10th ARM(SZ)JKUT2024
1003-Y

MATHEMATICS

Time : 3 Hours]   [Maximum Marks : 80

Section-A   1 each

1. The number $\sqrt{3}$ is .

    (A) Odd number

    (B) Rational number

    (C) Real number

    (D) None of these

2. Zeroes of the polynomial $3x^2 + 5x - 2$ are :

   (A) $\frac{1}{3}, -2$

   (B) $-\frac{1}{3}, 2$

   (C) $3, \frac{1}{2}$

   (D) None of these

3. The pair of linear equations $x - 2y = 0$ and $3x + 4y - 20 = 0$ are :

   (A) Parallel

   (B) Intersecting

   (C) Coincident

   (D) None of these

4. 15ᵗʰ term of the A.P. : 2, 7, 12. .... is :

    (A) 62

    (B) 27

    (C) 72

    (D) None of these

5. $\sin^2 30° + \cos^2 60°$ is equal to :

    (A) $\dfrac{3}{4}$

    (B) 1

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

    (D) None of these

6. The distance of a point from the y-axis is called its :

    (A) Ordinate

    (B) Coordinate

    (C) Abscissa

    (D) None of these

7. L.C.M. of 6 and 20 is :

    (A) 120

    (B) 60

    (C) 20

    (D) None of these

8. The probability of a leap year selected at random contains 53 Sundays is :

   (A) $\dfrac{53}{366}$

   (B) $\dfrac{1}{7}$.

   (C) $\dfrac{53}{365}$

   (D) **None of these**

9. A cylindrical pencil sharpened at one edge is a combination of :

   (A) A cone and a cylinder

   (B) A hemisphere and a cylinder

   (C) Four cylinders

   (D) None of these

10thARM(SZ)JKUT2024—1003-Y

A-3-Y

10. Discriminant of the quadratic equation $x^2 + 5x + 5 = 0$ is :

   (A) 25

   (B) -5

   (C) 5

   (D) None of these

11. Prime factorization of 5313 is $3 \times 7 \times 11 \times 23$.   (True/False)

12. The sum of first 100 positive integers is :

   (A) 5000

   (B) 5050

   (C) 5005

   (D) None of these

13. $\frac{3}{2}$ can be the probability of an event. (True/False)

14. All squares are .... (similar/congruent) ✓

15. Two tangents drawn at the end points of diameter of a given circle

are always .. ..

16. Write formula for n^{th} terms of an A.P.

17. $x = 2$, $y = 3$ is a solution of equation $3x + 4y = 18$. (True/False) ✓

18. The value of sin A never exceeds 1. (True/False) ✓

Or

$cosec^2 A$ – .... = 1 for $0° < A \leq 90°$.

19. Calculate mean of first 8 natural numbers.

20. Write the formula for mode of grouped data.

Or

If mean = 20, mode = 18, then median = ...

Section-B

2 each

21. Solve the pair of linear equations $\frac{x}{2} + \frac{2y}{3} = -1$ and $x - \frac{y}{3} = 3$ by elimination method.

2. Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ by factorisation.

Given $\sec\theta = \frac{13}{12}$, calculate all other trigonometric ratios.

24. Find volume of sphere of radius 3 cm.

Or

Calculate the curved surface area of cylinder of radius 2 cm and height 7 cm.

25. Find the values of y for which the distance between the points P(2, −3) and Q(10, y) is 10 units.

Or

Check whether (5, −2), (6, 4) and (7, −2) are the vertices of an isosceles triangle.

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

Turn Over

Section-C

3 each

27. Find the coordinates of the points which divide the linesegment joining A(–2, 2) and B(2, 8) into four equal parts.

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

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

Or

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

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

30. E is a point on the side AD produced of a parallelogram ABCD and

BE intersects CD at F. Show that :

$$\Delta ABE \sim \Delta CFB$$

31. The diagonals of a quadrilateral ABCD intersect each other at the

point O such that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$. Show that ABCD is a trapezium.

32. Prove that $6 + \sqrt{2}$ is irrational. https://www.jkboseonline.com

33. An AP consists of 50 terms of which 3rd term is 12 and the last

term is 106. Find the 29th term.

Or

Find the sum of the first 15 multiples of 8.

Turn Over

34. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting :

(i) A face card

(ii) A spade

Section–D   4 eac·

35. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

Or

Find the value of K so that the quadratic equation $Kx(x-2)+6=0$ has equal roots.

36. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass. (Use $\pi = 3.14$)

Or

From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2.

37. 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 its foot is 45°. Determine the height of the tower.

Turn Over

38. Evaluate :

$$\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$$

Or

Prove the identity :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$

39. If a line intersects sides AB and AC of a $\triangle ABC$ at D and E respectively and is parallel to BC, prove that :

$$\frac{AD}{AB} = \frac{AE}{AC}$$

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find th height of the tower.

10. If the median of the distribution given below is 28.5, find the value 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