Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER • 2014

Subject Code:171503 **Date: 04-12-2014**

Subject Name: Resource Optimization Techniques

Time: 10:30 am - 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.**

Q.1 (a) Define OR. Discus its scope in Indian industries related to Industrial engineering. 07

(b) Explain use of OR to solve any problem of industries for optimum solution with OR phases. 07

Q.2 (a) Find an initial basic feasible solution to the following T.P. using Vogel's approximation method(test optimality also) 07

Destinations

		1	2	3	4	Availability
Origins	A	6	2	4	4	20
	B	3	4	4	5	25
	C	5	3	3	2	30
	D	4	1	4	1	30
Requirement		30	25	35	25	

(b) What is Linear programming? State the applications of it and also discuss its advantages in brief. 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 6x+10y+3z

Subject to -x+y+z >= 1

3x+y-z>= 2

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= 3x1+4x2- 2x3,

Subject to x1+x2+x3=09,

X1-x2>=1,

2x2+3x2+x3<=30,

X1,x2,x3>=0.

(b) Explain the following terms related to Game theory: 07

A. Game,

1

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	6	5	23	17	11	14	10	7
Machine-B	8	12	14	10	22	9	5	23

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

OR

Q.4 (a) Prove that Dual of Dual ia a primal. **07**

Minimize z= x1-3x2+2x3,
Subject to 3x1-x2+2x3<=8,
-2x1+4x2<=11,
-4x1+3x2+8x3<= 12,
X1,x2,x3>=0.
Formulate the dual LP.

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

		Player-B			
	2	1	2	3	4
Player-A	0	-7	-4	1	2
	1	5	8	-3	2

Q.5 (a) Explain the following queuing model ; M/M/1 (∞/fcfs). **07**
Given an average arrival rate =8 per hour , average service time =5 minutes .
Calculate the average queue length, waiting and idle time facilities.

(b) Solve the following assignment problem optimally: **07**

			subject s			
		1	2	3	4	5
	1	40	49	41	48	50
Faculty 2		33	36	30	34	37
	3	34	41	33	41	34
	4	24	33	43	40	40

OR

Q.5 (a) The probability Pn of failure just before n is shown in below. If individual replacement costs rs. 2.50 anf group replacement costs rs. 0.50 per item. Find the optimum replacement solution. **07**

n	1	2	3	4	5	6	7	8
pn	0.01	0.02	0.06	0.15	0.10	0.15	0.10	0.12

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