E–3–C

Roll No..

Total No. of Questions : **40**] [Total No. of Printed Pages : **8**

XKDAR21

5503–C

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 80**

Section–A 1 each

1. The prime factors of 39 are :

(A) 3, 11 (B) 3, 13

(C) 9, 13 (D) None of these

2. A polynomial of degree 3 is called :

(A) Quadratic polynomial (B) Zero polynomial

(C) Linear polynomial (D) None of these.

3. A quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) has two non-real roots if :

(A) D = 0 (B) D < 0

(C) D > 0 (D) None of these

4. The common difference of the A.P. series 1, 3, 5, 7, ... is :

(A) 2 (B) -2

(C) 0 (D) None of these

5. A(–4, 5) lies in :

(A) 1st quadrant (B) 3rd quadrant

(C) 4th quadrant (D) None of these

6. A tangent to a circle intersects it in :

(A) No point (B) One point

(C) Two points (D) None of these

7. Area of a circle of radius 2 cm is :

(A) 8π (B) 6π

(C) 4π (D) None of these

8. Which of the following can not be the probability of an event ?

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$

(C) $\frac{4}{3}$ (D) 0

9. tan A is not defined at :

(A) 45° (B) 30°

(C) 90° (D) 0°

10. Class mark is always equal to :

(A) $\frac{\text{Upper classmark} - \text{Lower classmark}}{2}$

(B) $\frac{\text{Upper classmark} + \text{Lower classmark}}{2}$

(C) $\frac{\text{Upper classmark} \times \text{Lower classmark}}{2}$

(D) None of these

11. $\sqrt{3}$ is an ..... number. (Fill in the blank)

12. For unique solution in $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$. (True/False)

13. If $a_n = 5n + 2$, find a_2.

Or

What is the 10th term of the A.P. : 2, 7, 12, ... ?

14. The value of cos θ increases as θ increases. (True/False)

15. All squares are ..... (similar/congruent)
(Choose correct word)

16. The distance between $P(x_1, y_1)$, and $Q(x_2, y_2)$ is ..... .
(Fill in the blank)

Or

Write the formula for find the area of a triangle whose vertices are $P(x_1, y_1)$, $Q(x_2, y_2)$ and $R(x_3, y_3)$.

17. Write one application of Trigonometry.

18. Define Concentric circles.

19. If P(A) = 0, write $P(\bar{A})$/P(Not A).

20. Length of an arc of a circle with radius r and angle with degree measure θ is ..... . (Fill in the blank)

Section–B 2 each

21. Find H.C.F. and L.C.M. of 26 and 91 using prime factorisation.

22. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total suruface area of the toy.

23. Find whether the pair of linear equations are consistent or inconsistent :

$$2x - 3y = 8$$

$$4x - 6y = 9$$

24. Find the value of $\frac{2\tan 30°}{1+\tan^2 30°}$.

Or

Find the value of $\frac{\tan 65°}{\cot 25°}$.

25. One card is drawn from a well shuffled deck of 52 cards. Calculate the probability that the card will :

(i) be an ace

(ii) not be an ace

26. The marks obtained by 30 students of class 'X' of a certain school in a Mathematics paper consisting of 100 marks are presented in table below. Find the mean of the marks obtained by the students :

Marks Obtained (x_i)	10	20	36	40	50	56	60	70	72	80	88	92	95
Number of Studnets (f_i)	1	1	3	4	3	2	4	4	1	1	2	3	1

Section–C

3 each

27. Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$ and verify the relationship between zeroes and the coefficients.

Or

Divide $2x^2 + 3x + 1$, by $x + 2$ and find the quotient and the remainder.

28. Solve the pair of linear equations by substitution method :

$$7x - 15y = 2$$

$$x + 2y = 3$$

29. Find the roots of the quadratic equation using the quadratic formulae $3x^2 - 5x + 2 = 0$.

30. How many terms of the A.P. : 24, 21, 18, ... must be taken so that their sum is 78.

Or

Find the sum of the odd numbers between 0 and 50.

31. Prove the identity :

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$$

32. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Or

Prove that the parallelogram circumscribing a circle is a rhombus.

33. Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also find the area of the corresponding major sector (using π = 3.14).

34. A metallic sphere of radius 4.2 cm is melted and recast into a shape of a cylinder of radius 6 cm. Find the height of cylinder.

Section–D

4 each

35. Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

Or

The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

36. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of the foot is 45°. Determine the height of the tower.

37. Find the point on the Y-axis which is equidistant from the points A(6, 5) and B(–4, 3).

Or

Find the value of k if the points A(2, 3), B(4, k) and C(6, –3) are collinear.

38. In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. Prove it.

Or

In an equilateral triangle ABC, D is the point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9(AD)^2 = 7(AB)^2$.

39. Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

40. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household :

Family Size	1–3	3–5	5–7	7–9	9–11
Number of Families	7	8	2	2	1

Find the mode of this data.