

Code No.: ME506PC

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**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**  
**III-B.TECH-I-Semester End Examinations (Regular) - January- 2024**  
**OPERATIONS RESEARCH**  
**(MECH)**

[Time: 3 Hours]

[Max. Marks: 70]

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks.

**PART-A**

**(20 Marks)**

1. a) What are key row and key column in simplex tableau? [2M]
- b) Discuss the Basic Solution and Unbounded Solution. [2M]
- c) What is meant by degeneracy in transportation problem? [2M]
- d) How the assignment problem can be viewed as a linear programming problem? [2M]
- e) Outline the three assumptions of job sequencing. [2M]
- f) What are the characteristics of game theory? [2M]
- g) Define a saddle point in a game. [2M]
- h) What is inventory management? outline the major decisions concerning inventory. [2M]
- i) Define the stage and state of a dynamic programming model. [2M]
- j) What do you understand by a queuing theory? [2M]

**PART-B**

**(50 Marks)**

2. Solve the following LPP by using simplex method. [10M]  
Maximize  $Z = 5x_1 + 3x_2$   
Subjected to  
 $3x_1 + 5x_2 \leq 15$   
 $5x_1 + 2x_2 \leq 10$   
and  $x_1, x_2 \geq 0$
- OR**
3. Discuss the various steps involved in a Big-M method to solve the linear programming problem. [10M]
4. Solve the following transportation problem by North West corner rule. [10M]

	F1	F2	F3	Supply
W1	2	7	4	5
W2	3	3	1	8
W3	5	4	7	7
W4	1	6	2	14
Dem and	7	9	18	

**OR**

5. What is the unbalanced Assignment problem? Explain the detailed procedure to solve the unbalanced Assignment problem. [10M]

6. Consider the following two machines and six jobs flow shop problem. [10M]  
Test for the optimal sequence and estimate the total elapsed time.

Job	1	2	3	4	5	6
Machine A	5	10	8	9	6	12
Machine B	7	8	13	7	11	10

**OR**

7. Discuss in brief, the replacement procedure for the items that deteriorate with time. [10M]
8. Explain the following. [10M]  
i. Pure strategy.  
ii. Saddle Point.

**OR**

9. Derive EOQ model with uniform demand and its assumptions. [10M]
10. What are the applications of dynamic programming? [10M]

**OR**

11. What is a Waiting line? Discuss some important applications of queuing theory. [10M]

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