

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER – II • EXAMINATION – SUMMER 2015

Subject Code: 820007

Date: 16/05/2015

Subject Name: Research Methodology & Operations Research (RM&OR)

Time: 10.30 AM TO 01.30 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** What is research? How research is useful in a business? Explain. **07**
(b) Write the 'Research Process' with good diagram. **07**

- Q.2 (a)** A rubber company is engaged in producing three different types of tyres A, B, and C. The company has two production plants to produce these. In a normal eight hour working day, plant I produces 100, 200 and 200 tyres of types A, B and C respectively. Plant II produces 120, 120, and 400 tyres of type A, B, and C respectively. The monthly demand of A, B, and C is 5000, 6000 and 14000 units respectively. The daily cost of operation of plants I and II are Rs. 5000 and Rs. 7000 respectively. Find the minimum number of days to operation per month at two different plants to minimize the total cost while meeting the demand using graphical method. **07**
(b) What is hypothesis? Explain the Null hypothesis and Alternate hypothesis in details with five different examples. **07**

OR

- (b)** What is sampling? Write a note on how systematic and stratified sampling works? Elicit. **07**
Q.3 (a) A marketing manager has five salesman and five sales districts. Considering the capabilities of the salesman and the nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district would be as below: **07**

Sales Men	Districts				
	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

- Find the assignment of salesmen to districts that will result in maximum sales
(b) Write a note on 'Secondary Data Analysis & Tools'. **07**

OR

- Q.3 (a)** Write dual of the following problem. **07**

$$\text{Max. } z = 3x_1 + 5x_2 + 7x_3$$

Subject to:

$$2x_1 + 4x_2 + 3x_3 \leq 40$$

$$-4x_1 + 5x_2 - 3x_3 \geq 25$$

$$x_1 + 2x_2 + 5x_3 = 15$$

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

- (b) Find an initial basic feasible solution to the following transportation problem. Is it an optimal? Use VAM & Stepping Stone only. 07

	D1	D2	D3	D4	Available Units
O1	5	4	2	1	130
O2	2	3	7	5	100
O3	5	4	5	6	30
Demand	40	50	70	100	

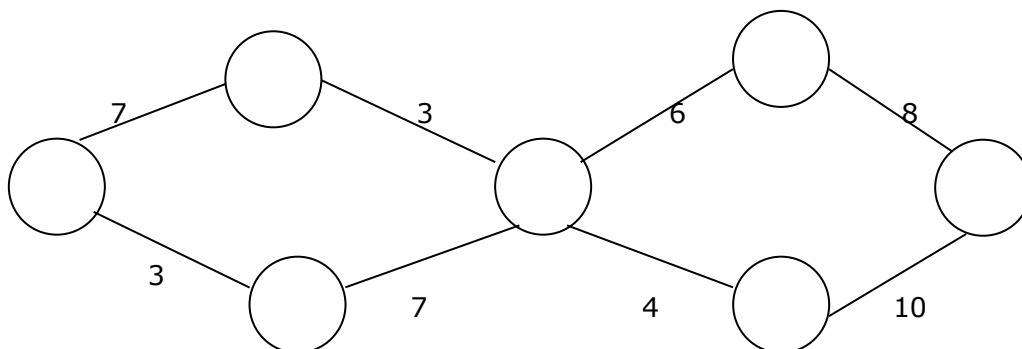
- Q.4 (a) Distinguish: LPP, IPP & GPP. 07
 (b) Solve the following Travelling Salesman Problem. 07

	A	B	C	D	E
A	--	10	3	6	9
B	5	--	5	4	2
C	4	9	--	7	8
D	7	1	3	--	4
E	3	2	6	5	--

OR

- Q.4 (a) Write a note on 'One Tail and Two Tail Analysis' with good illustrations. 07
 (b) A firm manufactures two products TV & DVD player which must be processed through two processes, Assembly and Finishing. Assembly has 96 hours available and finishing has 78 hours available. For 1 TV set requires 6 hours in assembly and 4 hours in finishing while 1 DVD player set requires 5 hours in assembly and 3 hours in finishing. If profit is Rs. 1000 per TV and Rs. 500 per DVD player set, find out the best combination of TV and DVD player set to realize a maximum profit of Rs. 5000. 07

- Q.5 (a) Solve the Minimum Spanning Tree. 07



- (b) 'Type I and Type II errors are inversely proportional to each other' – Do you agree with this statement? Justify your answer. 07

OR

- Q.5 (a) What is Monte Carlo Simulation? Write the advantages and limitations of simulation. 07
 (b) Write the procedure of generating a research report in detail. 07
