**B–3–X**

Roll No..... .....

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

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

# *10th SZJDAR22*

# *6203–X*

# *MATHEMATICS*

**Time : 2.30 Hours]**

**[Maximum Marks : 80**

***General Instructions :–***

(i) This question paper comprises four Sections–A, B, C and D. This question paper carries 40 questions. All questions are compulsory.

(ii) Section–A (Q. No. **1** to **20**) comprises of *twenty* questions of 1 mark each.

(iii) Section–B (Q. No. **21** to **26**) comprises of *six* questions of 2 marks each.

(iv) Section–C (Q. No. **27** to **34**) comprises of *eight* questions of 3 marks each.

(v) Section–D (Q. No. **35** to **40**) comprises of *six* questions of **4** marks each.

## Section–A

1 each

Question No. **1** to **10** are MCQs of 1 mark each. Select the correct option :

1. The common difference of an A.P. –5, –1, 3, 7, ..... is :

(A) 4 (B) –4

(C) 2 (D) None of these

2. $41\sqrt{2}$ is :

(A) Rational (B) Irrational

(C) Even (D) None of these

3. The zero of a linear polynomial $ax + b$ is :

(A) $-\frac{b}{a}$

(B) $-\frac{a}{b}$

(C) $\frac{b}{a}$

(D) None of these

4. Sum of the roots of the quadratic equation $3x^2 - 5x + 2 = 0$ is :

(A) $-\frac{5}{3}$

(B) $\frac{3}{5}$

(C) $\frac{5}{3}$

(D) None of these

5. A line intersecting a circle in two points is called a :

(A) Tangent

(B) Chord

(C) Secant

(D) None of these

6. Length of an arc of a sector is given by :

(A) $\frac{\theta}{360} \times 2\pi r$

(B) $\frac{\theta}{360} \times \pi r$

(C) $\frac{\theta}{180} \times 2\pi r$

(D) None of these

7. The midpoint of the line segment joining the points (2, 3) and (–4, 7) is :

(A) (–1, 5)

(B) (3, 5)

(C) (5, −1)

(D) None of these

8. The probability of getting a number less than 4 in a single throw of a die is :

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

(B) $\frac{3}{4}$

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

(D) None of these

9. The value of cos 72° − sin 18° is :

(A) −1

(B) 0

(C) 1

(D) None of these

10. The graph of the equation $x = 2$ is :

(A) A line parallel to $x$-axis

(B) A line parallel to $y$-axis

(C) $y$-axis

(D) None of these

In Q. No. **11** to **15**, fill in the blanks. Each question is of 1 mark each.

11. LCM of 6 and 20 is ..... . (20, 60)

12. If angle between two tangents drawn from a point P to a circle of radius $a$ and centre O is 90°, then OP = $a\sqrt{2}$. (True/False)

13. The 6th term of the A.P. 5, 8, 11, 14, ..... is 21.

(True/False)

*Or*

The sum of all natural numbers from 1 to 100 is 5050.

(True/False)

14. If $\Delta ABC$ is right angled at C, then the value of $\cos(A + B)$ is 1. (Yes/No)

15. Any two ..... triangles are similar. (Isosceles/Equilateral)

Q. No. **16** to **20** are very short answer type questions of 1 mark each.

16. Define Collinear points.

*Or*

Write a formula for finding the distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$.

17. What is the line of sight ?

18. State AA similarity criterion for two triangles.

19. If P(E) = 1, find P(not E).

20. Given $r$ = 7 cm, find the circumference of circle. $\left(\text{Take, } \pi = \frac{22}{7}\right)$

## Section–B

2 each

Q. No. **21** to **26** carry 2 marks each.

21. Find the H.C.F. of 26 and 91.

22. 2 cubes each of volume 64 $cm^3$ are joined end to end. Find the surface area of the resulting cuboid.

23. Solve the pair of equations by the substitution method :

$$x + y = 14$$

$$x - y = 4$$

24. If $\sin A = \frac{3}{4}$, calculate cos A and tan A.

*Or*

Find the value of :

$$\frac{1 - \tan^2 45°}{1 + \tan^2 45°}$$

25. A die is thrown once. Find the probability of getting :

(i) a prime number

(ii) an odd number

26. The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate :

| Literacy rate (in %) | 45–55 | 55–65 | 65–75 | 75–85 | 85–95 |
|---|---|---|---|---|---|
| Number of Cities | 3 | 10 | 11 | 8 | 3 |

## Section–C

3 each

Q. No. **27** to **34** carry 3 marks each.

27. Find the zeroes of the quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and the coefficients.

*Or*

On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.

28. Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages ?

29. Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by applying the quadratic formula.

30. How many multiples of 4 lie between 10 and 250 ?

*Or*

Find the sum of first 51 terms of an A.P. whose second and third terms are 14 and 18 respectively.

31. Prove the identity :

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

32. 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.

*Or*

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that :

$$\angle PTQ = 2\angle OPQ$$

33. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.



34. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

## Section–D

4 each

Q. No. **35** to **40** carry 4 marks each.

35. Find two consecutive positive integers, sum of whose squares is 365.

*Or*

Find the value of 'K' for which the quadratic equation $Kx(x - 2) + 6 = 0$ has two equal roots.

36. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.

37. If (1, 2), (4, $y$), ($x$, 6) and (3, 5) are the vertices of a parallelogram taken in order, find $x$ and $y$.

*Or*

Find the area of the triangle whose vertices are (–5, –1), (3, –5) and (5, 2).

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

*Or*

Diagonals AC and BD of a trapezium ABCD with AB ∥ DC intersect each other at the point O. Using a similarity criterion for two triangles, show that :

$$\frac{OA}{OC} = \frac{OB}{OD}$$

39. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

40. The distribution below gives the weight of 30 students of a class. Find the median weight of the students :

| Weight (in kg) | No. of Students |
|---|---|
| 40–45 | 2 |
| 45–50 | 3 |
| 50–55 | 8 |
| 55–60 | 6 |
| 60–65 | 6 |
| 65–70 | 3 |
| 70–75 | 2 |