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| **SESSION** | **MARCH 2023** |
| **PROGRAM** | **MASTER of business administration (MBA)** |
| **SEMESTER** | **II** |
| **course CODE & NAME** | **DMBA205 – OPERATIONS RESEARCH** |
| **CREDITS** | **4** |
| **nUMBER OF ASSIGNMENTS & Marks** | **02**  **30 Marks each** |

**Assignment Set – 1**

**1. What is Operations Research? Discuss the importance of O.R. in decision making process.**

**Ans 1.**

**Operations Research**

Operations Research (O.R.), also known as Operational Research, is a discipline that uses advanced analytical methods to help make better decisions. O.R. applies mathematics, statistics, and other quantitative techniques to solve complex problems and improve operational efficiency.

Churchman, Aackoff, and Aruoff defined operations research as “the application of scientific

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**2. Use Two-Phase Simplex Method to solve the following linear programming problem:**

**Maximize Z = 5x1+8x2**

**Subject to: 3x1 + 2x2 ≥3**

**x1 + 4x2 ≥4**

**x1 + x2≤5**

**wherex1, x2 ≥ 0**

**Ans 2.**

Problem involves inequalities of "greater than or equal to" in the constraints, which doesn't directly conform to the usual setup where the constraints are in the form of "less than or equal to". To rectify this, we need to rewrite these inequalities by multiplying them by -1, effectively transforming them into "less than or equal to" constraints. We also have to

**3. Find the optimum solution of the following Transportation problem using MODI method:**

**Destination**

**Supply D1 D2 D3 D4 Supply**

**S1 21 16 25 13 11**

**S2 17 18 14 23 13**

**S3 32 27 18 41 19**

**Demand 6 10 12 15**

**Ans 3.**

In order to find the optimal solution using the MODI (Modified Distribution) Method, we first need to find an initial feasible solution using either the North-West Corner Method, Minimum Cost Method, or Vogel's Approximation Method.

The MODI method can then be used to check for optimality and improve the initial feasible solution if necessary. Please note that MODI method only works if you already have a

**Assignment Set – 2**

**4.a) What is Simulation? Write the advantages of Simulation.**

**Ans 4(a)**

**Simulation**

Using simulation, an analyst can introduce the constants and variables related to the problem, set up the possible courses of action and establish criteria which act as measures of effectiveness. The major reasons for applying simulation technique to OR problems may be listed as below:

1. It is an appropriate tool to use in solving a problem when experimenting on the real

**4b) Write any five difference between CPM and PERT?**

**Ans 4(b)**

**Difference between CPM and PERT**

There are no essential differences between PERT and CPM as both of them share in common the determination of a critical path. Both are based on the network representation of activities and their scheduling, which determines the most critical activities to be controlled in order to meet the completion date of the project.

**5. The following table gives the activities in a construction project and other relevant information:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity (y)** | **Optimistic**  **Time (in days)** | **Most likely**  **Time(in days)** | **Pessimistic**  **Time (in days)** |
| **1-2** | **30** | **44** | **54** |
| **1-3** | **8** | **12** | **16** |
| **2-3** | **1** | **2** | **3** |
| **2-4** | **2** | **3** | **5** |
| **3-4** | **8** | **10** | **12** |
| **4-5** | **14** | **22** | **25** |

**i) Draw a PERT diagram and mark clearly the Critical Path.**

**ii) Determine the expected project length?**

**iii) What is the probability that the project would be successfully completed in less than 60 days? 4+2+4 10**

**Ans:**

**6. What is two-person zero sum game? Reduce the following game by dominance property and solve it:**

**Player B**

**Player A B1 B2 B3 B4 B5**

**1 3 2 7 4**

**3 4 1 5 6**

**6 5 7 6 5**

**2 0 6 3 1**

**Ans:**

A two-person zero-sum game is a type of game in which one player's gain is the other player's loss. In other words, the sum of the payoffs for each player is zero in every outcome. These types of games are very prevalent in economic theory and game theory.

Reducing a game by dominance means eliminating strategies that are always worse than some other strategy