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**Presidency University**

**Bengaluru**

 **School of Management**

**Summer term End-Term Examination - August 2024**

**Date**: 08..08.2024

**Time**: 09:30am – 12:30pm

**Max Marks**: 100

**Weightage**: 50%

**Semester**: IV

**Course Code**: MBA3044

**Course Name**: Operations Research

**Department:** SOM

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any information on the question paper other than roll number.*
3. *Question paper consists of 3 parts.*

**PART A**

**Answer any 5 Questions. Each question carries 3 marks. (5Qx 3M= 15)**

1. Define a Linear Programming Problem. (C.O.No.1) [Knowledge]

2. Define a solution to an LPP. (C.O.No.1) [Knowledge]

3. Define a transportation problem. (C.O.No.2) [Knowledge]

4. What is a slack variable? (C.O.No.2) [Knowledge]

5. Write the Standard form of LPP. (C.O.No.1) [Knowledge]

6. Define a surplus variable (C.O.No.1) [Knowledge]

7. With the help of an example, identify the objective function, and the constraints of an LPP

 (C.O.No.1) [Comprehension]

**PART B**

**Answer any 2 Questions. Each question carries 10 marks. (2Qx 10M= 20)**

8 A company sells two different products A and B, making a profit of Rs 40 and Rs 30 per unit, respectively. They are both produced with the help of a common production process and are sold in two different markets. The production process has a total capacity of 30,000 person-hours. It takes three hours to produce a unit of A and one hour to produce a unit of B. The market has been surveyed and company officials feel that the maximum number of units of A that can be sold is 8,000 units and that of B is 12,000 units. Subject to these limitations, products can be sold in any combination. Formulate this problem as an LPP to maximize profit. (C.O.No.1) [Application]

9 Solve the following LPP graphically

 Max Z = 5X1 + 3X2

 subject to 3X1 + 5X2 ≤ 15

 5X1 + 2X2 ≤ 10

 and X1, X2 ≥ 0 (C.O.No.1) [Application]

10 Determine an initial basic feasible solution to the following transportation problem by using Vogel’s approximation method.

|  |  |
| --- | --- |
|  | Destination |
| source |  | D1 | D2 | D3 | D4 | Supply |
| S1 | 1 | 2 | 1 | 4 | **30** |
| S2 | 3 | 3 | 2 | 1 | **30** |
| S3 | 4 | 2 | 5 | 9 | **40** |
| Demand | **20** | **40** | **30** | **10** | **100** |

 (C.O.No.2) [Application]

 **PART C**

**Answer the following Questions. (1Qx 15M= 15)**

 11. Use simplex method to solve the following LPP.

 Max *Z* = 6*X*1 + 8*X*2

 subject to 5*X*1 + 2*X*2 ≤ 20

X1 + 2*X*2 ≤ 10

 and *X*1, *X*2 ≥0