

**A-3-X**

Roll No.....

Total No. of Questions : 40]

[Total No. of Printed Pages : 15

**10<sup>th</sup>ARM(SZ)JKUT2024**

**1003-X**

**MATHEMATICS**

Time : 3 Hours]

[Maximum Marks : 80

Section-A

1 each

1. Which of the following numbers is an irrational number ?

(A) 0.101

(B) 0.202202220.....

(C) 0.1011

(D) None of these

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2. Sum of zeroes of the polynomial  $2x^2 - 8x + 6$  is :

(A)  $-4$

(B)  $3$

(C)  $4$

(D) None of these

3. The pair of linear equations  $2x + 3y - 9 = 0$  and  $4x + 6y - 18 = 0$

are :

(A) Coincident

(B) Parallel

(C) Intersecting

(D) None of these

4. 35<sup>th</sup> term of the A.P. : 21, 18, 15, ..... is :

(A) -18

(B) -71

(C) -81

(D) None of these

5.  $\cot 30^\circ$  is equal to :

(A)  $\sec 30^\circ$

(B)  $\cot 60^\circ$

(C)  $\tan 60^\circ$

(D) None of these

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

(A) Abscissa

(B) Ordinate

(C) Coordinate

(D) None of these

7. H.C.F. of 7 and 28 is :

(A) 4

(B) 28

(C) 7

(D) None of these

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8. The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow ?

(A) 0.25

(B) 0.145

(C) 0.05

(D) None of these

9. Volume of cone is :

(A)  $\pi r^2 h$

(B)  $\frac{1}{3} \pi r^2 h$

(C)  $3\pi r^2 h$

(D) None of these

10. Discriminant of the quadratic equation  $3x^2 - 2\sqrt{6}x + 2 = 0$  is :

(A) 24

(B) 6

(C) 0

(D) None of these

11. Prime factorization of 1771 is  $7 \times 11 \times 13$ . (True/False)

12. The sum of first 51 positive integers is :

(A) 1316

(B) 1326

(C) 1362

(D) None of these

13.  $-0.5$  can be the probability of an event. (True/False)
14. All circles are ..... (congruent, similar)
15. Number of tangents that can be drawn from a point outside the circle is .....
16. Write formula for sum to  $n$  terms of an A.P.
17.  $x=0, y=2$  is a solution of equation  $y-2x=-2$ . (True/False)
18. The value of  $\cos A$  exceeds 1. (True/False)

Or.

$$\sin^2 A + \dots = 1 \text{ for } 0^\circ \leq A \leq 90^\circ.$$

19. Calculate mean of first 6 prime numbers.
20. Write the formula for class mark of grouped data.

Or

If mean = 15.6, median = 15.73, then mode = .....

**Section-B**

2 each

21. Solve the pair of linear equations  $3x - 5y - 4 = 0$  and  $9x = 2y + 7$  by substitution method.
22. Find the roots of the quadratic equation  $2x^2 + x - 6 = 0$  by factorisation.
23. 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 line segment 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 circle 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  $\frac{AO}{BO} = \frac{CO}{DO}$ . 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 3<sup>rd</sup> term is 12 and the last term is 106. Find the 29<sup>th</sup> term.

Or

Find the sum of the first 15 multiples of 8.

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 each

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  $1 \text{ cm}^3$  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  $\text{cm}^2$ .

37. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle of depression of its foot is  $45^\circ$ . Determine the height of the tower.

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Turn Over

38. Evaluate :

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

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  $\Delta ABC$  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 the 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
<b>Total</b>	<b>60</b>