**Assignment of OR for 3rd year extension management students**

1. ABC Metal crafters company makes brass tray and buckets. The number of trays (x1 )and buckets (x2) that can be produced daily is constrained by the availability of brass and labor, as reflected in the following LP model.

Maximize Z = 6x1 + 10x2

Subject to:

x1 + 4x2 90 ( brass, lb)

2x1 + 2x2 960 (labor, hrs)

x1,x2 0

REQUIRED

1. Solve primal problem with simplex method
2. Formulate the dual of this problem solve it with simplex method
3. Define the dual variables and explain what they mean.

2. Steel mills in three cities produce the following amounts of steel:

Location Weekly Demand (tones)

Bethlehem 130

Birmingham 210

Gary 320

These mills supply steel to four cities where manufacturing plants have the following demand.

**Location** *Weekly* **Demand** *(tons)*

1. Detroit 130
2. St. Louis 70
3. Chicago 180
4. Norfolk 240

**Shipping costs per ton of steel are as follows**

To

From 1 2 3 4

A $14 9 16 18

B 11 8 7 16

C 16 12 10 22

1. Set up a transportation tableau for this problem and determine the initial solution. Identify the method used to find the initial solution.

b. Formulate this problem as a general linear programming model.

3. Consider the following payoff table for three alternatives, A,B, and C, under two future states of the economy, good and bad.

Economic Conditions

Investment Good Bad

A $ 70,000 $ 25,000

B 120,000 -60,000

C 40, 000 40,000

Determine the decision using the following decision criteria.

1. Maximax
2. Maximin
3. Minimax regret
4. Hurwicz (α = 0.3)
5. Equal likelihood

4.Solving the following by using simplex method.

Maximize 60x1 + 70x2

Subject to: 2x1 + x2 ≤ 300

3x1 + 4x2 ≤ 509

4x1 + 7x2 ≤ 812

x1, x2 ≥ 0

5. A company has three factories located in three cities viz. X, Y, Z. These factories supplies consignments to four dealers viz. A, B, C and D. The dealers are spread all over the country. The production capacity of these factories is 1000, 700 and 900 units per month respectively. The net return per unit product is given in the following table.

Solve this maximization case of transportation.

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| **FACTORIES** | **DEALERS** | | | | CAPACITY |
| **A** | **B** | **C** | **D** |
| X | 6 | 6 | 6 | 4 | 1000 |
| Y | 4 | 2 | 4 | 5 | 700 |
| Z | 5 | 6 | 7 | 8 | 900 |
| **REQUIREMENT** | **900** | **800** | **500** | **400** |  |