawn from a well-shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade? (S)
- On her vacations Veena visits four cities A, B, C and D in random order. What is the probability that she visits A before B? (S)

7. 4 cards are drawn from a well shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade? **(U)**
8. A and B are two events such that $P(A)=0.42, P(B)=0.48$ and $P(A \text{ and } B)=0.16$. Determine (i) $P(\text{not } A)$ (ii) $P(A \text{ or } B)$. **(U)**
9. A and B are two events such that $P(A)=0.54, P(B)=0.69$ and $P(A \cap B)=0.35$. Find (i) $P(A \cap B')$ (ii) $P(B \cap A')$ **(S)**
10. The probabilities that at least one of the events A and B occurs is 0.8. If A and B occur simultaneously with probability 0.1, then find $P(A') + P(B')$. **(S)**
11. In class XI of a school 40% of the students study Mathematics and 30% study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology. **(A)**
12. If E and F are events such that $P(E) = \frac{1}{3}$, $P(F) = \frac{1}{6}$ and $P(E \text{ and } F) = \frac{1}{9}$ then find (i) $P(E \text{ or } F)$ (ii) $P(\text{not } E \text{ and not } B)$.
13. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (i) a spade (ii) a red card (iii) not a King **(S)**
14. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (i) a heart (ii) a queen (iii) not a black card **(S)**
15. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (i) a diamond (ii) not an ace (iii) not a club. **(S)**
16. A committee of two persons is to be selected from 2 men and 2 women. What is the probability that the committee will have (i) no man? (ii) One man? **(A)**
17. A group of two persons is to be selected from 3 men and 2 women. What is the probability that the group will have (i) no woman? (ii) at least one woman? **(A)**
18. A team of three persons is to be selected from 2 boys and 3 girls. What is the probability that the team will have (i) three girls (ii) at most one boy? **(A)**
19. A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12 **(S)**

Five Mark Questions

1. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (i) a diamond (ii) not an ace card (iii) a black card (iv) not a diamond (v) not a black card. **(A)**
2. A bag contains 9 discs of which 4 are red, 3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it will be (i) red, (ii) yellow, (iii) blue, (iv) not blue, (v) either red or blue. **(A)**
3. Two students Anil and Ashima appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that (i) Both Anil and Ashima will not qualify the examination. (ii) At least one of them will not qualify the examination and (iii) Only one of them will qualify the examination. **(A)**
4. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (a) no man? (b) one man? (c) two men? **(A)**
5. A die is thrown, find the probability of following events: (i) A prime number will appear, (ii) A number greater than or equal to 3 will appear, (iii) A number less than or equal to one will appear, (iv) A number more than 6 will appear, (v) A number less than 6 will appear. **(A)**

6. A card is selected from a pack of 52 cards. (a) How many points are there in the sample space?
 (b) Calculate the probability that the card is an ace of spades. (c) Calculate the probability that the card is (i) an ace (ii) black card. **(A)**
7. Three coins are tossed once. Find the probability of getting (i) 3 tails (ii) exactly two tails (iii) no tail (iv) at most two tails **(A)**
8. Three coins are tossed once. Find the probability of getting (i) 3 heads (ii) 2 heads (iii) at least 2 heads (iv) at most 2 heads (v) no head **(A)**
9. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$. Determine (i) $P(\text{not } A)$, (ii) $P(\text{not } B)$ and (iii) $P(A \text{ or } B)$ **(A)**
10. In Class XI of a school 40% of the students study Mathematics and 30% study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology.
11. In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing both?
12. The probability that a student will pass the final examination in both English and Hindi is 0.5 and the probability of passing neither is 0.1. If the probability of passing the English examination is 0.75, what is the probability of passing the Hindi examination?
13. In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that (i) The student opted for NCC or NSS. (ii) The student has opted neither NCC nor NSS. (iii) The student has opted NSS but not NCC.
14. On her vacations Veena visits four cities (A, B, C and D) in a random order. What is the probability that she visits (i) A before B? (ii) A before B and B before C? (iii) A first and B last? (iv) A either first or second? (v) A just before B?
15. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (i) all Kings (ii) 3 Kings (iii) at least 3 Kings.
16. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box, what is the probability that (i) all will be blue? (ii) at least one will be green?
17. A die has two faces each with number '1', three faces each with number '2' and one face with number '3'. If die is rolled once, determine $P(2)$ (ii) $P(1 \text{ or } 3)$ (iii) $P(\text{not } 3)$
18. In a certain lottery 10,000 tickets are sold and ten equal prizes are awarded. What is the probability of not getting a prize if you buy (a) one ticket (b) two tickets (c) 10 tickets.
19. Out of 100 students, two sections of 40 and 60 are formed. If you and your friend are among the 100 students, what is the probability that (a) you both enter the same section? (b) you both enter the different sections?
20. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.35$. Find (i) $P(A \cup B)$ (ii) $P(A' \cap B')$ (iii) $P(A \cap B')$ (iv) $P(B \cap A')$ **(S)**
21. Two friends Ramesh and Arati appeared in a competitive examination. The probability that Ramesh will qualify the examination is 0.08 and that Arati will qualify the examination is 0.15. The probability that both will qualify the examination is 0.03. Find the probability that only one of them will qualify the examination. **(A)**
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CHAPTER-1**SETS**

1	2	3	4	5	6	7	8	9	10
C	D	D	C	C	B	B	D	C	B
11	12	13	14	15	16	17	18	19	20
D	B	B	B	B	D	A	D	D	C
21	22	23	24	25	26	27	28	29	30
D	D	C	D	B	A	C	B	A	C
31	32	33	34	35	36	37	38	39	40
C	B	A	D	C	C	D	A	A	B
41	42	43	44	45	46	47	48	49	50
C	C	C	B	C	A	C	A	A	A
51	52	53	54	55	56	57	58	59	60
B	A	C	D	C	C	D	B	9	5
61	62	63	64	65					
7	1	4	2	1					

CHAPTER-2**RELATIONS AND FUNCTIONS**

1	2	3	4	5	6	7	8	9	10
B	B	D	D	D	C	A	B	D	D
11	12	13	14	15	16	17	18	19	20
C	D	C	A	B	C	D	D	A	D
21	22	23	24	25	26	27	28	29	30
A	B	A	B	D	A	B	C	A	9
31	32	33	34	35	36	37	38	39	40
4	8	8	16	C	A	C	D	B	C
41	42	43	44	45	46	47	48	49	50
B	C	D	C	B	B	D	A	A	C

CHAPTER-3**Trigonometric Functions**

1	2	3	4	5	6	7	8	9	10
C	A	D	A	D	B	B	B	D	D
11	12	13	14	15	16	17	18	19	20
A	D	A	C	A	C	C	C	B	C
21	22	23	24	25	26	27	28	29	30
B	A	D	B	D	D	B	A	B	A
31	32	33	34	35	36	37	38	39	40
C	D	A	B	D	$\frac{1}{2}$	0	1	0.34	$-\frac{5}{12}$
41	42	43	44	45	46	47	48	49	50
$-\frac{44}{125}$	A	D	C	A	A	A	A	A	B
51	52	53	54	55	56	57	58	59	60
C	D	C	B	B	C	B	D	C	D

**CHAPTER-4
COMPLEX NUMBER**

1	2	3	4	5	6	7	8	9	10
A	B	A	D	D	A	A	B	B	B
11	12	13	14	15	16	17	18	19	20
C	C	D	C	A	D	C	A	C	A
21	22	23	24	25	26	27	28	29	30
C	C	B	C	A	A	C	C	C	B
31	32	33	34	35	36	37	38	39	40
D	A	C	A	C	2	4	1	1	1
41	42	43	44	45	46	47			
2	3	0	$\frac{1098}{16}$	D	D	A			

**CHAPTER-5
LINER INEQUALITIES**

1	2	3	4	5	6	7	8	9	10
D	B	D	C	C	C	C	C	A	B
11	12	13	14	15	16	17	18	19	20
D	C	B	D	C	A	A	C	B	A
21	22	23	24	25	26	27	28	29	30
B	A	C	A	D	C	B	C	D	B
31	32	33	34	35	36	37	38	39	40
B	A	B	2	0	-1/2	C	A	D	A

**CHAPTER-6
PERMUTATIONS AND COMBINATIONS**

1	2	3	4	5	6	7	8	9	10
C	D	B	A	D	C	A	D	C	A
11	12	13	14	15	16	17	18	19	20
C	D	B	C	B	B	B	C	D	A
21	22	23	24	25	26	27	28	29	30
B	D	D	B	B	A	D	A	C	D
31	32	33	34	35	36	37	38	39	40
D	B	C	D	A	A	A	C	C	B
41	42	43	44	45	46	47	48	49	50
C	D	B	C	24	36	0	1	66	10
51	52	53	54	55	56	57	58	59	60
D	A	A	B	A	4	A	C	A	B
61	62	63	64	65					
B	C	A	B	B					

**CHAPTER-7
BINOMIAL THEOREM**

1	2	3	4	5	6	7	8	9	10
B	C	B	C	D	A	A	D	D	D
11	12	13	14	15	16	17	18	19	20
D	C	C	B	C	B	C	7	2	-4
21	22	23	24	25	26	27	28	29	30
121	21	1	A	A	D	A	A	C	C

**CHAPTER-8
SEQUENCES AND SERIES**

1	2	3	4	5	6	7	8	9	10
C	C	C	A	A	B	B	A	B	D
11	12	13	14	15	16	17	18	19	20
D	A	C	B	A	A	B	B	C	D
21	22	23	24	25	26	27	28	29	30
A	C	C	A	C	C	B	B	A	-8
31	32	33	34	35	36	37	38	39	40
5	162	$\sqrt{3}$	8	6	13	1	B	D	B
41	42	43	44	45	46	47	48	49	50
A	A	B	A	B	A	A	B	D	D
51	52	53	54	55					
B	C	D	C	B					

**CHAPTER-9
STRAIGHT LINES**

1	2	3	4	5	6	7	8	9	10
D	D	B	C	C	A	D	B	B	B
11	12	13	14	15	16	17	18	19	20
C	B	A	D	B	B	B	C	A	D
21	22	23	24	25	26	27	28	29	30
C	C	B	C	B	B	C	B	B	B
31	32	33	34	35	36	37	38	39	40
A	A	A	C	D	A	A	C	B	A
41	42	43	44	45	46	47	48	49	50
B	B	C	B	A	C	D	0	$\sqrt{3}$	-1
51	52	53	54	55	56	57	58	59	60
$\frac{5}{-7}$	$\frac{2}{3}$	$\frac{2}{5}$	5	-4	3	-6	1	-5	y=0
61	62	63	64	65	66	67	68	69	70
x=0	$\frac{2}{-7}$	$\frac{6}{5}$	6	B	A	A	C	B	C
71	72	73	74	75					
B	A	A	B	C					

CHAPTER - 10
CONIC SECTIONS

1	2	3	4	5	6	7	8	9	10
A	D	C	D	B	D	A	D	A	C
11	12	13	14	15	16	17	18	19	20
B	B	B	D	B	A	B	A	D	A
21	22	23	24	25	26	27	28	29	30
A	C	D	A	B	A	C	B	B	A
31	32	33	34	35	36	37	38	39	40
A	C	C	B	B	D	C	C	B	D
41	42	43	44	45	46	47	48	49	50
B	D	C	B	A	A	B	B	D	A
51	52	53	54	55	56	57	58	59	60
D	C	C	D	B	C	A	D	C	A
61	62	63	64	65	66	67	68	69	70
B	A	C	C	9π	$\frac{9}{2}$	2	$\sqrt{\frac{3}{2}}$	$2\sqrt{3}$	$\frac{4}{5}$

CHAPTER 11

Introduction to three-Dimensional Geometry

1	2	3	4	5	6	7	8	9	10
B	C	B	B	C	A	D	C	C	C
11	12	13	14	15	16	17	18	19	20
A	C	B	D	A	A	B	B	B	B
21	22	23	24	25	26	27	28	29	30
C	C	C	A	B	C	A	A	B	B
31	32	33	34	35	36	37	38	39	40
C	C	B	D	D	C	A	B	C	B
41	42	43	44	45	46	47	48	49	50
A	A	8	0	0	8 TH	$5\sqrt{2}$	2	1	C

**CHAPTER -12
LIMITS AND DRIVATIVES**

1	2	3	4	5	6	7	8	9	10
B	B	D	B	C	A	C	B	C	B
11	12	13	14	15	16	17	18	19	20
B	D	B	C	C	A	B	A	B	D
21	22	23	24	25	26	27	28	29	30
B	C	D	C	B	B	C	B	B	D
31	32	33	34	35	36	37	38	39	40
D	A	A	B	A	A	D	B	B	C
41	42	43	44	45	46	47	48	49	50
A	D	D	A	C	D	D	A	A	D
51	52	53	54	55	56	57	58	59	60
D	C	3	1	1	2	1	0	$\frac{1}{2}$	A

**CHAPTER -13
STATSTICS**

1	2	3	4	5	6	7	8	9	10
B	A	C	B	A	D	C	C	C	B
11	12	13	14	15	16	17	18	19	20
D	D	C	A	C	A	A	A	B	C
21	22	23	24	25	26	27	28	29	30
A	C	B	B	C	C	B	C	D	A
31	32	33	34	35	36	37	38	39	40
C	A	C	D	C	A	A	A	2	0
41	42	43	44	45	46	47	48	49	50
4	5	0	16160	4	8	5	2.5	B	A

**CHAPTER-14
PROBABILITY**

1	2	3	4	5	6	7	8	9	10
B	B	C	C	A	A	C	C	D	D
11	12	13	14	15	16	17	18	19	20
C	B	A	B	A	D	A	B	C	C
21	22	23	24	25	26	27	28	29	30
A	A	B	A	C	D	A	D	C	D
31	32	33	34	35	36	37	38	39	40
A	C	B	B	C	0	1	12	7	4
41	42	43	44	45	46	47	48	49	50
4	∞	$\frac{9}{11}$	1	$\frac{1}{4}$	0	1	4	A	B
51	52	53	54	55	56	57	58	59	60
A	C	C	D	A	D	C	C	C	A