Sample paper

Class-XI

Subject: Maths

Time: 3 Hrs   M.M. 100

Section – A (1 mark each)

1. Find the value of $1 + i^4 + i^6 + i^{10}$.
2. Number of relation that can be defined on the set A = {1,2,3} is…………
3. Write the negation of the statement "Sum of 3 and 4 is equal to 9".
4. Write the contra positive of the statement "If it is hot outside, then you feel thirsty".
5. Find the component statement of the following compound statement and check whether it is true or false. "All integers are positive or negative"
6. Write the sample space for the following experiment- "A coin is tossed and then a die is rolled only if the coin shows a head".
7. If P (E) = $\frac{1}{4}$, P (F) = $\frac{1}{2}$ and P (E and F) = $\frac{1}{8}$, find P(E or F).
8. Find the image of (1,2,3) in ZX- Plane.
9. The radius of circle $2x^2 + 2y^2 + 4x - 3y + 2 = 0$ is …….
10. Circum – centre of the triangle formed by the lines x =0, y = 0 and the line $\frac{x}{a} + \frac{y}{b} = 1$ is ….

Section – B (4 Marks Each)

11. One card is drawn from a well shuffled pack 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) a black card (d) not a diamond.

Or

A letter is chosen at random from the word 'ASSASSINATION. Find the probability that the letter is (a) A vowel (b) a consonant.

12. If U = {x: x ∈ N, 1≤ x ≤9}, A ={1,2,3,4}, B = {2,4,6,8} find (i) B ∩ C (ii) A∪ (B ∩ C) (iii) A – (B ∩ C) (iv) B' ∪ C'.

13. Find the domain and range of the real valued function 'f' defined by f(x) = $(x - 1)^{\frac{1}{2}}$.

14. Let A = {1,2,3,4,5,6}. Define a Relation 'R' from A to A by R = {(x,y): y = x + 1}, (i) Write 'R' in Roaster form (ii) depict this relation using arrow diagram.

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

16. Using principle of mathematical induction, prove that $2 \times 7^n + 3 \times 5^n - 5$ is divisible by 24, $\forall$ $n \in N$.

17. Convert $\frac{-16}{1+3i}$ in polar form.

Or

(a) solve : $\sqrt{5}\, x^2 + x + \sqrt{5} = 0; x \in C$.

(b) Find the conjugate of $\frac{12+5i}{4+3i}$ and express it in the form of (a + ib).

18. How many words can be formed from the letters of the word 'DAUGHTER' so that (i) the vowels come together? (ii) The vowels never come together?

19. 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 at least one boy and one girl?

20. Find the co-efficient of a^4 in the product of $(1 + 2a)^4 (2 - a)^5$ using binomial distribution.

21. Find the co-ordinates of the foci, the vertices, the eccentricity and the length of latus rectum of the curve $y^2 - 16x^2 = 16$.

Or

A rod AB of length 15cm rests in between two co-ordinate axes in such a way that the end point A lies on X-axis and B lies on Y-axis. A point P(x,y) is taken on the rod in such a way that AP = 6cm. show that the locus of P is an ellipse.

22. Find the sum of the series up to 'n' terms 0.6 + 0.66 + 0.666 + 0.6666 + …..

Or

The sum of first four terms of an AP is 56. The sum of last four terms in 112. If its first term is 11, then find the number of terms.

Section – C (6 Marks Each)

23. In a survey of 60 people, it was found that 25 read news paper 'H', 26 read newspaper 'T', 26 people read newspaper 'I' 9 read both 'H' and 'I', 11 read both 'H' and 'T', 8 read 'T' and 'I', 3 read all three newspapers. Find (i) the number of people who read at least one of the newspapers.

(ii) the number of people who read exactly one newspaper.

24. If tan x = $\frac{3}{4}$ and x lies in third quadrant, find the values of sin $\frac{x}{2}$, cos $\frac{x}{2}$ and tan $\frac{x}{2}$.

Or

(a) Solve: sin x = $\frac{-3}{2}$

(b) Solve: sin 2x – sin 4x + sin 6x = 0.

25. Solve the following system of linear inequalities graphically:

$$3x + 4y \leq 150, x + 4y \leq 80, x \leq 15, x \geq 0, y \geq 0.$$

26. A line is such that its segment between the lines 5x – y + 4 = 0 and 3x + 4y – 4 =0 is bisected at the point (1,5). Obtain its equation.

Or

The vertices of a triangle are A(10,4), B(- 4, 9) and C(- 2 , -1). Find the equations of its altitudes. Also find its orthocentre.

27. (i) Find the derivative of 'tan x' using first principle.

(ii) find the $\lim_{x \to 1} f(x)$ where f(x)= $\begin{cases} x^2 - 1, x \leq 1 \\ -x^2 - 1, x > 1 \end{cases}$.

28. Calculate Mean and Standard Deviation for the following distribution by short-cut Method.

Classes	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
Frequency	3	7	12	15	8	3	2

29. If S_1, S_2 and S_3 are the sum of first 'n' natural numbers, their squares and their cubes respectively, show that $9S_2{}^2 = S_3(1 + 8S_1)$.