**Code No.MB203C**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**M.B.A II-Semester (Regular) Examination, september-2023**

**Subject: OPERATIONS RESEARCH**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.(05X2M=10M)**

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| --- | --- | --- | --- | --- |
| Q.No | Questions | Marks | CO | BTL |
| 1 a | Limitations of Operations Research | 2 | I | BL3 |
| b | Relationship between Primal and Dual Problem | 2 | II | BL2 |
| c | What is meant by balanced and unbalanced transportation problems? | 2 | III | BL1 |
| d | Steps in the CPM process | 2 | IV | BL3 |
| e | Elements of the queuing system | 2 | V | BL3 |

**PART-B**

**Answer Any Five questions**.**(5X10M=50M)**

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2** | **a** | A company manufactures two products A and B. The resources are the capacities Machine-1, Machine-2, and Machine-3. The available capacities are 50,25,and 15 hours respectively. Product A requires 1 hour of Machine-2 and 1 hour of Machine-3. Product B requires 2 hours of Machine-1, 2 hours of Machine-2 and 1 hour of Machine-3. The profit contribution of products A and B are Rs 5 and Rs 4 respectively. Formulate the linear programming model | **10** | **I** | **BL5** |
| **b** | **Solve the given linear programming problems graphically:**  **Minimize: Z = 20x + 10y**  **and the constraints are:**  **x + 2y ≤ 40,**  **3x + y ≥ 30,**  **4x + 3y ≥ 60,**  **x ≥ 0, y ≥ 0** |  | **I** | **BL6** |
| **3** | **a** | Find solution using Simplex method MAX Z = 3x1 + 9x2 subject to x1 + 4x2 <= 8 x1 + 2x2 <= 4 and x1,x2 >= 0 | **10** | **II** | **BL6** |
| **b** | Find solution using Two-Phase method MIN Z = 5x1 + 2x2 + 10x3 subject to x1 - x3 <= 10 x2 + x3 >= 10 and x1,x2,x3 >= 0 |  | **II** | **BL6** |
| **4** | **a** | Solve the given transportation problem using Vogel’s approximation method.  Vogel's approximation method | **10** | **III** | **BL5** |
| **b** | **Explain Hungarian Method Steps** |  | **III** | **BL3** |
| **5** | **a** | Find out the completion time and the critical activities for the following project: | **10** | **IV** | **BL6** |
| **b** | **Critical path, Total float, Free float, Independent float**   |  |  |  | | --- | --- | --- | | **A** | **-** | **2** | | **B** | **-** | **4** | | **C** | **-** | **3** | | **D** | **A** | **1** | | **E** | **B** | **6** | | **F** | **C** | **5** | | **G** | **D,E** | **7** | | **H** | **F,G** | **2** | |  | **IV** | **BL6** |
| **6** | **a** | **Find Solution of game theory**   |  |  |  | | --- | --- | --- | | Player A\Player B | B1 | B2 | | A1 | 1 | 3 | | A2 | 5 | 2 | | **10** | **V** | **BL5** |
| **b** | **Give a general structure of queuing system** |  | **V** | **BL5** |
| **7** | **a** | **Scope and Application of Operations Research** | **10** | **I** | **BL4** |
| **b** | **Find solution using Simplex(BigM) method MAX Z = 3x1 + 5x2 subject to x1 - 2x2 <= 6 x1 <= 10 x2 >= 1 and x1,x2 >= 0** |  | **II** | **BL5** |
| **8** | **a** | Vogel’s Approximation Method Vogel’s Approximation Method Steps | **10** | **III** |  |
| **b** | Difference Between PERT and CPM |  | **IV** |  |
| **9** | **a** | **What is Simulation? Scope of Simulation Techniques** | **10** | **V** |  |
| **b** | **Find solution using Simplex method MAX Z = 22x1 + 6x2 + 2x3 subject to 10x1 + 2x2 + x3 <= 100 7x1 + 3x2 + 2x3 <= 72 2x1 + 4x2 + x3 <= 80 and x1,x2,x3 >= 0** |  | **II** |  |

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