A–3–X

Roll No.....

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

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

10^{th} ARF(SZ)JKUT2024-25

103–X

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 80

Section–A

1 each

1. Find zeroes of the polynomial $4u^2 + 8u$.

2. Define impossible event.

3. 0.1 can be the probability of an event. (True/False)

4. How many tangents can a circle have ?

5. Circumference of a circle with radius 'r' = ...

6. $\sqrt{3}$ is a rational number. (True/False)

7. Sum of a rational and irrational number is :

(A) a rational

(B) a natural

(C) an irrational

(D) an integer

8. HCF of (12, 15, 21) is ..... .

9. The graph of $y = 4x$ is a line parallel to :

(A) X-axis

(B) Y-axis

(C) Passing through origin

(D) None of these

10. If the pair of linear equations has unique solution, then the lines representing these equations :

(A) Coincide

(B) Intersecting at one point

(C) Parallel to each other

(D) None of these

11. 30th term of an A.P. : 10, 7, 4, ... is :

(A) 97

(B) –77

(C) 77

(D) –87

12. The value of $\cos \theta$ increases as θ increases. (True/False)

13. Evaluate :

$$\frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$$

14. If $a_n = n^2 + 1$, find a_3.

15. A quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has two distinct roots if :

(A) $D = 0$

(B) $D < 0$

(C) $D > 0$

(D) None of these

16. Find the sum of Ist five multiple of 3.

17. Find the distance between the points (2, 3) and (4, 1).

18. Mean of Ist 'n' natural numbers is :

(A) $\frac{n(n+1)}{2}$

(B) $\frac{n}{2}$

(C) $\frac{n^2+1}{2}$

(D) $\frac{n+1}{2}$

19. Find the mode of the given data :

3, 5, 7, 6, 1, 3, 2, 4, 3, 4

20. Volume of a sphere :

(A) πrl

(B) $\pi r^2 h$

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

(D) $\frac{4}{3}\pi r^3$

Section–B

2 each

21. Find whether the pair of linear equations

$$2x - 3y = 8$$

and

$$4x - 6y = 9$$

are consistent or inconsistent.

22. Find the nature of the roots of the quadratic equation :

$$2x^2 - 6x + 3 = 0$$

23. If

$$\sin A = \frac{3}{4}$$

find cos A and tan A.

24. Find the point on X-axis which is equidistant from (2, –5) and (–2, 9).

Or

Find the value of 'y' for which the distance between the points P(2, –3) and Q(10, y) is 10 unit.

25. Find the quadratic polynomial whose sum and product of zeroes respectively 1 and 1.

26. Find the area of sector of a circle with radius 6 cm and the angle of the sector is 60°.

Section–C

3 each

27. Find the area of a rhombus whose vertices are (3, 0), (4, 5), (–1, 4) and (–2, –1) taken in an order.

28. Prove that Parallelogram circumscribing a circle is a rhombus.

Or

Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

29. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

30. Show that $3\sqrt{2}$ is an irrational number.

31. If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

Or

ABCD is a trapezium in which AB $\parallel$ DC and its diagonals intersect each other at point O. Show that :

$$\frac{AO}{BO} = \frac{CO}{DO}$$

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

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

(i) a spade

(ii) a red face card

(iii) a jack.

34. D is a point on side BC of a triangle ABC such that :

$$\angle ADC = \angle BAC$$

Show that $CA^2 = CB.CD$.

Or

E is a point on the side AD produced of a parallelogram ABCD and BE intersect CD at F. Show that :

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

Section–D 4 each

35. Find the value of K so that the quadratic equation

$$Kx(x - 2) + 6 = 0$$

has equal roots.

Or

The altitude of right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

36. A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter, the diameter of spherical part is 8.5 cm. Find the volume of the vessel.

Or

A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its end, the length of the entire capsule is 14 mm. Find the surface area, if the diameter is 5 mm.

37. The shadow of a tower standing on a level ground is found to be 40 m longer when the sun's altitude is 30° than when it is 60°, find the height of the tower.

Or

The angle of elevation of the top of building from the foot of tower is 30° and the angle of elevation of the top of tower from the foot of the building is 60°. If the tower is 50 m high, find the height of building.

38. Prove that :

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

39. If AD and PM are the medians of triangles ABC and PQR respectively such that :

$$\Delta ABC \sim \Delta PQR$$

Prove that :

$$\frac{AB}{PQ} = \frac{AD}{PM}$$

Or

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

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

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

Weight (in kg)	Number of Students
40—45	2
45—50	3
50—55	8
55—60	6
60—65	6
65—70	3
70—75	2