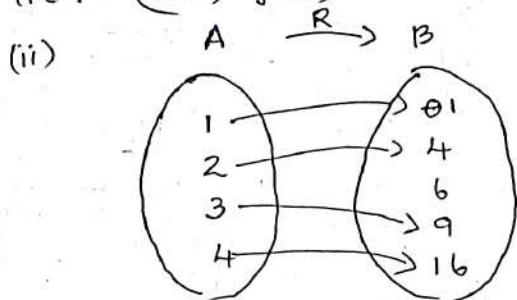


Answer any 6 questions from 1 to 8. Each carries 3 scores.

I. (i) $A = \{1, 2, 3\}$ then number of subsets of $A =$ _____ (1)
 (a) 3, (b) 6, (c) 8, (d) 9

(ii) If $U = \{1, 2, \dots, 9\}$ and $A = \{1, 2, 3, 4\}$ $B = \{3, 4, 5, 6, 7\}$
 (a) $A \cup B$ (1)
 (b) $(A \cup B)'$ (1)

2. (i) If $(x+1, y-3) = (3, 1)$ Find x and y (1)



The given arrow diagram represents a relation from A to B (1)

(a) Represent the relation R in roster form. (1)
 (b) Find its domain and range. (1)

3. (i) Solve $7x+3 < 5x+9$. (2)

(ii) Show the graph of the solutions on number line. (1)

4. (i) If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{10!}$, find x . (2)

(ii) Find the number of arrangements of the word "DAUGHTER" (1)

5. (i) Focus of the parabola $y^2 = 4x$ is
 (a) $(1, 0)$, (b) $(0, 1)$, (c) $(-1, 0)$, (d) $(0, -1)$ (1)

(ii) Find the centre and radius of the circle $x^2 + y^2 + 6x - 4y - 3 = 0$ (2)

6. (i) Which one of the following ^{points} lies in the 6th octant.

(a) $(-4, 2, -5)$, (b) $(-4, -2, -5)$, (c) $(4, -2, -5)$, (d) $(4, 2, 5)$.

(ii) Check whether the points $P(-2, 3, 5)$, $Q(1, 2, 3)$, $R(4, 0, -1)$ are collinear.

7. (i) Write the sample space for tossing a coin 2 times (1)
- (ii) Write the probability of getting at least one head (2)

8. (i) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = \underline{\hspace{2cm}}$ (1)

(ii) $\lim_{x \rightarrow 3} \frac{x-3}{x^2-x-6}$ (2)

From questions 9 to 16 answer any six questions. Each question carries 4 scores.

9. (i) If U is the universal set and A is any set then $U \cap A = \underline{\hspace{2cm}}$ (1)
- (i) U (ii) A (iii) ϕ (iv) A'

- (ii) Let $A = \{x : x \text{ is a natural number less than } 3\}$
 $B = \{x : x \text{ is a prime number, } x \leq 7\}$
 Write A, B in roster form (2)

- (iii) Find $A - B$ and $B - A$

10. (i) Let $A = \{1, 2, 3\}$ and $B = \{3, 4\}$ (1)
 Find $A \times B$

- (ii) Draw the graph of the function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = |x| + 1$ and write its range. (3)

11. (a) $i^{18} = \underline{\hspace{2cm}}$ (1)
 (i) 1 (ii) 0 (iii) -1 (iv) i

- (b) Write the real and imaginary parts of the complex number $-3 + \sqrt{-7}$ (1)

- (c) Find the multiplicative inverse of the complex number $3 + 4i$ (2)

12. a) If $nC_9 = nC_8$, find nC_2 (1)

(b) How many ways can a team of 5 persons be selected out of a group of 4 men and 7 women, if the team has at least one man and one woman. (3)

13. (a) Number of Terms in the expansion of $(x + \frac{1}{x})^{20}$ is (1)

- (i) 19 (ii) 20 (iii) 21 (iv) 22 (1)

(b) Expand $(x + \frac{1}{x})^6$ using binomial theorem (3)

14. Find the sum of n terms of the series $8 + 88 + 888 + \dots$ (4)

15. Find the coordinates of the foci, vertices, length of major axis, the eccentricity and length of latus rectum of the ellipse

$\frac{x^2}{25} + \frac{y^2}{9} = 1$ (4)

16. One card is drawn at random from a pack of 52 playing cards. Find the probability that

- a) the card drawn is black (1)
- b) the card drawn is a face card (1)
- c) the card drawn is a spade (1)
- d) the card drawn is a black face card (1)

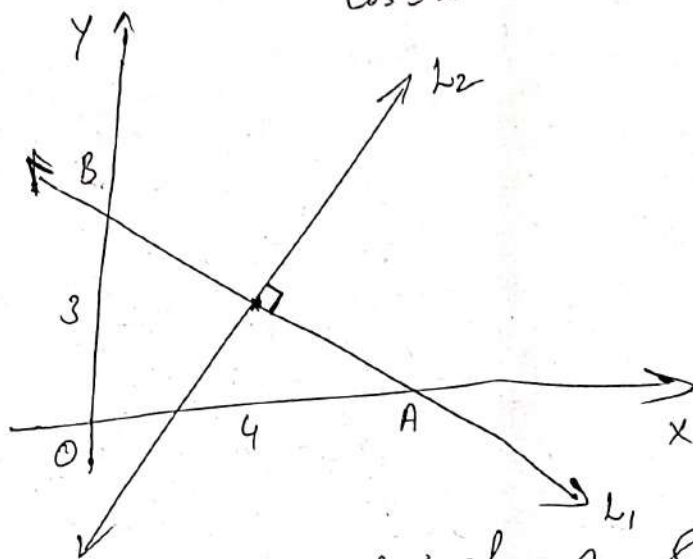
18 questions are given

Answers any 3 questions from 17 to 20. Each question carry 6 marks.

(17)

- (i) Convert 240° into radians (1)
- (ii) Find the value of $\sin x$ and $\tan x$ other five trigonometric functions if $\cos x = -1/2$, x lies in IIIrd quadrant. (2)
- (iii) PT $\frac{\sin 5x - 2\sin 3x - \sin x}{\cos 5x - \cos x} = \tan x$ (3)

(18)



- (i) Find the co-ordinates of A & B. (1)
- (ii) Find the equation of line L_1 (1)
- (iii) Find the equation of line L_2 , which is perpendicular to L_1 and passing through the mid point of AB (4)

(19) (20)

(i) Find the derivative of $\tan x$ using first principle. (3)

(ii) Differentiate $\frac{x^2 \tan x}{1+x}$. (3)

(20) Find the mean, variance and standard deviation for the following distributions. (6)

(2)

| Classes | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|--------------|------|-------|-------|-------|-------|-------|
| Frequencies. | 6 | 8 | 14 | 16 | 4 | 2 |

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