

Y-12-X

Roll No.

Total No. of Questions : 29]

[Total No. of Printed Pages : 8

XIARJKUT23
9212-X
MATHEMATICS

Time : 3.00 Hours]

[Maximum Marks : 100

Section-A

(Objective Type Questions)

1 each

1. Domain of the function $f(x) = \sqrt{9-x^2}$ is :
(A) $(-3, 3)$
(B) $(-3, 0)$
(C) $(0, 3)$
(D) $[-3, 3]$
2. x -coordinate in yz -plane is zero. (True/False)
3. Imaginary part of $-i = \dots\dots\dots$
4. If $P(A) = \frac{2}{5}$, find $P(\text{not } A)$.

XIARJKUT23-9212-X

Turn Over

Y-12-X

Section-B

(Very Short Answer Type Questions)

2 each

5/ If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{2, 4, 6, 8\}$, $B = \{2, 3, 5, 7\}$, verify
 $(A \cup B)' = A' \cap B'$.

6/ Find the value of $\sin 765^\circ$.

7/ Find the solution of linear inequation $3(2 - x) \geq 2(1 - x)$.

8. Evaluate :

$$\lim_{x \rightarrow 0} \frac{ax + x \cos x}{b \sin x}$$

9. Find the derivative of $x^3(5 + 3x)$ w.r.t. x .

10/ Using binomial theorem evaluate $(102)^5$.

11/ Find the equation of straight line intersecting the x -axis at a distance of 3 units to the left of origin with slope -2 .

12/ If the sum of a certain number of terms of the A.P. 25, 22, 19, is 116, find the number of terms.

XIARJKUT23-9212-X

Y-12-X

Section-C

(Short Answer Type Questions)

4 each

- ✓ 13. In a group of 400 people, 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English ?

- ✓ 14. Prove the following by using the principle of Mathematical induction for all $n \in \mathbb{N}$:

$$1^2 + 3^2 + 5^2 + \dots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$$

- ✓ 15. Find the general solution of the trigonometric equation :

$$\sin x + \sin 3x + \sin 5x = 0$$

16. Two lines passing through the point (2, 3) intersect each other at an angle of 60° . If the slope of one line is 2, find the equation of the other line.

- ✓ 17. If $x - iy = \sqrt{\frac{a - ib}{c - id}}$, prove that :

$$(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$$

18. Find the equation of parabola whose form is $(0, -3)$ and directrix is $y = 3$.

✓ 19. Find the ratio in which the yz -plane divides the line segment formed by joining the points $(-2, 4, 7)$ and $(3, -5, 8)$.

✓ 20. (a) Write the negation of the following statements :

(i) Chennai is the capital of Tamil Nadu.

(ii) The number 2 is greater than 7.

(b) Write each of the following statements in the form 'if-then':

(i) You get a job implies that your credentials are good.

(ii) A quadrilateral is a parallelogram if its diagonals bisect each other. <https://www.jkboseonline.com>

✓ 21. A card is selected from a pack of 52 cards :

(a) Find the probability that the card is an ace of spade.

(b) Find the probability that the card is an ace.

(c) Find the probability that the card is a black.

(5)

Or

If E and F are events such that $P(E) = \frac{1}{4}$, $P(F) = \frac{1}{2}$ and $P(E \text{ and } F) = \frac{1}{8}$,

find :

(i) $P(E \text{ or } F)$

(ii) $P(\text{not } E \text{ and not } F)$

✓ 22. In the expansion of $(1 + a)^{m+n}$, prove that coefficients of a^m and a^n are equal.

Or

Find the 13th term in the expansion of :

$$\left(9x - \frac{1}{3\sqrt{x}}\right)^{18}, \quad x \neq 0$$

✓ 23. Let $A = \{1, 2, 3, 4, 6\}$ and R be the relation on A defined as $R = \{(a, b) : a, b \in A, b \text{ is exactly divisible by } a\}$:

(i) Write R in roaster form

(ii) Find the domain of R

(iii) Find the range of R

Or

Let f be a subset of $z \times z$ defined by $f : \{(ab, a + b) : a, b \in z\}$ where z is a set of integer. Is f a function from z to z ? Justify your answer.

Section-D

(Long Answer Type Questions)

6 each

✓ 24. If $\cot x = \frac{3}{4}$, x lies in 3rd quadrant find the values of other five trigonometric functions.

Or

Prove that :

$$2 \cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$$

✓ 25. Find r , if $5 \cdot {}^4P_r = 6 \cdot {}^5P_{r-1}$.

Or

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

XIARJKUT23-9212-X

Y-12-X

26. Find sum of n terms of two A.P's are in the ratio $5n + 4 : 9n + 6$. Find the ratio of their 18th terms.

Or

In a, b, c, d are in G.P., show that :

$$(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2$$

27. Find the derivative of the function $f(x) = \frac{x+1}{x-1}$ from first principle.

Or

If $f(x) = \frac{4x + 5 \sin x}{3x + 7 \cos x}$, find $f'(x)$.

28. Find the equation of ellipse with length of minor axis 16 and foci $(0, \pm 6)$.

Or

Find the coordinates of the foci, vertices, the eccentricity and the length of the latus rectum of the hyperbola $5y^2 - 9x^2 = 36$.

29. Find the mean and variance for the following frequency distribution :

Classes	Frequencies
0—10	5
10—20	8
20—30	15
30—40	16
40—50	6

<https://www.jkboseonline.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से

XIARJKUT23—9212-X

Y-12-X