E–3–A

Roll No..

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

XKDAR21

5503–A

MATHEMATICS

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

Section–A 1 each

1. The H.C.F. of 5 and 2 is :

   (A) 2 (B) 5

   (C) 10 (D) 1

2. A polynomial of degree 1 is called :

   (A) Linear polynomial (B) Quadratic polynomial

   (C) Zero polynomial (D) None of these

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

   (A) $D = 0$ (B) $D > 0$

   (C) $D < 0$ (D) None of these

The common difference of the A.P. 2, 4, 6, 8, 10, ... is :

(A) -2 (B) 4

(C) 2 (D) None of these

The distance of the point $A(x_1, y_1)$ from the origin O(0, 0) is :

(A) $\sqrt{x_1^2 + y_1^2}$ (B) $\sqrt{x_1^2 - y_1^2}$

(C) x_1^2 (D) y_1^2

A line which cuts the circle at only one point is called :

(A) Chord (B) Tangent

(C) Secant (D) None of these

Circumference of a circle with radius 'r' is :

(A) πr^2 (B) πr^3

(C) $2\pi r$ (D) None of these

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

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

(C) 15% (D) .2

9. The value of sin (90 – θ) is :

(A) sin θ

(B) cos θ

(C) tan θ

(D) None of these

10. The mean of the grouped data can be determined by direct method as :

(A) $\frac{\sum f(x_i)}{\sum f_i x_i}$

(B) $\frac{\sum x_i}{\sum f_i}$

(C) $\frac{\sum f_i x_i}{\sum f_i}$

(D) None of these

11. L.C.M. $(a, b) = \frac{a \times b}{\ldots\ldots\ldots\ldots}$ (Fill in the blank)

12. $x = 1$, $y = 3$ is the solution of $x + 2y = 7$ and $2x + y = 5$.

(True/False)

13. $S_n = \frac{n}{2}[a + (n-1)d]$ is the sum to n terms of an A.P. Series.

(True/False)

Or

30th term of the A.P. 10, 7, 4, ... is 77. (Fill in the blank)

14. sin θ = cos θ for all values of θ. (True/False)

5. All ..... triangles are similar. (isosceles/equilateral)

(Choose correct word)

6. Write the co-ordinates of the point P(x, y) which divide the line segment joining the points A(x_1, y_1) and B(x_2, y_2) internally in the ratio of $m_1 : m_2$.

Or

The mid-point of line segment joining the points (x_1, y_1) and (x_2, y_2) is ..... (Fill in the blank)

17. Define the term 'Angle of elevation'.

18. State Pythagoras theorem.

19. If P(A) = .7, find P(not A).

20. If R denotes radius of a sphere, write the formula for volume of sphere.

Section–B

2 each

21. 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cubiod.

22. Find the H.C.F. of 96 and 404 by the prime factorisation method.

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 $\pi = 3.14$).

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.