JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

M.TECH-I SEMESTER STRUCTURAL ENGINEERING

COURSE CODE (CREDITS): 11M1WCE114 MAX. MARKS: 15

COURSE NAME: MODELLING, SIMULATION AND COMPUTER APPLICATION

COURSE INSTRUCTORS: Dr. TANMAY GUPTA MAX. TIME: 1 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1. A cooperative society of farmers has 50 hectares of land to grow two crops X and Y. The profit from crops X and Y per hectare are estimated as Rs 10,500 and Rs 9,000 respectively. To control weeds, a liquid herbicide must be used for crops X and Y at rates of 20 liters and 10 liters per hectare. Further, no more than 800 liters of herbicide should be used in order to protect fish and wildlife using a pond which collects drainage from this land. How much land should be allocated to each crop so as to maximize the total profit of the society? Solve the problem formulating as LPP and using Graphical solution. **5 [CO2]**

Q.2 An open rectangular box with square base is to be made from 48 ft^2 of material. What dimensions will result in a box with the largest possible volume ? **3 [CO1]**

Q.3 You have $12,000 to invest, and three different funds from which to choose. The municipal bond fund has a 7% return, the local bank's CDs have an 8% return, and the high-risk account has an expected (hoped-for) 12% return. To minimize risk, you decide not to invest any more than $2,000 in the high-risk account. For tax reasons, you need to invest at least three times as much in the municipal bonds as in the bank CDs. Assuming the year-end yields are as expected, setup the problem as LPP and write initial simplex table for the same. **3 [CO2]**

Q.4 (a) Explain with an example use of Modelling and Simulation in Civil Engineering.

(b) Write any 4 advantages and 4 disadvantages of application on Modelling and Simulation.

2+2 [CO1]