**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 methodMAX Z = 3x1 + 9x2subject tox1 + 4x2 <= 8x1 + 2x2 <= 4and x1,x2 >= 0 | **10** | **II** | **BL6** |
| **b** | Find solution using Two-Phase methodMIN Z = 5x1 + 2x2 + 10x3subject tox1 - x3 <= 10x2 + x3 >= 10and 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**

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| --- | --- | --- |
| **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) methodMAX Z = 3x1 + 5x2subject tox1 - 2x2 <= 6x1 <= 10x2 >= 1and 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 methodMAX Z = 22x1 + 6x2 + 2x3subject to10x1 + 2x2 + x3 <= 1007x1 + 3x2 + 2x3 <= 722x1 + 4x2 + x3 <= 80and x1,x2,x3 >= 0** |  | **II** |  |

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