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

1. Solve the following linear programming problem using simplex method.

Maximize x1 + x2

Subject to: -2x1 + x2 ≤ 1

x1 ≤ 2

x1 + x2 ≤ 3

x1, x2, x3 ≥ 0

1. Suppose a manufacturing company owns three factories (sources) and distribute his products to five different retail agencies (destinations). The following table shows the capacities of the three factories, the quantity of products required by the various retail agencies and the cost of shipping one unit of the product from each of the three factories to each of the five retail agencies.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **FACTORIES** | **RETAIL AGENCY** | | | | | **CAPACITY** |
| **1** | **2** | **3** | **4** | **5** |
| **1** | 1 | 9 | 13 | 36 | 51 | **50** |
| **2** | 24 | 12 | 16 | 20 | 1 | **100** |
| **3** | 14 | 33 | 1 | 23 | 26 | **150** |
| **REQUIREMENT** | **100** | **60** | **50** | **50** | **40** |  |

Required: allocate the products based on:

1. Northwest corner method
2. LCM
3. VAM METHOD
4. Formulate the equation in the form of LP
5. SOLVE THE FOLLOWING TRANSPORTATION PROBLEM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PLANTS** | **SHOAPS** | | | |
| **S1** | **S2** | **S3** | **CAPACITY** |
| X | 20 | 17 | 25 | **400** |
| Y | 10 | 10 | 20 | **500** |
|  | **400** | **400** | **500** |  |

REQUIRED: solve this transportation problem by using above method

1. 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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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** |  |

5. A juice company has its products viz. canned apple and bottled juice with profit margin Rs.4 and Rs.2 respectively pre unit. The following table shows the labour, equipment, and ingredients to produce each product per unit.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Canned Apple Bottled Juice Total | Canned Apple Bottled Juice Total | Canned Apple Bottled Juice Total |
| Labour | 2.0 | 3.0 | 12.0 |
| Equipment | 3.2 | 1.0 | 8.0 |
| Ingredients | 2.4 | 2.0 | 9.0 |

Required: Formulate the linear programming problem (model) specifying the product mix which will maximize the profit without exceeding the levels of resources.