Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2171503 **Date:23/11/2016**

Subject Name:Resource Optimization Techniques

Time:10.30 AM to 1.00 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)** Define OR. Explain its scope for application in industries. **07**

(b) "OR is the tool that give bad answer of any problem otherwise it may be worse answer" Criticize the statement. **07**

Q.2 **(a)** Solve the following transportation problem: **07**

	D1	D2	D3	D4	D5	D6	Availability
O1	**1**	**2**	**1**	**4**	**5**	**2**	**30**
O2	**3**	**3**	**2**	**1**	**4**	**3**	**50**
O3	**4**	**2**	**5**	**9**	**6**	**2**	**75**
O4	**3**	**1**	**7**	**3**	**4**	**6**	**20**
Requirement	**20**	**40**	**30**	**10**	**50**	**25**	**175**

(b) What is meant by an optimality test in a transportation problem?. **07**

OR

(b) Explain in short: **07**
(a) feasible solution,(b) basic feasible solution
(c) optimum solution,(d) non-degenerate feasible solution.

Q.3 **(a)** Solve the following LPP. **07**

Minimize 4x+3y+z
Subject to x-2y +z >= 2
x+ y-z >= 3
x, y, z >= 0

(b) Explain the Kan DALL'S notation to represent a queuing model. Also explain Balking and Jockeying in queuing. **07**

OR

Q.3 **(a)** Solve the following LPP. **07**

Maximize z= x1+24x2- x3,
Subject to x1+x2+x3=15,
x1-x2>=3,
x1+2x2+x3<=20,

x1,x2,x3>=0.

(b) Explain the following terms related to Game theory: **07**
A. Game,
B. mixed strategy,
C. Two person's zero sum game.
D. saddle point.

Q.4 **(a)** 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

(b) What are causes of replacement of a machine? How group replacement problem can solve with OR? **07**

OR

Q.4 **(a)** Prove that Dual of Dual is a primal. **07**
Minimize z= x1-x2+x3,
Subject to 2x1-x2+x3<=7,
x1-3x2<=12,
-2x1+2x2+4x3<= 10,
x1, x2,x3>=0.
Formulate the dual LP.

Q.4 **(b)** Solve the following Game: **07**

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

Q.5 **(a)** Explain the following queuing model ; M/M/1☹(∞/ FCFS). Given an average arrival rate =5 per hour , average service time =7 minutes . Calculate the average queue length, waiting and idle time facilities. **07**

(b) **07**

Five wagons are available at stations 1,2,3,4 and 5. These are required at five stations I, II, III, IV and V. The mileages between various stations are given by the table below. How should the wagons be transported so as to minimize the total mileage covered?

		TO STATIONS				
		I	II	III	IV	V
FROM STATIONS	1	**10**	**5**	**9**	**18**	**11**
	2	**13**	**9**	**6**	**12**	**14**
	3	**3**	**2**	**4**	**4**	**5**
	4	**18**	**9**	**12**	**17**	**15**
	5	**11**	**6**	**14**	**19**	**10**

OR

Q.5 **(a)** The probability Pn 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
pn	0.02	0.03	0.05	0.12	0.14	0.18	0.15	0.12

(b) What is degeneracy in transportation problem? Hove can it solve? Explain with example. **07**

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