JKBOSE
QUESTION PAPERS

Jammu & Kashmir Board of School Education

Roll No. .....

Z–7–X

Total No. of Questions : **31**] [Total No. of Printed Pages : **8**

11^{th} ARM(SZ)JKUT2024

1207–X

MATHEMATICS

Time : 3.00 Hours] **[Maximum Marks : 80**

***General Instructions* :**

(i) This question paper contains 4 Sections A, B, C and D. Each Section is compulsory.

(ii) **Section–A** : Q. No. **1** to **10** comprises of 10 questions of 1 mark each.

(iii) **Section–B** : Q. No. **11** to **20** comprises of 10 Very Short Answer (V.S.A.) type questions of 2 marks each.

(iv) **Section–C** : Q. No. **21** to **28** comprises of 8 Short Answer (S.A.) type questions of 4 marks each.

(v) **Section–D** : Q. No. **29** to **31** comprises of 3 Long Answer (L.A.) type questions of 6 marks each.

Section–A

(Objective Type Questions)

1 each

1. Subsets of set {-1, 1} are :

   (A) ϕ, {–1}

   (B) ϕ only

   (C) ϕ, {–1}, {1}, {–1, 1}

   (D) 0

2. Let :

$$f(x) = \frac{x^2}{2},$$

   then $f(2)$ is equal to :

   (A) 2

   (B) 4

   (C) 6

   (D) 8

3. sin $(x + y)$ is equal to :

   (A) sin x + sin y

   (B) sin x – sin y

   (C) sin x cos y + cos x sin. y

   (D) None of these

4. The value of $(\sqrt{3}i)^2$ is equal to :

(A) 3

(B) –3

(C) 9

(D) 18

5. The value of

$$\frac{n!}{(n-r)!}$$

when $n = 6$, $r = 2$ is equal to :

(A) 6

(B) 8

(C) 15

(D) 30

6. e (eccentricity) of ellipse is :

(A) $e < 1$

(B) $e = 1$

(C) $e > 1$

(D) $e = 2$

7. Equation of circle with centre (0, 2) and radius 2 is equal to :

(A) $x^2 + y^2 - 6y = 0$

(B) $x^2 + y^2 - 4y = 0$

(C) $x^2 + 2y^2 - 3 = 0$

(D) $2x^2 + y^2 + 3y = 0$

8. The value of $-12x > 30$ when x is a natural number is :

(A) 3

(B) < 3

(C) No solution

(D) 0

9. Mean of first 4 natural numbers is :

(A) 4

(B) 2.5

(C) 0

(D) -4

10. Sample space of a coin when tossed twice is :

(A) {H, H}

(B) {HH, HT, TH, TT}

(C) {HH, TT}

(D) {TH, HT}

Section–B

(Very Short Answer Type Questions) 2 each

11. Write down all the subsets of set {1, 2, 3}.

12. Find the union of sets A = {x/x is a natural number and $1 < x \leq 6$}, B = {x/x is natural number and $6 < x < 10$}.

13. Reduce the equation $3x + 2y - 12 = 0$ into intercept form and find its intercepts on the axes.

14. Find the centre and radius of the circle $(x + 5)^2 + (y - 3)^2 = 36$.

15. Find the coordinates of focus and the equation of the directrix of the parabola $y^2 = 12x$.

16. Find the degree measure of the angle subtended at the centre of circle of radius 100 cm by an arc of length 22 cm. $\left(\text{Use } \pi = \frac{22}{7}\right)$

17. Write down the sample space when a die is thrown twice.

18. Find the mean deviation about the median for the data as under :

13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17.

19. If

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

then find x.

20. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}$ ..... is 729 ?

Section–C

(Short Answer Type Questions)

21. Find the domain and range of the real function :

$$f(x) = \sqrt{9 - x^2}.$$

22. Prove that :

$$\cos\left(\frac{\pi}{4} - x\right)\cos\left(\frac{\pi}{4} - y\right) - \sin\left(\frac{\pi}{4} - x\right)\sin\left(\frac{\pi}{4} - y\right) = \sin(x + y).$$

23. Find the multiplicative inverse of $\sqrt{5} + 3i$.

24. Solve the inequality :

$$\frac{x}{2} - \frac{5x}{3} \geq \frac{2}{5} - \frac{7x}{5} \geq \frac{3}{5}$$

and show the graph of the solution on number line.

13

25. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are 'a' and 'b', then show that :

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}.$$

26. Find the derivative of :

$$f(x) = \frac{2x + 3}{x - 2}$$

from the first principle.

27. Find the derivative of :

$$(5x^3 + 3x - 1)\ (x - 1).$$

28. Find n if

$${}^{n-1}p_3 : {}^{n}p_4 = 1 : 9.$$

Section–D

(Long Answer Type Questions) 6 each

29. Prove that :

$$\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x.$$

Or

Prove that :

$$\cos 4x = 1 - 8 \sin^2 x \cos^2 x.$$

30. In how many ways can one select a cricket team of 11 from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers.

Or

In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student.

31. Find the mean deviation about the mean for the following data :

Income Per Day (in ₹)	No. of Persons
0—100	4
100—200	8
200—300	9
300—400	10
400—500	7
500—600	5
600—700	4
700—800	3

Or

In Class XI of a school 40% of the students study Mathematics and 30% students study Biology. 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology or both.

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