FACULTY OF ENGINEERING
BE 4/4(M/P/AE) I-Semester (Suppl.) Examination, May / June 2019
Subject: Operation Research

Time: 3 Hours   **Max. Marks: 75**

Note: Answer all questions from Part-A, & Any five question from Part-B

Part - A (2.5 x 10 = 25 Marks)
1. Briefly describe the scope of operations research
2. State the applications of LPP to industry
3. What is test for optimality in simplex method.
4. What is the condition of simplex to be solved by dual simplex method.
5. What is unbalanced assignment problem.
6. Define queue discipline.
7. What are the applications of game theory.
8. Classify replacement problems.
9. What are the assumptions of common queuing models.
10. Define sequencing and sequencing order.

Part- B (50 Marks)
11. Use Big-M method to solve following LPP   10
    Minimize $Z = 5x_1 + 3x_2$
    Subjected to constraints
    $2x_1 + 4x_2 \leq 12$
    $2x_1 + 2x_2 = 10$
    $5x_1 + 2x_2 \geq 10$, $x_1, x_2 \geq 0$

12. Use dual simplex method to solve the following LPP   10
    Maximize $Z = -3x_1 - x_2$
    Subjected to constraints
    $-x_1 - x_2 \leq -1$
    $-2x_1 - 3x_2 \leq -2$
    $x_1 , x_2 \geq 0$

13. a) How to solve an assignment problem if objective function is to be maximized.   3
    b) Consider the following unbalanced transportation problem and find the optimal
       solution.   7

<table>
<tr><td></td><td colspan="4">Stores</td></tr>
<tr><td></td><td>A</td><td>B</td><td>C</td><td>Supply</td></tr>
<tr><td>W</td><td>4</td><td>8</td><td>8</td><td>76</td></tr>
<tr><td>X</td><td>16</td><td>24</td><td>16</td><td>82</td></tr>
<tr><td>Y</td><td>8</td><td>16</td><td>24</td><td>77</td></tr>
<tr><td>Demand</td><td>72</td><td>102</td><td>41</td><td></td></tr>
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To (row label for the table)

14   a) Explain Two-person zero–sum game.   3
     b) Solve the Travelling sales men problem given in following table.   7

                                                                                  …2

To

	1	2	3	4	5
1	-	6	12	6	4
2	6	-	10	5	4
3	8	7	-	11	3
4	5	4	11	-	5
5	5	2	7	8	-

From

15. The data collected in running a machine, the cost of which is Rs 60,000 are given below. Determine optimum period for replacement of the machine.   10

Years	1	2	3	4	5
Resalevalue Rs.	42000	30000	20400	14400	9650
Running Cost, Rs.	18000	20270	22880	26700	31800

16. Determine total elapsed time for the following production problem.   10

Job	A	B	C	D	E	F
M/C 1	6	16	8	12	16	12
M/C 2	12	14	10	14	14	14
M/C 3	8	10	12	10	10	16

17. Write short notes on
    a) Genetic algorithm   5
    b) Sensitivity analysis   5

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