10 NOV 2025 MCA SEM-I CHOICE BASED MFCS-I QP CODE: 10094634

(3 Hours) **Marks: 80**

N.B. : 1) Question No.1 is **Compulsory.**
2) Attempt any **THREE** from the remaining **FIVE** questions.
3) Figures to the right indicate full marks.
4) Scientific Calculator is allowed.

Q1. **(a)** Find Spearman's Rank Correlation Coefficient of the following data: **[5]**

Marks in DS	86	97	85	77	90
Marks in PS	92	89	94	68	76

(b) What is the probability that 4A's come consecutively in arrangement of the letters in the word "MAHARASHTRA" **[5]**

(c) The average number of homes sold by the Acme Realty company is 2 homes per day. What is the probability that exactly 3 homes will be sold tomorrow? **[5]**

(d) In a frequency distribution , the coefficient of skewness based upon quartiles is 0.6. If the sum of upper and lower quartiles is 100 and the median is 38 , find the value of upper and lower quartile. **[5]**

Q2. **(a)** The following table gives the number of accidents in a city during a week. Test whether the accidents are uniformly distributed over a week. **[10]**

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	13	15	9	11	12	10	14

(Given: for 6 degrees of freedom at 5% level of significance, the table value of $\chi 2$ is 12.59)

(b) Calculate Karl Pearson's correlation coefficient from the following elementary data: **[10]**

X	10	8	7	9	6	3	2	4
Y	6	7	9	10	8	10	11	12

Q3. **(a)** Measurements at the University of Mumbai on a certain day indicated that the source of incoming jobs is 15% from MIDC Thane, 35% from MIDC Taloja, and 50% from MIDC Andheri. Suppose that the probabilities that the job initiated from these MIDCs requires set-up are 0.01,0.05 and 0.02 respectively. Find the probability that a job chosen at random at University of Mumbai requires set-up. Also find the probability that a randomly chosen job comes from MIDC Taloja, given that it is requires set-up. **[10]**

(b) The joint PDF of a two-dimensional random variable (x, y) is given by **[10]**
$f(x, y) = 2 \ , \ 0 < x < 1, 0 < y < x$
$= 0 \ , \quad$ otherwise
(i) Find the marginal and conditional density functions of X and Y
(ii) Find the conditional density function of Y|X and X|Y
(iii) Check for independence of X and Y

Q4. **(a)** Calculate Bowley's coefficient of skewness of the following data: **[10]**

Class Intervals	0-10	10-20	20-30	30-40	40-50
Frequency	5	9	12	5	5

(b) A coin is tossed four times. Calculate the expectation value and variance of the number of heads obtained **[10]**

Q5. **(a)** Determine the binomial distribution for which mean is 4 and variance is 3. **[10]**

(b) Calculate Karl Pearson's coefficient of skewness of the following data: **[10]**

Class Intervals	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	12	15	10

Q6. **(a)** The two lines of regression are $2x + 3y - 61 = 0$ and $x + y - 25 = 0$ **[10]**

Find i) the mean values of x and y.

ii) the coefficient of correlation.

iii) the most profitable value of y when x = 16.

(b) A random variable X has the following probability distribution function **[10]**

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

i)Find the value of k

ii)Evaluate P(X<6), P(X>=6) and P(0<X<5)

iii)Determine the distribution function of X

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