

[18/A-8]

SEAT No. _____

No. of Printed Pages : 03

SARDAR PATEL UNIVERSITY
B.Sc. Semester – IV Examination
Monday, 15th April, 2019
US04ESTA01
(Operations Research – II)

Time: 10.00 to 12.00 p.m

M.Marks: 70

Note: (i) Graph paper will be provided on request (ii) Q.3 to 6 each sub question is of 5 marks.

Q.1 Multiple Choice Questions

(10 × 1)

- (1) An assumption of assignment problems is _____
(a) The number of assignees and the number of tasks are the same
(b) The objective is to minimize the number of assignments not made
(c) Each task is to be performed by more than one assignee
(d) None of these
- (2) While solving an assignment problem, an activity is assigned to a resource through a square with zero opportunity cost because the objective is to _____
(a) minimize total cost of assignment
(b) reduce the cost of assignment to zero
(c) reduce the cost of that particular assignment to zero
(d) None of these.
- (3) An assignment problem _____
(a) will always have an integer solution.
(b) has all supplies and demands equal to 0.
(c) always has the demand greater than the supply.
(d) None of these.
- (4) Games which involve more than two players are called _____
(a) conflicting games
(b) negotiable games
(c) n - person games.
(d) None of these
- (5) When the sum of gains of one player is equal to the sum of losses to another player in a game, the situation is known as _____
(a) biased game
(b) zero-sum game
(c) fair game
(d) None of these
- (6) Game models are classified by the _____
(a) number of players
(b) sum of all payoffs
(c) number of strategies
(d) all of the above.
- (7) The given game problem can be solved by _____.
- | Company A | I | II | III | IV |
|-----------|---|----|-----|----|
| I | 7 | 6 | 5 | 2 |
| II | 4 | 4 | 4 | 1 |
| III | 1 | 1 | 1 | 0 |
- (a) Graphical method
(b) Dominance property
(c) both (a) and (b)
(d) none of these
- (8) The Activity which can be delayed without affecting the execution of the immediate succeeding is determined by
(a) Total Float
(b) Free Float
(c) Independent float
(d) None of these
- (9) Float or slack analysis is useful for
(a) Projects behind the schedule only
(b) Projects ahead of the schedule only
(c) Both (a) and (b).
(d) None of these
- (10) The critical path satisfy the condition that
(a) $E_i = L_i$ and $E_j = L_j$
(b) $L_j - E_i = L_i - L_j$
(c) $L_j - E_i = L_i - E_j = c$
(d) None of these

Q.2 Short Type Questions (Attempt Any Ten)

(10 × 2)

- (1) How to obtain opportunity cost table?
- (2) What modification will you make in Hungarian method for solving assignment problem maximization case?
- (3) How will you develop new revised opportunity cost matrix?
- (4) Define (i) strictly determinable game, (ii) fair game.
- (5) What is the game in the game theory? What are the properties of a game?
- (6) What is the best strategy on the basis of minimax criterion of optimality?
- (7) State rules of network diagram.
- (8) Interpret: The strategy A_3 is dominated by A_5 .

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- (9) State the rules for Dominance Property.
 (10) Define the term: (i) Total float (ii) free float.
 (11) What is the objective of Critical path analysis?
 (12) What is a game without saddle point?

Q.3(a) Assignment for A firm wants to purchase three different types of machines and five manufacturers come forward with the following price offers (in Lacs). The firm's policy is not to purchase more than one machine from any manufacturer. Determine how best the company can purchase three machines.

		Machines		
Manufacturers	W	X	Y	
A	2.99	3.11	2.68	
B	2.78	2.87	2.57	
C	2.92	3.05	2.80	
D	2.82	3.10	2.74	
E	3.11	2.90	2.64	

(b) Solve the following assignment problem and interpret your results.

		Machines			
Jobs	A	B	C	D	
1	18	24	28	32	
2	8	13	17	19	
3	10	15	19	22	

OR

Q.3(a) Write the steps for solving Assignment Problem.

(b) A project work consists of four major jobs for which an equal number of contractors have submitted tenders. The tender amount quoted (in lakh rupees) is given in the matrix.

		Job			
Contractor	A	B	C	D	
1	10	24	30	15	
2	16	22	28	12	
3	12	20	32	10	
4	9	26	34	16	

Find the assignment which minimizes the total cost of the project, when each contractor has to be assigned at least one job.

Q.4(a) Two players A and B without showing each other, put on a table a coin, with head or tail up. A wins Rs. 8 when both the coins show head and Rs. 1 when both are tails. B wins Rs. 3 when the coins do not match. Given the choice of being matching player (A) or non-matching player (B), which one would you choose and what would be your strategy?

(b) Player A can choose his strategies from { A1,A2,A3} only, while B can choose from the set { B1,B2 } only. The rules of the game state that the payments should be made in accordance with the selection of strategies:

Strategy Pair selected	Payments to be made	Strategy Pair selected	Payments to be made
(A1,B1)	Player A pays Rs. 1 to player B	(A2,B2)	Player B pays Rs. 4 to player A
(A1,B2)	Player B pays Rs. 6 to player A	(A3,B1)	Player A pays Rs. 2 to player B
(A2,B1)	Player B pays Rs. 2 to player A	(A3,B2)	Player A pays Rs. 1 to player B

OR

Q.4(a) Describe maximin-minimax method of solving a two person zero sum game.

(b) For the following payoff matrix for firm A, determine the optimal strategies for both firms and the value of the game.

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(i)

		Firm B		
Firm A	-3	-2	-3	
	2	0	2	
	5	-2	-4	

(ii)

		Firm B		
Firm A	15	2	3	
	6	5	7	
	-7	4	0	

Q.5(a) Explain the graphical method of solving $2 \times n$ and $m \times 2$ games.

(b) Explain the theory of dominance in the solution of rectangular games.

OR

Q.5(a) Use the relation of dominance to solve the rectangular game whose pay off matrix to A is given below:

Player B

Player A	I	II	III	IV	V	VI
I	0	0	0	0	0	0
II	4	2	0	2	1	1
III	4	3	1	3	2	2
IV	4	3	7	-5	1	2
V	4	3	4	-1	2	2
VI	4	3	3	-2	2	2

(b) Solve the following (2 X 4) game.

Player B

Player	I	II	III	IV
I	2	2	3	-1
II	4	3	2	6

Q.6 Draw the Network Diagram for the following activities and find the critical path. Calculate Total float available.

Job	A	B	C	D	E	F	G	H
Job time(days)	23	8	20	16	24	18	19	4
Immediate predecessors	B, C	D	E	G	F	G	H	-

OR

Q.6 A project has the following time Schedule. Construct a PERT network and compute.

1. Critical Path and Its duration. 2. Calculate Total float available.

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-7	5-8	6-8	7-9	8-9	9-10
Time in Weeks	2	2	2	4	5	8	4	3	4	5	3	4

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