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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, Master of Business Administration (MBA)

Semester End Examination; May/June - 2018

Quantitative Techniques

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer all **FOUR** full questions from **PART - A** and **PART - B** (Case study) is compulsory.*
ii) Scientific calculators are allowed.

PART - A

1 a. Explain the various rules of Probability. 10

b. Fit a Poisson distribution for the following data: 10

x:	0	1	2	3	4
f:	49	35	12	3	1

OR

2 a. Explain the Baye's theorem of conditional probability. 10

b. The Probability of a new product acceptance in a market is estimated to be 0.7. A sample of 5 persons is selected. What is the probability that, i) Exactly 3 persons are favoring the product, ii) None favor the product and iii) Atleast 1 favors the product. 10

3 a. Discuss the scope and applications of Operations Research. 10

b. Solve the following game: 10

		Player B			
		I	II	III	IV
Player A	I	3	5	4	2
	II	5	6	2	4
	III	2	1	4	0
	IV	3	3	5	2

OR

4 a. Explain the various types of models in OR. 10

b. Solve the following game by graphical method: 10

		Player B	
		B_1	B_2
Player A	A_1	-2	4
	A_2	8	3
	A_3	9	0

5 a. Discuss the applications of LPP in management. 10

b. Solve the following LPP graphically:

Maximize $Z = x_1 + 1.5\, x_2$

Subjected to constraints: $2x_1 + 2x_2 \leq 16$

$x_1 + 2x_2 \leq 12$

$4x_1 + 2x_2 \leq 28$

$x_1, x_2 \geq 0$ 10

Contd…2

OR

6 a. Explain the general structure of LPP with its components. Also mention the assumptions underlying LPP. 10

b. Convert the following LPP into its dual form: 10

Minimize $Z = 3x_1+2x_2-3x_3+x_4$

Subject to constraints:

$x_1 + x_2 + x_3 - x_4 \geq 7$

$2x_1 + 5x_2 + 3x_4 \geq 10$

$x_1+3x_3+x_4 \geq 11$

$x_1, x_2, x_3, x_4 \geq 0$

7 a. Explain the steps involved in Hungarian method of solving assignment model. 10

b. Find IBFS for the following problem by VAM: 10

		Destination				
		D_1	D_2	D_3	D_4	Supply
	O_1	4	3	4	1	100
Origins	O_2	5	2	3	2	40
	O_3	4	6	2	5	60
Demand		75	50	75	50	

OR

8 a. Find IBFS for following problems by, i) NWCR ii) LCM 10

	P	Q	R	S	Supply
A	6	8	4	3	10
B	7	5	6	3	30
C	9	8	7	4	20
Demand	15	15	15	15	

b. Solve the following assignment problem given that the matrix below is a profit matrix 10

	B_1	B_2	B_3	B_4
A_1	6	1	8	4
A_2	3	2	1	6
A_3	7	5	9	3
A_4	4	7	6	8

PART - B (Case Study)

9. A company has identified the demand pattern for its products in markets with the following details: 20

Daily Demand	Probability
0	0.01
15	0.15
25	0.2
35	0.5
45	0.12
50	0.02

Consider the following random numbers and run the simulation for 10 days and find the average demand. 21, 27, 47, 54, 60, 39, 43, 91, 25, 20. Further if the company wants to decide on either to produce 32 units or 29 units per day. Selling price being `60. The total cost being `40. In case there are unsold units, it should be disposed at `5 P.u. In case of unsatisfied demand, it has a penalty cost `10 P.u. You are required to help the management in deciding how many units to produce taking cost into account.

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