JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION, 2017

M.TECH IV SEMESTER

COURSE CODE: 10M13CE432   MAX. MARKS: 25

COURSE NAME: CONSTRUCTION METHODS IMPROVEMENT

COURSE CREDITS: 03   MAX. TIME: 1.5 HRS

Note: All questions are compulsory. Draw figure, sketches and give suitable example to illustrate your answers. Assume missing data suitably if required.

1. How do you identify the presence of multiple optima in the Simplex method?   [2]

2. Explain the significance of 'Artificial Variable' with example. When is used and why?[2]

3. A manufacturer produces three products A, B and C. Each product requires processing on two machines M_1 and M_2. the time required to produce one unit of each product on a machine is given in the table below:

Product	Time to produce one unit (hours)	
	Machine M_1	Machine M_2
A	0.5	0.6
B	0.7	0.8
C	0.9	1.05

There are 85 hours available on each machine; the operating cost is Rs. 5/hour for machine M_1 and Rs. 4/hour for machine M_2. The product requirements are at least 90 units of A, at least 80 units of B and at least 60 units of C. the manufacturer wishes to meet the requirements at minimum cost. Formulate the problem as linear programming problem. Do not solve.   [4]

4. Solve the following linear programming problem by Big-M method. Also, comment on the final solution.   [8]

   Maximize $Z = 10x_1 + 20x_2$

   $2x_1 + 4x_2 \geq 16$

   $x_1 + 5x_2 \geq 15$

   $x_1, x_2 \geq 0$

5. A dairy firm has three plants located in a state. Each day the firm must fulfill the needs of its four distribution centers. Cost of shipping of one million liters of milk from each plant to each centre is given in the following table in hundreds of rupees. Daily milk production at each plant and milk requirement at each centre is also given in the table in million liters.

Plants (Origin)	Distribution centers (Destination)				Supply
Plant 1	2	3	11	7	6
Plant 2	1	0	6	1	1
Plant 3	5	8	15	9	10
Demand	7	5	3	2	17 (Total)

The dairy firm wishes to determine as to how much should be the shipment from which milk plant to which distribution centers so that the total cost of shipment is the minimum. Determine the optimal transportation policy. [9]