

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2171503
Date: 26/11/2018
Subject Name: Resource Optimization Techniques
Time: 10:30 AM TO 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) Explain importance of OR. **03**
 (b) Discuss History of OR. **04**
 (c) How will you implement OR in any industry? **07**
Q.2 (a) Discuss the scope of OR in industry. **03**
 (b) Write note: Models of OR **04**
 (c) In a machine shop 8 different products are being manufactured each requiring **07**
 time on

two different machines A and B are given in the table below:

Product 1 2 3 4 5 6 7 8

Machine-X 40 55 25 30 90 100 75 20

Machine Y 20 30 50 35 35 40 50 20

Find an optimal sequence of processing of different product in order to minimize the total manufactured time for all product. Find total ideal time for two machines and elapsed time.

OR

- (c) Solve the following Assignment Problem. **07**

		operators				
		1	2	3	4	5
	1	30	40	30	32	32
job	2	23	37	32	35	43
	3	45	41	53	51	44
	4	40	20	30	30	30

- Q.3** (a) What are the problems you may face for OR implementation? **03**
 (b) Write down the procedure for solving problem of sequencing with **04**
 TWO machines.
 (c) Find an initial basic feasible solution to the following T.P. using Vogel's **07**
 approximation method.

Destinations

	1	2	3	4	Availability
a	26	24	25	27	70
Origins b	13	14	18	15	75
C	16	14	14	14	50
D	15	12	13	15	60
Requirement	60	65	50	60	

OR

- Q.3** (a) What is Linear programming? **03**
 (b) Explain application of LPP in real world. **04**

- (c) Solve the following LPP. 07
 Minimize $5x+3y+z$
 Subject to $x-y+z \geq 4$
 $x+2y-z \geq 5$
 $x, y, z \geq 0$

- Q.4** (a) What is degeneracy in transportation problem? 03
 (b) How will you do optimality test in transportation problem? 04
 (c) Prove that Dual of Dual is a primal. 07
 Minimize $z = x_1 - x_2 + x_3$,
 Subject to $x_1 - x_2 + x_3 \leq 6$,
 $x_1 - 2x_2 \leq 10$,
 $-2x_1 + x_2 + 3x_3 \leq 12$,
 $x_1, x_2, x_3 \geq 0$.

OR

- Q.4** (a) State application of queuing model with example. 03
 (b) Explain MODI method. 04
 (c) 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, average waiting time in the queue and system. And probability that MORE THAN 2 customers in the system.
- Q.5** (a) How will you apply game theory in any industry? 03
 (b) Explain saddle point of two person zero sum game with example. 04
 (c) Solve the following Game: 07

		Player-q			
	20	30	40	50	60
Player-p	10	18	15	11	12
	10	14	17	13	11

OR

- Q.5** (a) When you prefer group replacement? 03
 (b) Differentiate: individual v/s group replacement model 04
 (c) Solve the following Game graphically: 07

		Player-B				
STRATEGY		A	B	C	D	E
1		2	3	4	5	6
Player-A 2		0	8	5	1	2
