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

END TERM EXAMINATION

FIRST SEMESTER [MBA] DECEMBER-2015

Paper Code: MS 103 *Subject: Decision Sciences*

Time : 3 Hours *Maximum Marks :75*

Note: Attempt any five questions. All questions carry equal marks. Stats table(z) to be distributed.

Q1. a) Differentiate between quartile deviation and standard deviation in terms of measure of dispersion.

b) Following frequency distribution of online customer enquiry on an e-commerce portal.

X	F
0-10	15
10-20	35
20-30	45
30-40	45
40-50	70
50-60	10

Compute median and mode of distribution.

Q2. a) How do we test significance of pearson correlation coefficient?

b) Two regression equations are

$3x + 4y = 12$

$6x + 5y = 30$

Compute $\bar{X}, \bar{Y}$ and r ?

Q3. Solve the following LPP graphically

M in $Z = 4x_1 + 6x_2$

$3x_1 + 4x_2 \leq 24$

$5x_1 + 6x_2 \leq 40$

$6x_1 + 8x_2 = 48$

$x_1, x_2 \geq 0$

Q4. Solve the following LPP by simplex method.

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

$3x_1 + 4x_2 + x_3 = 108$

$2x_2 + 3x_3 = 72$

$5x_1 + 6x_2 = 160$

$x_1, x_2, x_3 \geq 0$

Q5. a) Explain application of decision tree in business decision making.

b) Consider the following pay.off matrix.

Strategy → / Events ↓	S_1	S_2	S_3	S_4
N_1	100	-80	110	120
N_2	180	120	100	-60
N_3	-150	-120	-110	-110
N_4	-100	80	120	80

Select strategy using a) Maxi Max b) Maximin c) Laplace d) Hurwitz

P.T.O.

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END TERM EXAMINATION

FIRST SEMESTER [MBA] NOVEMBER - DECEMBER 2017

Paper Code: MS-103 **Subject: Decision Sciences**

[Batch 2017 onwards]

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions. All questions carry equal marks.

Q1 (a) In a bolt factory, machine A, B and C manufacture respectively 25%, 35% and 40%. Of the total of their output 5, 4 and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A, B and C?

(b) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 1/7 and that of wife's selection is 1/5. What is the probability that both of them will be selected.

(i) Only one of them will be selected, and

(ii) None of them will be selected.

Q2 (a) The number of defects per unit in a sample of 330 units of manufactured product was found as follows:

No. of Defects:	0	1	2	3	4
No. of Units:	214	92	20	3	1

Fit a Poisson distribution to the data and test for goodness of fit. (give $e^{-0.439}=0.6447$)

(b) The results of a particular examination are given below in summary form:

Serial	Result	% of candidates
1	Passed with distinction	10
2	Passed	60
3	Failed	30

It is known that a candidate gets plucked if he obtains less that 40 marks (out of 100) while he must obtain at least 75 marks in order to pass with distinction. Determine the mean and standard deviation of the distribution of marks assuming this to be normal.

Q3 A company possesses two manufacturing plants, each of which can produce three products X, Y and Z from a common raw material. However, the proportions in which the products are produced are different in each plant and so are the plant's operation cost per hour. Data on production per hour and costs are given below, together with current orders in hand for each product.

	Products			Operating cost per hour
	X	Y	Z	Rs.
Plant A	2	4	3	9
Plant B	4	3	2	10
Orders on hand	50	24	60	

You are required to use the simplex method to find the number of production hours needed to fulfil the orders in hand at minimum cost.

P.T.O.

Q4 Five salesman are to be assigned to five territories. Based on the past performance, the following table shows the annual sales (in rupees lakhs) that can be generated by each salesman in each territory. Find the optimum assignment.

	Territory				
Salesman	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**
S_1	26	14	10	12	9
S_2	31	27	30	14	16
S_3	15	18	16	25	30
S_4	17	12	21	30	25
S_5	20	19	25	16	10

Q5 (a) A producer of boats has estimated the following distribution of demand for a particular kind of boat:

No. of demanded:	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Probability	0.14	0.27	0.27	0.18	0.09	0.04	0.01

Each boat cost him Rs. 7,000 and he sells them for Rs. 10,000 each. Any boat that are left unsold at the end of the season must be disposed off for Rs. 6,000 each. How many boats should be in stock so as to maximize his expected profit?

(b) Growfast company is evaluating four alternative single period Investment opportunities whose returns are based on the state of the economy. The possible states of the economy and the associated probability distribution is as follows?

State:	Fair	Good	Great
Probability:	0.2	0.5	0.3

The returns for each investment opportunity and each state of the economy are as follows:

	State of Economy		
Alternative	**Fair (Rs.)**	**Food (Rs.)**	**Great (Rs.)**
W	1000	3,000	6,000
X	500	4,500	6,800
Y	0	5,000	8,000
Z	-4,000	6,000	8,500

Using the decision- tree approach, determine the expected return for each alternative. Which alternative investment proposal would you recommend if the expected monetary value criterion is to be employed?

Q6 (a) Solve the game for the pay-off matrix:

		Player B			
		B_1	**B_2**	**B_3**	**B_4**
Player A	**A_1**	19	6	7	5
	A2	7	3	14	6
	A_3	15	8	18	4
	A_4	8	7	13	-1

(b) Explain the following terms used in Game Theory:

(i) Pure Strategy and Mixed strategy games
(ii) Two person zero sum game
(iii) Saddle point
(iv) Maximum and minimax principles
(v) Principle of Dominance

P.T.O.

(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?

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END TERM EXAMINATION

FIRST SEMESTER [MBA] DECEMBER 2016 – JANUARY 2017

Paper Code: MS-103 **Subject: Decision Sciences**

(Batch 2015 onwards)

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions.

Q1 Write short answer on the following:- **(15)**

(a) Types of correlation
(b) Addition Theorem of Probability
(c) Odds in Favour and Odds against.
(d) Average Deviation
(e) Poisson Distribution.

Q2 (a) Calculate the coefficient of correlation from the following bivariate frequency distribution:- **(7.5)**

Sales Revenue (Rs. in lakhs)	Expenditure on Promotion (Rs. in thousands)				Total
	5-10	10-15	15-20	20-25	
75-125	4	1	-	-	5
125-175	7	6	2	1	16
175-225	1	3	4	2	10
225-275	1	1	3	4	9
Total	13	11	9	7	40

(b) In a country, for its oil Industry, the product wise market structure indicates that 15% of the market is captured by branded products and 85% of the market is captured by unbranded products? If 50 oil customers are randomly selected:- (7.5)

(i) What is the probability that exactly six customer will purchase branded oil?
(ii) What is the probability that exactly five or less customer will purchase branded oil?
(iii) What is the probability that more than seven customers will purchase branded oil?

Q3 Use the Simplex method to solve the following LP problem **(15)**

Maximize $Z = 3x_1 + 5x_2 + 4x_3$

subject to the constraints

$2x_1 + 3x_2 \le 8$

$2x_2 + 5x_3 \le 10$

$3x_1 + 2x_2 + 4x_3 \le 15$

and $x_1, x_2, x_3 \ge 0$.

Q4 Solve the LPP using Simplex Method:- **(15)**

Minimize $Z = 6x + 4y$

Subject to constraints

$-x + y \le 1$

$x + y \ge 3$

and $x, y \ge 0$