Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 171503 Date: 07-12-2013

Subject Name: Resource Optimization Techniques

Time: 10:30 TO 01:00 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 various phases of OR. **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)** 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	4	5	7	60
Origins	b	4	4	8	5	45
	C	6	4	4	4	40
	D	5	2	3	5	50
Requirement		50	55	45	45	

(b) What is Linear programming? Explain application of LPP in real world. **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+2y+z
Subject to x-y +z >= 1
x+2y-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= 2x1+4x2- x3,
Subject to x1+x2+x3=10,
x1-x2>=2,
x1+2x2+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	5	4	21	16	15	10	11	5
Machine-B	7	10	13	11	20	9	5	21

(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+2x3,

Subject to 2x1-x2+x3<=7,

x1-3x2<=12,

-3x1+2x2+5x3<= 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). **07**

Given an average arrival rate =4 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**

		Teaching subjects				
		1	2	3	4	5
	1	30	40	30	32	32
STAFF	2	33	47	22	25	33
	3	35	31	43	41	34
	4	40	20	30	30	30

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	0.01	0.03	0.05	0.11	0.13	0.20	0.13	0.11

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

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