



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

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Mid-Semester Examination

Summer Semester, A. Y. 2021-2022

Course No: MCE 4823

Time: 1½ Hours

Course Title: Operations Research

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 algebraic analytical simplex method. Also explain the optimal solution. [20]
CO2, PO2
Minimize $z = 5x_1 + 3x_2$
Subject to:
 $5x_1 + 2x_2 \geq 10$
 $2x_1 + 4x_2 \leq 12$
 $2x_1 + 2x_2 = 10$
 $x_1, x_2 \geq 0$
- b. Briefly write down the procedure of solving the linear programming problem using graphical method. [5]
CO1, PO1
2. A company has three production plants X, Y, Z with production capacity of 7, 9 and 18 units per week of a product, respectively. These units are to be shipped to four warehouses E, F, G, and H with requirement of 5, 8, 7 and 14 units per week, respectively. The transportation costs (in BDT) per unit between factories to warehouses are given in the table below: [25]
CO2, PO2

Plant/ Warehouse	E	F	G	H	Supply
X	19	30	50	10	7
Y	70	30	40	60	9
Z	40	8	70	20	18
Demand	5	8	7	14	34

Here inside the table unit transportation cost is provided for each specific cell according to *plant-to-warehouse* transportation applicable for that cell. Find the optimal solution for the above mentioned transportation problem. Use the Vogel's Approximation Method for initial solution. Also comment on the optimal solution

3. A manufacturing company must assign five jobs. A, B, C, D and E to five employees P, Q, R, S and T. The assignment cost for this purpose is given in 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

Job Employee	P	Q	R	S	T
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

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