Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17MA2023** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BASICS OF OPERATIONS RESEARCH** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q. No. | Sub Div. | Questions | **Course**  **Outcome** | **Marks** |
| 1. | a. | Using Graphical method Solve  Max Z= 4x+5y  Subject to x+y ≤ 10 : 2x+5y ≥ 35 x,y≥ 0 | CO1 | 10 |
|  | b | Using Graphical method Solve  Min Z= 3x+2y  Subject to -2x+3y ≥ 9 : 3x - 2y ≤ -20 x,y≥ 0 | CO1 | 10 |
| **(OR)** | | | | |
| 2. |  | Using Simplex method solve  Max Z= 3x+5y  Subject to x≤40 : y ≤30: x+y ≤60 x,y≥ 0 | CO2 | 20 |
|  |  |  |  |  |
| 3. | a. | Find the optimal solution of the TP whose cost-matrix is given below:   |  |  |  | | --- | --- | --- | |  | Ware-houses | Capacity | | W1 W2 W3 W4 | | F1  Factory: F2  F3 | 2 3 4 7  1 0 6 1  5 8 15 2 | 6  1  10 | | Requirement | 7 5 3 2 |  | | CO3 | 20 |
| **(OR)** | | | | |
| 4. | a. | Using North west Corner rule, Least cost method and Vogel’s approximation method find the initial basic feasible solution for the following transportation problem   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 1 | 0 | 2 | 3 | 15 | | 2 | 5 | 1 | 2 | 12 | | 0 | 2 | 6 | 4 | 13 | | 0 | 2 | 1 | 1 | 18 | | 20 | 8 | 15 | 15 |  | | CO3 | 20 |
|  |  |  |  |  |
| 5. | a. | Solve the following assignment problem to find the minimum cost   |  | | --- | | 10 5 9 18 11  13 19 6 12 14  3 2 4 4 5  18 9 12 17 15  11 6 14 19 10 | | CO4 | 20 |
| **(OR)** | | | | |
| 6. | a. | Find the Optimum Travelling salesman distance, city A,B,C,D,E and F in order   |  | | --- | | ∞ 5 12 6 4 3  6 ∞ 10 5 4 3  8 7 ∞ 6 3 11  5 4 11 ∞ 5 8  5 2 7 8 ∞ 4  6 3 11 5 4 ∞ | | CO4 | 20 |
|  |  |  |  |  |
| 7. | a. | Solve the game whose pay off matrix is as follows (Player A Vs Player B)   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | B1 | B2 | B3 | B4 | | A1 | 7 | 5 | 2 | 3 | | A2 | 6 | 6 | 4 | 5 | | A3 | 6 | 8 | 5 | 6 | | A4 | 8 | 3 | 3 | 2 | | CO5 | 10 |
|  | b. | Solve the game whose pay off matrix is as follows (Player A Vs Player B)   |  | | --- | | -1 2 -2  6 4 -6 | | CO5 | 10 |
| **(OR)** | | | | |
| 8. | a. | Using Graphical method solve the Game problem  Player B     |  | | --- | | -2 0 -8  -4 -5 -3 |   Player A | CO5 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | A person repairing radios finds that the time spent on the radio set has been exponential with mean 20 minutes. If the radios are repaired in the order in which they come in and the arrival which they come in and the arrival is approx Poisson with an average rate of 15 for 8 hours oer day. Calculate λ, μ , Ls, Lq,Ws ,Wq. | CO6 | 10 |
|  | b. | A self service stroe employs one cashier at its counter. 9 customers arrive on an average every 5 minutes while the cashier serves 10 customers in 5 minutes. Assume Poisson distribution of arrival and servie Calculate λ, μ , Ls, Lq,Ws ,Wq. | CO6 | 10 |