JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B.Tech- V Semester (CE)

COURSE CODE(CREDITS):20B1WCE531(3) MAX. MARKS: 15

COURSE NAME: Modelling, Simulation and Computer Applications

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

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. Draw Q.2 on graph paper.

Q.1 (a) What do you understand by the terms Modelling and Simulation?

(b) Write any 4 applications of Modelling and Simulation. **2+2 [CO1]**

Q.2 The N. Dustrious Company produces two products: I and II. The raw material requirements, space needed for storage, production rates, and selling prices for these products are given in Table 1. The total amount of raw material available per day for both products is 1575. The total storage space for all products is 1500 ft^2, and a maximum of 7 hours per day can be used for production. All products manufactured are shipped out of the storage area at the end of the day. Therefore, the two products must share the total raw material, storage space, and production time. The company wants to determine how many units of each product to produce per day to maximize its total income. Solve it graphically. **5 [CO2]**

	Product I	Product II
Storage space (ft^2/unit)	4	5
Raw Material (lb/unit)	5	3
Production rate (units/hr)	60	30
Selling price ($/unit)	13	11

Q.3 What are slack and surplus variables in Linear Programming? Explain the difference between basic and non-basic variables. **2 [CO1]**

Q.4 Mr. Carter eats a mix of Cereal A and Cereal B for breakfast. The amount of calories, sodium and protein per ounce for each is shown in the table below. Mr. Carter's breakfast should provide at least 480 calories but less than or equal to 700 milligrams of sodium. Mr. Carter would like to maximize the amount of protein in his breakfast mix.

	Cereal A	Cereal B
Calories(per ounce)	100	140
Sodium(mg per ounce)	150	190
Protein(g per ounce)	9	10

Setup the problem as LPP and draw the initial simplex table with determination of initial entering and leaving variables. **4 [CO2]**