

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019**

**Subject Code: 2171503**
**Date: 28/11/2019**
**Subject Name: Resource Optimization Techniques**
**Time: 10:30 AM TO 01:00 PM**
**Total Marks: 70**
**Instructions:**

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

**MARKS**

- Q.1** (a) Define OR. **03**
- (b) Discuss its scope in Indian industries related to Industrial engineering. **04**
- (c) Explain various phases of OR to solve any problem of industries for optimum solution. **07**

- Q.2** (a) What is Linear programming? **03**
- (b) What are the problems you may face for OR implementation? **04**
- (c) Solve the following LPP. **07**
- Minimize  $4x+3y+z$ , Subject to  $x-2y+z \geq 2$ ,  $x+y-z \geq 3$ ,  $x, y, z \geq 0$

**OR**

- (c) Solve the following LPP. **07**
- Minimize  $10x+6y+2z$ , Subject to  $-x+y+z \geq 1$ ,  $3x+y-z \geq 2$ ,  $x, y, z \geq 0$

- Q.3** (a) Explain in short: Optimum solution. **03**
- (b) What is waiting line problem? How you solve it? **04**
- (c) Solve the following sequential problem by graphical and arithmetic method: **07**

Job	A	B	C	D	E	X	Y	Z
Machine-A	15	14	31	26	25	20	21	15
Machine-B	17	20	23	21	30	19	15	31

**OR**

- Q.3** (a) Explain in short: Non-degenerate feasible solution. **03**
- (b) What is the significance of Vogel's Approximate Method? **04**
- (c) What is degeneracy in transportation problem? How can it solve? **07**
- Q.4** (a) Discuss (i) Balking ii) Jockeying **03**
- (b) What are causes of replacement of a machine? **04**
- (c) Explain the following terms related to Game theory: **07**
1. Game, 2. Mixed strategy;  
3. Two person's zero sum game. 4. Saddle point.

**OR**

- Q.4** (a) What is application of Game Theory? **03**
- (b) Differentiate: Individual v/s Group replacement model. **04**
- (c) The probability  $P_n$  of failure just before  $n$  is shown in below. If individual replacement costs Rs. 3.50 and group replacement costs Rs. 1.00 per item. Find the optimum replacement solution. **07**

n	1	2	3	4	5	6	7	8
$P_n$	0.02	0.03	0.05	0.12	0.14	0.18	0.15	0.12

- Q.5** (a) Write note: Models of OR. **03**
- (b) Differentiate slack and surplus variables. **04**
- (c) Solve the following Game: **07**

	Player B				
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	3	2	3	4	5
Player-A	2	-7	-5	3	4
	3	5	7	-3	3

**OR**

- Q.5** (a) Discuss History of OR. **03**  
 (b) What is the role of duality in LPP? **04**  
 (c) Solve following transportation problem for minimum transportation cost. Unit shipping costs in Rs. Are given as under. **07**

Factory/Warehouse	a	b	c	d	Supply
A	8	9	6	3	18
B	6	11	5	10	20
C	3	8	7	9	18
Demand	15	16	12	13	

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