MANAV RACHNA vidyanatariksha

MANAV RACHNA UNIVERSITY
(FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED 'A' GRADE INSTITUTION)
Declared as State Private University under section 2f of the UGC act, 1956

DEPARTMENT OF MATHEMATICS

"T3 Examination, May 2017-18"

Semester:VI | **Date of Exam**: /05/2018.
Subject: Linear Programmimg & Game Theory | **Subject Code**: MAH 342-T
Branch: B.Sc(H) Maths | **Session**:
Course Type: Core | **Course Nature: Hard**
Time: 3 Hours | **Program: B.Sc**
Max.Marks: 80 | **Signature: HOD/Associate HOD:**

Note: Part A: All questions are compulsory. Each question is of 2 marks.
Part B: Attempt any 2 questions. Part C: Attempt any two questions.

PART A

Q1(a) How the problem of degeneracy arises in a transportation problem.

(b) What is an assignment problem?

(c) Can there be multiple optimal solutions to an assignment problem ? How would you identify the existence of multiple solutions, if any?

(d) What is Game Theory?

(e) Explain two-person zero-sum game by suitable example.

(f) Define the term 'strategy' and 'optimal strategy' with reference to Game Theory.

(g) Define saddle point.

(h) Explain the terms: Payoff matrix and rectangular game.

(i) How does travelling salesman problem differ from an assignment model?

(j) What are the common methods to obtain an initial basic feasible solution for a transportation problem.

PART B

Q2(a) Explain the difference between transportation problem and assignment problem . (5)

(b) Find the starting solution in the following transportation problem by 'North-West-Corner 'Rule Also obtain the optimum solution. (10)

	A	B	C	Available
O_1	2	7	4	5
O_2	3	3	1	8
O_3	5	4	7	7
O_4	1	6	2	14
Required	7	9	18	

Q3 (a) Using the following cost matrix, determine (10)

(i) Optimal job assignment

(ii) The cost of assignments

Mechanic/Job	1	2	3	4	5
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

(b) Give the mathematical formulation of an assignment problem. (5)

Q4 (a) Give the mathematical formulation of transportation problem. (5)

(b) A machine operator processes five types of items on his machine each week, and must choose a sequence for them. The set-up cost per change depends on the item presently on the machine and the set-up to be made according to the following table: (10)

From item/To item	A	B	C	D	E
A	-	4	7	3	4
B	4	-	6	3	4
C	7	6	-	7	5
D	3	3	7	-	7
E	4	4	5	7	-

If he processes each type of item once and only once each week, how should he sequence the items on his machine in order to minimize the total set-up cost ?

PART C

Q5. Solve (3x3)game by the simplex method of linear programming whose payoff matrix is given below

(15)

Player A/Player B	1	2	3
1	3	-1	-3
2	-3	3	-1
3	-4	-3	3

Q6 (a) The payoff matrix of a game is given. Find the solution of the game to the player A and B. (5)

Player A/Player B	1	2	3
1	-2	15	-2
2	-5	-6	-4
3	-5	20	-8

(b) In a game of matching coins with two players , suppose A wins one unit of value when there are two heads, wins nothing when there are two tails and loses half unit of value when there is one head and one tail. Determine the pay off matrix the best strategy for each player and the value of the game to A. (10)

Q7(a) Explain the Principal of dominance. (5)

(b) Two competitors A and B are competing for the same product. Their different strategies are given in the following payoff matrix: (10)

Company A/Company B	I	II	III	IV
I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	8

Use Dominance principle to find the optimal strategy.