

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Summer 2018 - 19 Examination

Semester: 2
Subject Code: 203216153
Subject Name: O.R. IN CONSTRUCTION MANAGEMENT

Date: 08/05/2019
Time: 10.30 am to 1.00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Obtain the Initial basic Feasible solution to the following transportation problem by Least cost cell (05)
 Method

Depot Unit	B1	B2	B3	B4	Stock
A1	2	3	5	1	8
A2	7	3	4	6	10
A3	4	1	7	2	20
Demand	6	8	9	15	

B) A multinational company has two factories that ship to three regional warehouses. The costs of (05)
 transportation per unit are:

Warehouses	Transportation cost (Rs)	
	Factory F1	Factory F2
W1	2	4
W2	2	2
W3	5	3

Factory F2 is old and has a variable manufacturing cost of Rs.20 per Unit. Factory F1 is Modern and Produces for Rs.10 per unit. Factory F2 has a monthly capacity of 250 units and factory F1 has a capacity of 400 units. The requirements at the warehouses are:

Warehouses	Requirement
W1	200
W2	100
W3	150

How should each factory ship to each warehouse in order to minimize the total cost? Formulate this problem as a linear programming model. Do not solve it

C) Write the application of Simulation. (05)

Q.2 Answer the following questions. (Attempt any three) (Each five mark) (15)

A) Which Assumptions are important in LPP?

B) Explain MAXIMIN-MINIMAX Principle

C) A company has factories at A, B and C which supply warehouses at D, E, F and G. The monthly factory capacities are 160, 150 and 190 units, respectively. Monthly warehouse requirements are 80, 90, 110 and 160, respectively. Unit shipping costs (in rupees) are as follows:

		To			
		D	E	F	G
From	A	42	48	38	37
	B	40	49	52	51
	C	39	38	40	43

D) Determine the optimum distribution for this company i.e problem no 2(c) to minimize shipping costs by using MODI method.

Q.3 (07)

A) A company is spending 1000 on transportation of its units from three plants to four distribution centers. The availability of unit per plant and requirement of units per distribution center, with unit cost of transportation are given as follows:

Plants	D. Centers	D1	D2	D3	D4	Availability
	P1		19	30	50	12
P2		70	30	40	60	10
P3		40	10	60	20	18
Requirement		5	8	7	15	

(08)

B) What is the maximum possible saving by optimum distribution? Use the Stepping Stone method to solve the above problem i.e Que.no 3(a)

OR

B) Perform optimality test by applying the MODI method for the above problem i.e Que.no 3(a) (08)

Q.4 A) solve graphically the following LPP (07)

Maximize

$$Z = 8x_1 + 16x_2$$

Subjected to

$$x_1 + x_2 \leq 200$$

$$x_2 \leq 125$$

$$3x_1 + 6x_2 \leq 900$$

$$x_1, x_2 \geq 0$$

OR

A) solve graphically the following LPP

(07)

Minimize

$$Z = 6x_1 + 14x_2$$

Subjected to

$$5X_1 + 4X_2 \geq 60$$

$$3X_1 + 7X_2 \geq 84$$

$$X_1 + X_2 \geq 18$$

$$X_1, X_2 \geq 0$$

B) Solve the following game given in the table by Graphical Method and find the Value of the Game **(08)**

Player B's Strategy

Player A's Strategy		B1	B2
	A1	-7	6
	A2	7	-4
	A3	-4	-2
	A4	8	-6