Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 172503 Date: 07-12-2013

Subject Name: Optimization Methods

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)** Explain procedure of modeling a LP Problem **07**

(b) Explain following term with neat sketch on graph **07**
1. Unbounded region 2. Infeasible region 3. Feasible region

Q.2 **(a)** Solve following LP problem using simplex method **07**

MAX: 350X1 + 300X2

S.T.: 1X1 + 1X2 <= 200
9X1 + 6X2 <= 1566
12X1 + 16X2 <= 2880
X1 >= 0
X2 >= 0

(b) A small manufacturer employs 7 skilled men and 12 semi skilled men for making a product in two qualities: a deluxe model and an ordinary model. The production of a deluxe model requires 3-hours work by a skilled man and a 2-hour work by a semi skilled man. The ordinary model requires 2-hour work by a skilled man and a 4-hours work by a semi skilled man. According to worker union's rules, no man can work more than 8-hours per day. The profit of the deluxe model is Rs.2200 per unit and that of the ordinary model is Rs.1600 per unit. Formulate a linear programming model for this manufacturing situation to determine the production volume of each model such that the total profit is maximized. **07**

OR

(b) Solve following problem using Big. M. Method **07**

Maximize $z=4x+5y$

Subject to $2x+3y\leq 8$

$3x+y\geq 4$

$x,y\geq 0$

Q.3 **(a)** Explain various methods of transportation problem solution with suitable example **07**

(b) Describe traveling salesman problem in detail with a case problem. **07**

OR

Q.3 **(a)** Solve the following assignment problem using Hungerian method. The matrix entries are processing times in hours. **07**

		Operator				
		1	2	3	4	5
Job	1	20	22	35	22	18
	2	4	26	24	24	7
	3	23	14	17	19	19
	4	17	15	16	18	15
	5	16	19	21	19	25

(b) What do you mean by stepping stone method of solving transportation problem optimally? Explain in detail with suitable example **07**

Q.4 **(a)** Explain simulation model for inventory management with a case problem **07**

(b) Solve following game problem using method of your choice **07**

		Player B		
	Strategy	1	2	3
	1	1	7	2
Player A	2	6	2	7
	3	6	1	6

OR

Q.4 **(a)** Explain applications of simulation with suitable examples **07**

Q.4 **(b)** Describe linear programming method to solve game problem with suitable example **07**

Q.5 **(a)** There is congestion on the platform of Ahmed Railway station. The trains arrive at the rate of 45 trains per day. The waiting time for any train to flag-off is exponentially distributed with an average of 65 minutes. Calculate the following: **07**

i) The mean queue size.

ii) The probability that the queue size exceeds 15.

(b) Explain the properties of dual problem with an example **07**

OR

Q.5 **(a)** Discuss the applications of quing theories in detail **07**

(b) Use dual simplex method to solve the following **07**

Minimize $Z = 2x + 3y$

Subject to $3x + 4y \geq 5$

$4x + 5y \geq 7$

$x + 2y \leq 4$

$x , y \geq 0$

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