

[21]

SARDAR PATEL UNIVERSITY
 B.Sc. (SEMESTER – IV) EXAMINATION-2018
 April 17, 2018, Tuesday
 Time: 10.00 a.m. to 01.00 p.m.
 Operation Research-II (US04EMTH06)

Total Marks: 70

Q.1 Choose the correct option in the following questions, mention the correct option in the answerbook. [10]

- (1) Number of basic allocation in any row or column in Assignment Problem can be.....
 (a) Exactly one (b) at most one (c) at least one (d) none of these
- (2) The transportation technique or simplex method cannot be used to solve the assignment problem because of
 (a) degeneracy (b) non-degeneracy (c) square matrix (d) none of these
- (3) An assignment problem is considered as a particular case of a Transportation problem because
 (a) the number of rows equals columns (b) all $x_{ij} = 0$
 (c) all rim conditions are 1 (d) all of above
- (4) If player B plays strategy B_4 with probability 1, then he plays the game withstrategy.
 (a) pure (b) mixed (c) minimal (d) none of these
- (5) The saddle point in the game is $a_{32} = 3$ then the value of the game is.....
 (a) 0 (b) 1 (c) 2 (d) 3

- (6) The value of the game
- | | | |
|----|----|----|
| | B1 | B2 |
| A1 | 3 | -2 |
| A2 | 5 | 12 |
- (a) 3 (b) -2 (c) 5 (d) 12

- (7) In sequencing if smallest time for a job belongs to machine-II then that job has to placed..... of the sequence.
 (a) in the middle (b) at the beginning (c) at the end (d) none of these
- (8) Processing time M_{ij} 's areof order of processing the jobs.
 (a) dependent (b) negligible (c) independent (d) none of these
- (9)is indicated by dotted arrow.
 (a) burst event (b) merge event (c) dummy activity (d) none of these
- (10) *Dangling* is a type of.....in network scheduling.
 (a) event (b) activity (c) error (d) none of these

Q.2 Attempt any Ten:

[20]

- (1) Give the mathematical formulation for assignment problem.
- (2) What is an unbalanced assignment problem? How to resolve it?

- (3) Solve the assignment problem:
- | | | | |
|---|----|----|-----|
| | I | II | III |
| A | 16 | 19 | 21 |
| B | 17 | 14 | 18 |
| C | 16 | 23 | 11 |

- (4) Explain the method to obtain saddle point of a game if it exists.

- (5) Find the range of values of p which will render the entry (2,1) a saddle point for the following

game:

	Player B	
	B_1	B_2
Player A	A_1	p
	A_2	11

C.P.T.O.)

(6) Find optimum strategy and value of the game for

		Player B	
		B ₁	B ₂
Player A	A ₁	12	19
	A ₂	11	9

(7) Define: (i) Total Elapsed time (ii) Idle time on a Machine.

(8) Explain the principal assumptions made while dealing with sequencing problems.

(9) Give the optimum job sequence for the following sequencing problem

No. of Jobs	1	2	3	4	5	6	7
Machine M ₁	3	6	1	7	9	15	6
Machine M ₂	9	13	16	5	4	8	12

(10) What is dummy activity in network diagram?

(11) Define Predecessor Activity and Concurrent Activity with figure.

(i2) Explain types of common errors in drawing networks.

Q.3

(a) Write the steps for solving an assignment problem by Hungarian method. [05]

(b) Solve the following assignment problem: [05]

	I	II	III	IV	V
1	11	10	18	5	9
2	14	13	12	19	6
3	5	3	4	2	4
4	15	18	17	9	12
5	10	11	19	6	14

OR

Q.3

(c) Solve the following assignment problem: [05]

	A	B	C	D	E
I	10	6	4	8	3
II	2	11	7	7	6
III	5	10	11	4	8
IV	6	5	3	2	5
V	11	7	10	11	7

(d) Find the Maximum assignment profit in the following A.P.: [05]

	a	b	c	d	e	f
A	13	22	16	23	19	21
B	21	19	26	16	27	31
C	22	31	24	29	16	10
D	37	25	29	34	23	17
E	29	23	32	28	26	29
F	33	33	26	23	27	19

Q.4

(a) Explain the dominance rules for game theory. [05]

(b) Solve the following game using graphical method [05]

		Player B			
		I	II	III	IV
Player A	I	1	3	3	4
	II	4	5	2	6

OR

Q.4

(d) Solve the following game using the principle of dominance: [05]

		Player B				
		B ₁	B ₂	B ₃	B ₄	B ₅
Player A	A ₁	9	3	1	8	0
	A ₂	6	5	4	6	7
	A ₃	2	4	3	3	8
	A ₄	5	6	2	2	1

(d) Determine the optimum strategies for each player and also obtain the value of the following game: [05]

		Player B			
		B ₁	B ₂	B ₃	B ₄
Player A	A ₁	8	6	2	8
	A ₂	8	9	4	5
	A ₃	7	5	3	5

Q.5

(a) Find the sequence that minimizes the total elapsed time required to complete the following tasks: [05]

No. of Jobs	1	2	3	4	5	6	7
Machine M ₁	3	12	15	6	10	11	9
Machine M ₂	8	10	10	6	12	1	3

(b) Find the sequence by Johnson's method that minimizes the total elapsed time and idle time for machine A and machine B required to complete the following jobs: [05]

Job	1	2	3	4	5	6
Machine I	5	9	4	7	8	6
Machine II	7	4	8	3	9	5

OR

Q.5

(c) Give Johnson's algorithm for determining the optimal sequence for processing n jobs through two machines. [04]

(d) Find the sequence by Johnson's method that minimizes the total elapsed time and idle time for machine A and machine B required to complete the following jobs: [06]

Tasks	A	B	C	D	E	F	G
Time on machine I	3	8	7	4	9	8	7
Time on machine II	4	3	2	5	1	4	3
Time on machine III	6	7	5	11	5	6	12

Q.6 A project has the following time schedule:

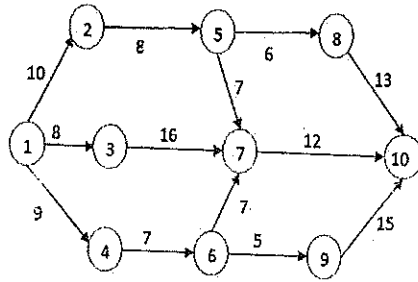
[10]

Activity	Time (month)	Activity	Time In month	Activity	Time In month
1-2	2	3-6	8	6-9	5
1-3	2	3-7	5	7-8	4
1-4	1	4-6	3	7-9	3
2-5	4	5-8	1		

Construct PERT network and compute total float for each activity and Find Critical path with its duration.

OR

Q.6 For the following network diagram obtain the critical path, total float, independent float and free float [10]



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