



MBA.IB.I/10.154

**M.B.A. (IB) DEGREE I SEMESTER EXAMINATION NOVEMBER 2010**

**SMI 2104 QUANTITATIVE METHODS**

Time : 3 Hours

Maximum Marks : 50

(All questions carry EQUAL marks)

(5 x 10 = 50)

- I. A. (a) Distinguish between a symmetric matrix and a skew symmetric matrix. Partition the following matrix to a symmetric and a skew symmetric matrix.

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 3 & 4 \\ -1 & -1 & 1 \end{bmatrix}$$

- (b) Explain the conditions for a function  $y = f(x)$  to have maximum and minimum values. Show that the total revenue  $R = 20 - x^2$  will be maximum when output  $x = 10$ .

**OR**

- B. (a) Define the Adjoint of a matrix. For any square matrix A, show that  $A(\text{Adj } A) = |A|I$ .  
 (b) Solve the following system of simultaneous equations using Cramer's rule :

$$3x_1 + 4x_2 - x_3 = 5$$

$$x_1 + 4x_2 + 2x_3 = 6$$

$$2x_1 + 3x_2 + x_3 = 4$$

- II. A. (a) Distinguish between arithmetic mean, geometric mean and harmonic mean stating the advantages and disadvantages of each.  
 (b) For the following data calculate the GM :

Size	5	8	10	12	14	16
Frequency	2	3	4	5	4	2

**OR**

- B. (a) Explain briefly the various measures of dispersion and their properties.  
 (b) The marks obtained by 50 students in an examination is given below. Calculate the mean marks and the standard deviation.

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of students	2	4	5	7	9	5	8	10

- III. A. (a) Define correlation. Explain Karl Pearson's coefficient of correlation. Illustrate spurious correlation with suitable examples.  
 (b) The data on price and quantity demanded of a commodity for the past five years is given below. Calculate the coefficient of correlation and hence comment on the relation.

(P.T.O.)

Price	7	8	9	6	5
Quantity demanded	8	6	7	9	10

OR

- B. (a) What is rank correlation? When is it applied?  
 (b) Marks obtained by 10 students in an examination before and after intense coaching is given below. Calculate the rank correlation coefficient for the data :

Exam. I	80	45	55	58	54	60	46	68	70	44
Exam. II	82	56	50	43	58	62	64	65	70	66

- IV. A. (a) What is an index number? Explain briefly how the consumer price index is constructed using Laspeyzer's method and Paasche's method.  
 (b) For the following data on prices and quantities for 2005 and 2010, calculate Fisher's ideal index number.

Commodity	2005		2010	
	Price	Quantity	Price	Quantity
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

OR

- B. (a) Explain briefly the index numbers currently used in India. What are the major problems involved in the construction of wholesale price index numbers.  
 (b) For the following data, construct the cost of living index number :

Commodity Group	Index No.	Weight
Food	152	48
Fuel & lighting	110	5
Clothing	130	15
House rent	100	12
Miscellaneous	80	20

- IV. A. (a) Define probability. Distinguish between marginal probability and conditional Probability. State Baye's theorem.  
 (b) In a certain locality it is found that 5 men out of 100 and 25 women out of 1000 are colour blind. A colour blind person is chosen at random. What is the probability of his being a male (assuming that males and females are in equal numbers)

OR

- B. (a) What are the major differences between binomial and Poisson distributions? What are the analytical properties of Poisson distribution? Illustrate with suitable examples its application.  
 (b) The marks obtained by 900 students in an aptitude test follows a normal distribution with mean 50 and standard deviation 20. Find the number of students (i) securing marks between 40 and 70 (ii) above 70 (iii) below 40.