

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E SEM-VII Examination-Nov/Dec.-2011

Subject code: 171503

Date: 24/11/2011

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. Discuss its scope in Indian industries related to Industrial engineering. **07**
- (b)** Explain various phases of OR to solve any problem of industries for optimum solution. **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	7	2	5	5	40
Origins b	4	4	6	5	25
C	5	3	3	2	20
D	4	-1	4	2	30
Requirement	30	35	25	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 $10x+6y+2z$
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. **07**
Also explain Balking and Jockeying in queuing.

OR

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

Maximize $z = 4x_1 + 5x_2 - 3x_3$,
 Subject to $x_1 + x_2 + x_3 = 10$,
 $x_1 - x_2 \geq 1$,
 $2x_1 + 3x_2 + x_3 \leq 40$,
 $x_1, x_2, x_3 \geq 0$.

(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	7	6	24	18	17	13	11	6
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 $3x_1 - x_2 + 2x_3 \leq 7$,
 $-2x_1 + 4x_2 \leq 12$,
 $-4x_1 + 3x_2 + 8x_3 \leq 10$,
 $x_1, x_2, x_3 \geq 0$.

Formulate the dual LP.

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

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

Q.5 (a) Explain the following queuing model ; $M/M/1 \oplus (\infty / f.c.f.s)$. **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

		subjects				
		1	2	3	4	5
	1	30	39	31	38	40
Faculty	2	43	37	32	35	38
	3	34	41	33	41	34
	4	39	36	42	42	36

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	0.03	0.07	0.10	0.15	0.20	0.15	0.11

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