

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Mid-Semester Examination
Course No IPE 4611
Course Title: Operations Research

Summer Semester, A. Y. 2021-2022
Time: 1½ Hours
Full Marks: 75

There are 3 (Three) questions. Answer all of them. The symbols have their usual meanings. Marks of each question and corresponding CO and PO are written in the right column. Assume reasonable values if required.

1. a. Solve the following linear programming problem using any appropriate method. Also explain the optimal solution
Maximize $z = 3x_1 - x_2$
Subject to:
 $2x_1 + x_2 \leq 2$
 $x_1 + 3x_2 \geq 3$
 $x_2 \leq 4$
 $x_1, x_2 \geq 0$ [20]
CO2,
PO2
- b. Briefly describe three key differences between Big M and Two Phase method of solving linear programming problems. [5]
CO1,
PO1

2. A battery manufacturing company has three plants and four warehouses at different locations. The unit cost of transporting the product from plant to warehouse is shown in the table. The capacity of each plant is shown on the right column and demand of each plant is shown in the bottom row. Find the optimal solution for this transportation problem. [25]
CO2,
PO2

Plant/ Warehouse	U	V	W	X	Supply
K	6	3	5	4	22
L	5	9	2	7	15
M	5	7	8	6	8
Demand	7	12	17	9	45

3. A logistics company would like to solve the following assignment problem. It needs to assign five staff members A, B, C, D and E to five jobs P, Q, R, S and T respectively. The assignment cost for this purpose is given in the table below. Only one job can be assigned to any one employee. The objective is to assign a job to an employee such that the total assignment cost is a minimum. Solve the problem using the appropriate method. [25]
CO2,
PO2

Staff member/ Job	P	Q	R	S	T
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	13

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