Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: 171503 **Date: 01/01/2013**

Subject Name: Resource optimization techniques

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt any five 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
a	6	2	4	4	20
Origins 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,

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**

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