

Roll No.

Z-7-X

Total No. of Questions: 31]

[Total No. of Printed Pages: 8

11thARM(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) ∮ 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 $A = \{x/x \text{ is a natural number and } 1 < x \le 6\}$, $B = \{x/x \text{ is natural number and } 6 < x < 10\}$.
- 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:

19. If

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

then find x.

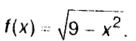


Which term of the sequence $\sqrt{3}$, 3, $3\sqrt{3}$ is 729?

Section-C

(Short Answer Type Questions)

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



22. Prove that:

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

- 23. Find the multiplicative inverse of $\sqrt{5+3i}$.
- 24. Solve the inequality:

6

and show the graph of the solution on number line.



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.

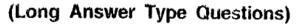
27. Find the derivative of :

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

28. Find *n* if

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

Section-D



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.

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Turn Over

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	■ ※ 2 24 ■ 14 ■ 14
	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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