Name: Enrolment No:	

UPES

End Semester Examination, December 2023

Course: Application of OR in Transportation **Semester: III**

Program: MBA AVM **Time: 03 hrs.**

Course Code: TRAV8021P **Max. Marks: 100**

Instructions: As per sections

SECTION A
10Qx2M=20Marks

S. No.	**Attempt all questions in this section**	**Marks**	**CO**
	Multiple choice questions:		
1	An optimal solution to an LP is a feasible solution that (a) Optimizes the objective function of the LP. (b) Is the only feasible solution to the LP. (c) Both (a) and (b). (d) None of the above.	**2**	**CO1**
2	A feasible solution to an LP is a solution that (a) Satisfies all of the constraints of the LP. (b) Optimizes the objective function of the LP. (c) Both (a) and (b). (d) None of the above.	**2**	**CO1**
3	An infeasible solution to an LP is a solution that (a) Does not satisfy all of the constraints of the LP. (b) Optimizes the objective function of the LP. (c) Both (a) and (b). (d) None of the above.	**2**	**CO1**
4	Which of the following benefits can airlines achieve by using operations research? (a) Reduced costs (b) Increased revenue (c) Improved operational efficiency (d) All of the above	**2**	**CO1**
5	Which of the following operations research techniques is used to solve the linear programming problem? (a) Simplex method (b) Branch and bound method (c) Dynamic programming (d) All of the above	**2**	**CO1**
6	Which of the following is NOT a typical application of operations research in aviation transport? (a) Crew scheduling	**2**	**CO1**

	(b) Fleet assignment (c) Revenue management (d) Aircraft maintenance scheduling		
7	Which of the following operations research techniques is used to solve the transportation problem? (a) Vogel's approximation method (b) North-West corner method (c) Hungarian method (d) All of the above	**2**	**CO1**
8	Which of the following benefits can companies achieve by using linear programming? A. Reduced costs B. Increased productivity C. Improved decision-making D. All of the above	**2**	**CO1**
9	Which of the following is NOT a typical application of linear programming? A. Production planning B. Inventory management C. Financial planning D. Marketing research	**2**	**CO1**
10	In Operations Research, what is the term for finding the best solution from a set of feasible solutions? a) Optimization b) Differentiation c) Integration d) Enumeration	**2**	**CO1**
SECTION B **4Qx5M= 20 Marks**			
	Attempt all questions in this section.		
11	Differentiate between Assignment problem and Transshipment problem.	**5**	**CO2**
12	A company uses 50,000 units of an item annually, each costing Rs. 1.20. Each order costs Rs. 45, and inventory carrying charges are 15 percent of the annual average inventory value. Find EOQ and Lead time	**5**	**CO2**
13	What do you understand by EOQ? Define various costs associated with the EOQ model.	**5**	**CO2**
14	Define the Canonical and Standard form in linear programming problems. **OR** Use the graphical method to solve the LPP given below. Max $z = 8x_1 + 5x_2$ $2x_1 + 2x_2 \leq 500$ $x_1 \leq 150$ $x_2 \leq 250$ $x_1, x_2 \geq 0$	**5**	**CO2**

SECTION-C
3Qx10M=30 Marks

	Attempt all questions in this section:		
15	How can operations research be used to optimize crew scheduling in aviation transportation? What are some of the challenges involved in solving this problem?	**10**	**CO3**
16	What are the various methods available for obtaining the initial basic feasible solution to transportation problems? Use the North-West Corner Rule to find the initial solution for the problem given below. **D 1** | **D 2** | **D 3** | **D 4** | **D 5** | **Supply** **S 1**: 3, 7, 6, 4, 5, 5 **S 2**: 2, 4, 3, 2, 2, 2 **S3**: 4, 3, 8, 5, 3, 3 **Demand**: 3, 3, 2, 2	**10**	**CO3**
17	Solve the game whose payoff matrix is given below. $\begin{bmatrix} -2 & 0 & 0 & 5 & 3 \\ 3 & 2 & 1 & 2 & 2 \\ -4 & -3 & 0 & -2 & 6 \\ 5 & 3 & -4 & 2 & -6 \end{bmatrix}$ **OR** What is game theory? Discuss its importance to business decisions.	**10**	**CO3**

SECTION-D
2Qx15M= 30 Marks

	Attempt all questions in this section:		
18	Discuss the role of operations research in aircraft maintenance routing. What are some of the key objectives that need to be considered when solving this problem? **OR** Solve the following LPP problem using the Simplex algorithm. Max $z = 3x_1 + 5x_2$ $x_1 \leq 4$ $2x_2 \leq 12$ $3x_1 + 2x_2 \leq 18$ $x_1, x_2 \geq 0$	**15**	**CO4**
19	Using the following cost matrix, determine (a) the optimal job assignment and (b) the cost of the assignments. **Jobs** Job 1 | Job 2 | Job 3 | Job 4 | Job 5 **Mechanics** A: 10, 3, 3, 2, 8 B: 9, 7, 8, 2, 7 C: 7, 5, 6, 2, 4 D: 3, 5, 8, 2, 4 E: 9, 10, 9, 6, 10	**15**	**CO4**