(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIRST SEMESTER [MBA] JANUARY - 2013

Paper Code: MS 103	Subject: Decision Sciences
Time : 3 Hours	Maximum Marks :60

Note: Attempt any five questions. Graph Paper and statistical tables to be provided. All questions carry equal marks.

Q1. The following data give the number of finished articles turned out per day by different number of works in a factory:

No. of articles:	18	19	20	21	22	23	24	25	26	27
No. of workers:	3	7	11	14	18	17	13	8	5	4

Find the mean value, standard deviation and coefficient of variation of daily output of finished articles.

Q2. The following data show the experience of machine operators and their performance ratings as given by the number of good parts turned out per 100 pieces:

Operator:	1	2	3	4	5	6	7	8
Experience (X):	16	12	18	4	3	10	5	12
Performance rating (Y):	87	88	89	68	78	80	75	83

Calculate the regression line of performance ratings on experience and estimate the probable performance if an operator has 10 years experience.

Q3. A firm manufactures two products A & B on which the profit earned per unit are Rs. 3 and Rs. 4 respectively. Each product is processed on two machines M_1 and M_2. Product A requires one minute of processing time on M_1 and two minutes on M_2, while B requires one minute on M_1 and one minute on M_2. Machine M_1 is available for not more than 7 hours and 30 minutes, while machine M_2 is available for 10 hours during any working day. Find the number of units of product A and B to be manufactured to get maximum profit.

Q4. Assume that the firms are competing for market share for a particular product. Each firm is considering what promotional strategy to employ for the coming period. Assume that the following pay off matrix describes the increase in market share for firm A and the decrease in market share for firm B. Determine the optimum strategies for each firm.

Firm B

		No Promotion	Moderate Promotion	Much Promotion
Firm A	*No* Promotion	5	0	-10
	Moderate Promotion	10	6	2
	Much Promotion	20	15	10

(i) Which firm would be the winner, in terms of market shares?

(ii) Would the solution strategies necessarily maximize profits for either of the firms?

110

P.T.O.

Q5. Four professors are each capable of teaching any one of four different courses. Class preparation time in hours for different topics varies from professor to professor and given in the table below Each professor is assigned only one course. Determine an assignment schedule so as to minimize the total course preparation time for all courses

Professor	Linear programming	Queueing Theory	Dynamic programming	Regression Analysis
A	2	10	9	7
B	15	4	14	8
C	13	14	16	11
D	4	15	13	9

Q6. Use Vogel's Approximation method to obtain an initial basic feasible solution of the transformation problem:

$$\begin{array}{c|cccc|c} & D & E & F & G & \text{Available} \\ \hline A & 11 & 13 & 17 & 14 & 250 \\ B & 16 & 18 & 14 & 10 & 300 \\ C & 21 & 24 & 13 & 10 & 400 \\ \hline \text{Demand} & 200 & 225 & 275 & 250 & \end{array}$$

Q7. The following are the details of estimated times of activities of a certain project.

Activity	Immediate Predecessor	Estimated times (weeks)
A	--	2
B	A	3
C	A	4
D	B,C	6
E	--	2
F	E	8

(a) Find the critical path and expected time of the project.
(b) Calculate the earliest start time and earliest finish time for each activity.
(c) Calculate the slack for each activity.

Q8. Write short notes on **any three** of the following:
(a) Poisson Distribution
(b) Average Deviation
(c) Simplex Method
(d) PERT
(e) Poisson Queueing systems Model (M/M/1): (∞/FIFO}

****

111

D. O.