

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. Discuss 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 $-x+y+z \geq 1$ $3x+y-z \geq 2$ $X,y,z \geq 0$

- (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 $z=3x_1+4x_2-2x_3$,Subject to $x_1+x_2+x_3=9$, $x_1-x_2 \geq 1$, $2x_1+3x_2+x_3 \leq 30$, $x_1,x_2,x_3 \geq 0$.

- (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 is a primal. **07**

Minimize $z = x_1 - 3x_2 + 2x_3$,
Subject to $3x_1 - x_2 + 2x_3 \leq 8$,
 $-2x_1 + 4x_2 \leq 11$,
 $-4x_1 + 3x_2 + 8x_3 \leq 12$,
 $x_1, x_2, x_3 \geq 0$.

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 ; $M/M/1 \otimes (\infty / fcfs)$. **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 P_n of failure just before n is shown in below. If individual replacement costs rs. 2.50 and group replacement costs rs. 0.50 per item. Find the optimum replacement solution. **07**

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

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