PD – 612

I Semester M.B.A. (Day/Evening) Degree Examination, January/February 2007
(Updated Scheme)
MANAGEMENT
1.3 : Mathematics and Statistics

Time: 3 Hours Max. Marks: 75

Instruction : *Calculators and Statistical Tables are* ***allowed.***

SECTION – A

Answer **any six** questions : **(6×2=12)**

1. a) Explain types of correlation.

   b) What are the types of classification of data ?

   c) Differentiate primary data and secondary data.

   d) What is classical theory of probability ?

   e) What are the components of time series ?

   f) What is a decision tree ?

   g) Find the sum of first 10 terms in an AP 2, –5, –12, –19.

   h) The sum of the first 8 terms of G.P. with the first term 25 and common ratio of $-\frac{1}{5}$ is ——— . Fill in the blank.

   i) Find the determinant of the matrix $A = \begin{bmatrix} 3 & -2 & 1 \\ 1 & 0 & 1 \\ 2 & 7 & 8 \end{bmatrix}$

P.T.O.

SECTION – B

Answer **any four** questions : (4×5=20

2. Explain various sampling methods.

3. City residents were surveyed recently to determine the readership of newspapers available. 50% of the residents read the morning newspaper, 60% read the evening paper, and 20% read both newspapers. Find the probability that a resident selected reads either the morning or evening paper.

4. Solve the following equations for x_1, x_2, x_3 using inverse method

   $3x_1 - 2x_2 + x_3 = 7$

   $4x_1 + 5x_2 - 3x_3 = 10$

   $11x_1 + 8x_2 - 5x_3 = 27$

5. The following data relate to the age of 10 employees and the number of days on which they reported sick in a month.

Age	20	30	32	35	40	46	52	55	58	62
Sick days	1	2	0	3	4	6	5	7	8	9

   Calculate Karl Pearson's coefficient of correlation and interpret it.

6. Fit a straightline trend to the following data :

Year	1991	1992	1993	1994	1995
Sale of sugar ('000 kgs)	80	90	92	93	94

7. A sample of 200 people with particular disease was selected. Out of these, 100 were given a drug and the others were not given any drug. The results are as follows.

	Number of People	
	Drug	**No drug**
Cured	65	55
Not cured	35	45

   Test whether the drug is effective or not.

SECTION – C

Answer **any three** questions : **(3×10=30)**

8. In a Post Office, three clerks are assigned to process incoming mail. The first clerk process 40%, second 35% and the third 25% of the mail. The first clerk has an error rate of 0.04, the second has 0.06 and the third has 0.03. A mail selected at random from a day's output is found to have an error. The Post Master wishes to know the probability that the mail was processed by the first, second or third clerk respectively.

9. Obtain two regression equations for the following data

X	30	50	20	80	10	20	20	40
Y	50	80	30	110	20	20	40	50

10. Construct Laspeyres, Paasche's and Fisher's ideal index for the following data

	1987		**1988**	
	Price	**Quantity**	**Price**	**Quantity**
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

11. a) The market supply function of a commodity is $q = 80 + 4P$ where q denotes the quantity supplied and P denotes the market price. The unit production cost is Rs. 1.50. The Government feels that a total profit of Rs. 240/- is desirable. What is the price that the farmer has to receive so that he can realize this profit.

    b) A firm produces a single product and it can market as many units as it is able to produce at a price of Rs. 1.75. Its plant and equipment can produce as many as 5000 units a day. The total fixed cost is Rs. 2,000 daily. Unit variable cost is Rs. 0.50. How many units per day must be produced in order that the firm breaks even ?

12. The screws produced by a certain machine were checked by examining number of defectives in a sample of 12. The following table shows the distribution of 128 samples according to the number of defective items they contained.

No. of defectives in a sample of 12	0	1	2	3	4	5	6	7	Total
No. of samples	7	6	19	35	30	23	7	1	128

Fit a Binomial distribution and find the expected frequencies if the chance of machine being defective is $\frac{1}{2}$.

SECTION – D **(Compulsory)**

13. The following represent the number of units of production per day turned out by 4 different workers using 5 different types of machines. **13**

Machine Type

Workers	**A**	**B**	**C**	**D**	**E**
1	4	5	3	7	6
2	6	8	6	5	4
3	7	6	7	8	8
4	3	5	4	8	2

On the basis of this information, can it be concluded that

a) The mean productivity is the same for different machines

b) The workers don't differ with regard to productivity ?