JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION-DECEMBER-2023

B.Tech-VII Semester

COURSE CODE (CREDITS): 19B1WEC733 (3) MAX. MARKS: 35

COURSE NAME: Optimization Techniques

COURSE INSTRUCTOR: Dr. Pardeep Garg MAX. TIME: 2 Hours

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.

Q1. A company is faced with the problem of assigning six different machines to five different jobs. The costs are estimated as shown in Table 1. Solve the problem assuring that the objective is to minimize total cost.

Table 1

	I	II	III	IV	V	VI
A	12	10	15	22	18	8
B	10	18	25	15	16	12
C	11	10	3	8	5	9
D	6	14	10	13	13	12
E	8	12	11	7	13	10

[CO-2, 6 marks]

Q2. Solve the transportation problem depicted in Table II by

i) Find out the basic feasible solution using 'Lowest Cost Entry' method.

ii) Test the solution obtained in step (i) for optimality showing all the intermediate steps and comment on the final result obtained. **[CO-2, 3+5= 8 marks]**

Table II

	S_1	S_2	S_3	S_4	a_i
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
b_j	20	40	30	10	**100**

Q3. A company has four plants P_1, P_2, P_3, P_4 from which it supplies to three markets M_1, M_2, M_3. Determine the optimal transportation plan from the following data represented in Table III giving the plant to market shifting costs, quantities available at each plant and quantities required at each market. **[CO-2, 5+5= 10 marks]**

Table III					
	Plant				
Market ↓	P_1	P_2	P_3	P_4	**Required at market**
M_1	19	14	23	11	11
M_2	15	16	12	21	13
M_3	30	25	16	39	19
Available at plant	6	10	12	15	**43**

Q4. In the process of scheduling of a project, what are the basic steps involved in CPM/ PERT, discuss in detail. Discuss the application areas of these techniques in industry.

[CO-3, 4 marks]

Q5. A book binder has one printing press, one binding machine, and the manuscripts of a number of different books. The times required performing the printing and binding operations for each book are known as tabulated in Table IV. We wish to determine the optimal order in which books should be processed on the machine, in order to minimize the total time required. Also, compute the total elapsed time, and the idle time corresponding to printing press and binding machine.

TABLE IV

Books	1	2	3	4	5	6
Printing Time (Hrs.)	30	120	50	20	90	110
Binding Time (Hrs.)	80	100	90	60	30	10

[CO-4, 7 marks]