SC-1

[12]

SARDAR PATEL UNIVERSITY
B.Sc. Semester – IV Examinations
18th April, 2016
Monday
Course Code: - US04ESTA01
(Operation Resaerch) - II

Time:-10:30 to 012:30   Marks: - 70

Note: - Simple/ Scientific calculator is allowed.

Q.1.   Select an appropriate answer for the given choice.   [10]

1.   If an assignment problem consists of 6 workers and 7 projects,
      a) one worker will   b) one worker will   c) each worker   d) one project will
      not get a project   be assigned two   will contribute   not get a worker
      assignment   projects   work toward the   assigned.
                                                  seventh project

2.   An optimal assignment requires that the maximum number of lines that can be
      drawn through squares with zero opportunity cost be equal to the number of
      a) rows or   b) rows and   c) rows +columns-   d) none of these.
      columns   columns   1

3.   An assignment problem:
      a) will always   b) has all supplies   c) always has the   d) none of these.
      have an integer   and demands   demand greater
      solution.   equal to 0.   than the supply.

4.   A game is said to be fair, if
      a)both upper and   b)upper and   c)upper value is   d)none of these.
      lower values of   lower values of   more than lower
      the game are   the game are not   of the game.
      same and zero.   equal.

5.   The payoff value for which each player in a game always selects the same strategy
      is called the
      a)saddle point   b)equilibrium   c) both (a) and (b)   d)none of these.
                            point

6.   Games which involve more than two players are called
      a)conflicting   b)negotiable   c)n-person games.   d)none of these.
      games   games

7.   The size of the payoff matrix is reduced by using the principle of _____.
      a) Game inversion   b) Dominance   c) rotation   d)none of these.
                            property   reduction.

8.   In the graphical method for solving $2 \times n$ game, the highest point on this lowest
      boundary gives the _____Point.
      a) minimum   b) minimax   c) maximin   d)none of these.

9.   Network models have advantage in terms of project
      a) Planning.   b) Scheduling.   c) Controlling.   d) All of these

10.   The slack for an activity is equal to

a) LF-LS.   b) EF-ES.   c) LS-ES.   d) None of these

Q.2.   Attempt any **Ten** questions from the following questions:-   [20]
  1.   What is an assignment problem? Give two applications.
  2.   How do you make assignments in the opportunity cost matrix?
  3.   How do you revise opportunity matrix in an assignment problem?
  4.   What are the characteristics of Game theory?
  5.   Define saddle point. State the rules for detecting a saddle point.
  6.   What is a Game?
  7.   What is the principle of Dominance?
  8.   What are Inferior and Superior strategies?
  9.   Solve the following 2x2 game without saddle points and obtain optimal strategies,value of game:

$$\begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix}$$

  10.   Define terms: Total float, Free float, Independent float.
  11.   State Rules for Network Diagram.
  12.   What is Critical Path Method?

Q.3.(a) State and discuss the methods for solving an Assignment problem.   [05]
  (b)   A project work consists of four major jobs for which an equal number of   [05]
         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.

OR

Q.3.(a) A departmental head has four subordinates, and four tasks to be performed. The   [05]
         subordinates differ in efficiency, and the tasks differ in their instrincts difficulty.
         His estimate, of the time each man would take to perform each task, is given in the
         matrix below:

Man-hours

Tasks	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

         How should the tasks be allocated, one to a man, so as to minimize the total man-
         hours?

  (b)   Allot five lathes to five operators (one for each) so as to maximise total expected   [05]
         profit per week if the profit per piece is Rs. 25.

Operators	1	2	3	4	5
P	20	22	27	32	36
Q	19	23	29	34	40
R	23	28	35	39	34
S	21	24	31	37	42
T	24	28	31	36	41

Weekly output in Lathe

Q.4.(a) a) What is strictly determined game? [04]
b) Explain about the pure and mixed strategy involved in Game.

(b) Player A can choose his strategies from {A1,A2,A3}only, while B can choose from [06] 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 Bpays Rs. 4 to playerA
(A1,B2)	Player Bpays Rs. 6 to player A	(A3,B1)	Player A pays Rs. 2 to player B
(A2,B1)	Player B pays Rs. 2 to playerA	(A3,B2)	Player A pays Rs. 1 to player B

Obtain the optimal strategies for the both the players.

OR

Q.4.(a) (1)For the following payoff matrix for firm A, determine the optimal strategies for [04] both firms and the value of the game.

Firm B

Firm A	-3	-2	6
	2	0	2
	5	-2	-4

(2)For the range of values of 'p and q' which will render the entry (2,2) a saddle point for the game.

B

A	B1	B2	B3
A1	2	4	5
A2	10	7	q
A3	4	p	6

(b) Two players A and B without showing each other, put on a table a coin, with head [6] 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?

Q.5.(a) Use the relation of dominance to solve the rectangular game whose payoff matrix [05] 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

Obtain the optimal strategy and the value of game for the both the player.

(b) Solve the following (2 X 4) game. [05]

Player   B

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

Obtain the optimal strategy and the value of game for the both the player.

OR

Q.5.(a) Explain about the Dominance property. [05]

(b) Write the steps for solving (n X 2) game graphically. [05]

Q.6. An estabilished company has decided to add a new product to its line. It will buy [10] the product from a manufacturing concern, package it, and sell it to a number of distributors selected on a geographical basis. Market research has indicated the volume expected and the size of sales force required. The steps shown in the following table are to be planned.

Activity	Predecessors	Duration (days)
A	----	6
B	A	4
C	B	7
D	A	2
E	D	4
F	E	10
G	---	2
H	G	10
I	J,H	6
J	---	13
K	A	9
L	C,K	3
M	I,L	5

Draw an arrow diagram for this project. Indicate the critical path. For each non-critical activity, find the total and free float.

OR

Q.6. A project has the following time Schedule. Construct a PERT network and compute [10] Critical Path and its duration. Calculate Total float available.

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

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