I Semester M.B.A. (Day/Evening) Degree Examination, Jan./Feb. 2006
(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) How is statistics useful in managerial decision-making ?
   b) What is correlation ? What is its significance ?
   c) What are the statistical techniques of business forecasting ?
   d) What do you understand by regression analysis ?
   e) What are averages ? How are they useful ?
   f) What do you understand by measures of dispersion ?
   g) Find the sum of the first 20 terms of an AP, 2, 5, 8, ...
   h) Give one example for each of the following :
      i) Linear function
      ii) Geometric progression.
   i) Find the sum of the first 8 terms of a G.P. 4, 8, 16, ...

SECTION – B

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

2. Briefly explain the procedure for sitting up and testing of a hypothesis.

3. In an intelligence test administered to 500 students, the average score was 42 and standard deviation was 24. Find :
   a) The number of students whose score exceeded 50.
   b) The number of students who got a score between 30 and 40.
   c) The number of students who got a score above 60.

4. 2000 families of a city were selected at random to test the belief that familie with higher income bought the sedan-type of car and families with lower incom bought the small car. Given the following results, use the chi square test t find out if the belief is true :

Income	Sedan type of car	Small car	Total
High	594	606	1200
Low	262	538	800
Total	856	1144	2000

5. Fit a straight line trend by the method of least squares to the data given belov and project the probable sales for the next two years : (A graph is not necessary)

Year	1999	2000	2001	2002	2003	2004
Sales (in Thousands of Rupees)	164	180	186	187	190	192

6. Calculate whether there is any correlation between the salaries and the amoun spent on car maintenance. Use Karl Pearson's method for correlation, determin the probable error and comment on the significance of correlation :

Average Salary in Rs.	10,000	12,000	15,000	18,000	20,000
Car Maintenance in Rs.	750	900	1,200	1,500	2,000

7. a) If the opening stock matrix is $\rightarrow \begin{vmatrix} 3 & 5 \\ 4 & 2 \end{vmatrix}$, the closing stock matrix is $\rightarrow \begin{vmatrix} 2 & 3 \\ 3 & 2 \end{vmatrix}$, the sales unit matrix is $\rightarrow \begin{vmatrix} 4 & 3 \\ 3 & 4 \end{vmatrix}$, the sales price per uni is Rs. 2 per unit, find the purchases matrix.

   b) The share prices of share C in a week were 52, 55, 54, 49, 47 and 51, whereа the share prices of share D in that week were. 75, 74, 69, 77, 80, 72 and 76 Find out which share is more stable in price fluctuations.

SECTION – C

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

8. What is sampling ? Explain the various methods of sampling.

9. Obtain the regression equations for the following data :

Operator	A	B	C	D	E	F	G	H
Experience in years (X)	17	13	19	5	4	11	6	14
Production in units day (Y)	86	87	88	67	77	79	74	82

10. Calculate fisher's ideal index and test for the factor reversal test and the time reversa test for the following data :

Commodity	**A**	**B**	**C**	**D**	**E**
P_0	30	32	30	31	32
Q_0	95	115	120	125	125
P_1	22	24	25	27	28
Q_1	215	220	219	222	224

11. The cost function is given as $C = 6x^3 + 4x^2 + 2$, find, if x = Rs. 8,
    a) The average cost function and the average cost.
    b) The marginal cost function and the marginal cost.
    c) The revenue function if the price per unit is Rs. 250 and the revenue.
    d) The profit function and the profit.

12. A company has 5 showrooms in 5 cities selling the same model of car. The number of cars sold over 4 months is given below. Using ANOVA, advice the company whether there is a significant difference in the sales among the different showrooms.

Months	Showroom A	Showroom B	Showroom C	Showroom D	Showroom E
September	8	9	7	6	9
October	10	11	8	9	9
November	8	10	9	11	10
December	7	10	8	9	9

SECTION – D

Case Study :

13. An investor has 3 options to invest, but he can invest in only one option at a time. He can invest either in a departmental store, a cold storage or in a car maintenance shop.

If he invests in a departmental store and succeeds, he can invest in the cold storage, and if he succeeds, be can invest in the car maintenance shop.

If he invests in the cold storage and succeeds, he can invest in the car maintenance shop and if he succeeds, he can invest in the departmental store.

If he invests in the car maintenance shop, and succeeds, he can invest in the cold storage and if he succeeds, he can invest in the departmental store. Based on the data given below, draw a decision tree and advice the investor on the best decision to take.

	Probability of success	Investment	Loss on failure
Departmental Store	0.65	8,00,000	45,000
Cold storage	0.60	7,50,000	40,000
Car maintenance shop	0.70	7,40,000	3,50,000

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 ?