JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2023

B.Tech-V Semester (CE)

COURSE CODE (CREDITS): 20B1WCE531 (3)   MAX. MARKS: 25

COURSE NAME: MODELLING, SIMULATION AND COMPUTER APPLICATION

COURSE INSTRUCTORS: Dr. Tanmay Gupta   MAX. TIME: 1 Hour 30 Minutes

Note: (a)All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for

solving problems

Q.1 What do you understand by Revised Simplex method. Write step by step procedure to execute revised simplex method. **[3][CO2]**

Q.2 Each month a store owner can spend at most $100,000 on PC's and laptops. A PC costs the store owner $1000 and a laptop costs him $1500. Each PC is sold for a profit of $400 while laptop is sold for a profit of $700. The sore owner estimates that at least 15 PC's but no more than 80 are sold each month. He also estimates that the number of laptops sold is at most half the PC's. How many PC's and how many laptops should be sold in order to maximize the profit? Solve using Simplex method. **[5][CO1]**

Q.3 Solve the following using two -phase method

Minimize $Z = -3x_1 + x_2 + x_3$

Subjected to

$x_1 - 2x_2 + x_3 \leq 11$

$-4x_1 + x_2 + 2x_3 \geq 3$

$2x_1 - x_3 = -1$

$x_1, x_2, x_3 \geq 0$ **[5][CO2]**

Q.4 Write the condition to identify the following in simplex table:

Degeneracy, Alternative optimum solutions, Unbounded solutions, Infeasible solutions **[4][CO2]**

Q.5 Consider the following LPP

Minimize $Z = 6x_1 + x_2 + 2x_3$

Subjected to

$2x_1 + 2x_2 + 0.5x_3 \leq 2$

$-4x_1 - 2x_2 - 1.5x_3 \leq 3$

$x_1 + 2x_2 + 0.5x_3 \leq 1$

$x_1, x_2, x_3 \geq 0$

After we apply the Simplex method a portion of the final tableau is as follows:

Basic	Z	X_1	X_2	X_3	X_4	X_5	X_6	Sol
Z	1				2	0	2	
X_5	0				1	1	2	
X_3	0				-2	0	4	
X_1	0				1	0	-1	

Identify the missing numbers. **[4][CO2]**

Q.6 A firm produces three products A, B, and C each of which passes through three different departments fabrication, finishing, packaging. Each unit of product A requires 3, 4 and 2 hours respectively, B requires 5, 4 and 4 hours respectively and C requires 2, 4 and 5 hours respectively in 3 departments respectively. Every day 60 hours are available in fabrication department, 72 hours in finishing and 100 hours in packaging department. If unit contribution of unit A is Rs. 5, Rs. 10 for B and Rs. 3 for C. Then determine number of units of each product so that total contribution to cost is maximized and also determine if any capacity would remain unutilized. Solve using Simplex method. **[4][CO1]**