

**Section B**

**Note :** Attempt all the questions.

**11. (a)** Find :

$$A^2 - 12A + 5I,$$

$$\text{where, } A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}.$$

**(b)** Find inverse of the matrix :

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 5 & 0 \\ 2 & 4 & 3 \end{bmatrix}$$

*Or*

**(a)** Obtain the value of  $x$  from the equation :

$$\tan(90^\circ + A)\sin A + \operatorname{cosec}(90^\circ + A) + x \cot(90^\circ + A) = 0$$

**(b)** Find the equation of a line which cuts off an intercept of 4 units on negative direction of the  $y$ -axis and makes an angle of  $120^\circ$  with the positive direction of  $x$ -axis. **6+6**

**Roll No. ....**

**Exam Code : J-19**

**Subject Code—0403**

**M.C.A. (First Year) EXAMINATION**

**(5 Years Integrated Course)**

**(Batch 2009 Onwards)**

**MATHEMATICS-I**

**MCA-103**

*Time : 3 Hours*

*Maximum Marks : 70*

**Section A**

**Note :** Attempt any *Seven* questions. **7×5=35**

**1.** Solve :

$$3x^2 - 2x - \sqrt{3x^2 - 2x + 4} = 16$$

**2.** If  $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix}$ , find a matrix  $C$

such that :

$$2A + B + C = 0$$

3. Solve using Cramer's rule :

$$x + y + z = 6$$

$$x - y + z = 2$$

$$2x + y - z = 1$$

4. Prove that :

$$\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$$

5. (a) Find the area of the triangle whose vertices are (4, 4), (3, -2), (-3, 16).

(b) Find the value of K if the slope of the line joining (-8, 11) and (2, K) is

$$-\frac{4}{3}.$$

6. Find  $\frac{dy}{dx}$  where  $y = \sqrt{x^2 - 1} + \frac{1 - \sqrt{x}}{1 + \sqrt{x}}$ .

7. Evaluate :

$$\int x \cdot \log 2x \, dx$$

8. Solve the differential equation :

$$x(1 + y^2)dx + y(1 + x^2)dy = 0$$

9. Find median for the following data :

Class Interval	Frequency
0-10	4
10-20	8
20-30	20
30-40	12
40-50	6

10. Two unbiased dice are thrown simultaneously.

Find the probability of :

(i) getting a multiple of 3 as the sum.

(ii) not getting the same number on the dice.

(iii) an even number on the first dice and an odd number on the second dice.

50-60	14
60-70	10
70-80	15
80-90	25

Or

(a) Obtain the coefficient of correlation for the data :

$x$	$y$
10	18
14	12
18	24
22	6
26	30
30	36

(b) Obtain mean and variance for a Binomial distribution. **6+5**

12. (a) Find  $\frac{dy}{dx}$  if  $y = a(1 - \cos \theta)$ ,  $x = a(\theta + \sin \theta)$   
at  $\theta = \frac{\pi}{2}$ .

(b) Evaluate :

$$\int \frac{dx}{(x-3)(x-4)}$$

Or

Solve the following differential equation :

(a)  $\frac{dy}{dx} = \frac{x+y+1}{x+1}$

(b)  $\frac{dy}{dx} = (4x+y+1)^2$ . **6+6**

13. Calculate mean, median and mode for the following data :

Class	Frequency
10-20	4
20-30	12
30-40	40
40-50	20