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Code No.: ME506PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
III–B.TECH–I–Semester End Examinations (Supply) – December 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) Write 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? Write 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 Maximize $Z= 5x_1+3x_2$ Subjected to [10M]
   $3x_1+ 5x_2 \leq 15$
   $5x_1+2x_2 \leq 10$
   and $x_1, x_2 \geq 0$

OR

3. Discuss the various steps involved in a Big-M method to solve the linear programing problem. [10M]

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

OR

5. 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
Demand	7	9	18	

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

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, replacement procedure for the items that deteriorate with time. [10M]

8. Explain the following. [10M]
   i) Two -person zero sum game.
   ii) Pure strategy.
   iii) Saddle Point.

OR

9.a) Write the different types of basic deterministic inventory modal. [5M]
b) Derive EOQ model with uniform demand and its assumptions. [5M]

10. What are the applications of dynamic programming? [10M]

OR

11. State the Bellman's principle of optimality in dynamic programming and give a mathematical formulation of a dynamic programming problem? [10M]

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