A–3–X

Roll No.....

Total No. of Questions : **40]**

[Total No. of Printed Pages : **15**

XARJKUT23

9303–X

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section–A

1 each

1. The number 3 is :

(A) an even number

(B) a composite number

(C) a prime number

(D) None of these

2. Zeroes of the quadratic polynomial $x^2 - 2x - 8$ are :

(A) 2, –4

(B) 2, 4

(C) –2, –4

(D) None of these

3. 8th term of an A.P. 10, 7, 4, ... is :

(A) –11

(B) –10

(C) –8

(D) None of these

4. Distance between the points (4, 3) and (0, 0) is :

(A) $\sqrt{7}$

(B) 5

(C) 12

(D) None of these

5. If $6x + 3y = C - 3$ and $12x + Cy = C$, has infinitely many solutions, then C is equal to :

(A) 6

(B) 5

(C) 4

(D) None of these

6. Circumference of a semi-circle with radius 'r' is :

(A) $2\pi r$

(B) πr

(C) πr^2

(D) None of these

7. How many parallel tangents can a circle have ?

(A) 2

(B) 1

(C) Infinite

(D) None of these

8. A card is drawn from a pack of 52 cards. What is the probability of getting a heart ?

(A) $\frac{1}{26}$

(B) $\frac{1}{2}$

(C) $\frac{1}{4}$

(D) None of these

9. $1 - \cos^2 30°$ is equal to :

(A) $-\sin^2 30°$

(B) $\sin^2 30°$

(C) $-\sin^2 60°$

(D) None of these

10. The product of roots of the quadratic equation $\sqrt{5}x^2 + 3x - 5 = 0$ is :

(A) $\sqrt{5}$

(B) $\frac{1}{\sqrt{5}}$

(C) $-\sqrt{5}$

(D) None of these

11. H.C.F. of two prime numbers is ..... . (Fill in the blank)

12. The sum of first n natural numbers is $\frac{n(n+1)}{2}$. (True/False)

Or

The next term of the A.P. $\sqrt{27}$, $\sqrt{48}$, $\sqrt{75}$, ... is $\sqrt{108}$.

(True/False)

13. The value of $\cos\theta$ increases as θ increases. (True/False)

14. All ..... triangles are similar. (isosceles, equilateral)

15. The common point of a tangent to a circle and the circle is called ..... (Fill in the blank)

16. Define Distance Formula.

Or

Define Ordinate of a Point.

17. State Basic Proportionality Theorem.

18. Define Angle of Elevation.

19. What is the probability of sure event ?

20. Write the formula for total surface area of hemisphere.

Section–B

2 each

21. Find the H.C.F. of 510 and 92.

22. A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass.

23. Solve the pair of linear equations :

$$x + y = 5$$

$$2x - 3y = 4$$

by elimination method.

24. Given $15 \cot A = 8$, find $\sin A$ and $\sec A$.

Or

Evaluate :

$$2 \tan^2 45° + \cos^2 30° - \sin^2 60°$$

25. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is :

(i) red ?

(ii) not red ?

26. A class teacher has the following absentee record of 40 students of a class for the whole term. Find the mean number of days a student was absent :

Number of Days	Number of Students
0–6	11
6–10	10
10–14	7
14–20	4
20–28	4
28–38	3
38–40	1

Section–C 3 each

27. Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

Or

Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively.

28. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

29 Find the roots of the quadratic equation $2x^2 + x - 6 = 0$ by factorization.

30. Find the 31st term of an A.P. whose 11th term is 38 and the 16th term is 73.

Or

Find the sum of the first 15 multiples of 8.

31. Write all the other trigonometric ratios of $\angle A$ in terms of sec A.

32 Prove that the lengths of tangents drawn from an external point to a circle are equal.

Or

The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

33. Find the area of a quadrant of a circle whose circumference is 22 cm.

34. How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm × 10 cm × 3.5 cm ?

Section–D

4 each

35. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

Or

Find the roots of $4x^2 + 3x + 5 = 0$ by the method of completing the square.

36. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

7. Find the area of the quadrilateral whose vertices taken in order, are (–4, –2), (–3, –5), (3, –2) and (2, 3).

Or

If A and B are (–2, –2) and (2, –4), respectively, find the coordinates of P such that $AP = \frac{3}{7}AB$ and P lies on the line segment AB.

38. Prove that the line joining the mid-points of any two sides of a triangle is parallel to the third side.

Or

In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

39. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

40. If the median of the distribution given below is 28.5, find the values of x and y :

Class Interval	Frequency
0–10	5
10–20	x
20–30	20
30–40	15
40–50	y
50–60	5
Total	**60**