

(03)

Sardar Patel University
BCA (V SEM.)(CBCS)Examination
2013
Wednesday, 13th November
Time: 10.30 a.m. to 1.30 p.m.
US05FBCA01: Operation Research

03

Total marks: 70

- Q1** Choose the correct alternative from the following: [10]
- 1 Operation Research was originated in _____.
(a) World war – I (b) World war – II (c) kargil war (d) none
 - 2 In graphical method the restriction on number of variables is _____.
(a) more then 3 (b) 3 (c) 2 (d) none
 - 3 In the simplex method the variables leaves the basis if the ratio is _____.
(a) maximum (b) minimum (c) 0 (d) none
 - 4 If all the constraint inequalities are of " \leq " type, _____ method is used to solve the lpp.
(a) Simplex method (b) MODI method (c) Hungarian method (d) none
 - 5 Transportation problem is a particular case of _____.
(a) lpp (b) assignment problem (c) network analysis (d) none
 - 6 The _____ variable is added to the constraint of less than equal to type.
(a) surplus (b) slack (c) artificial (d) none
 - 7 From the following methods _____ is a method to obtain initial solution to the given TP.
(a) simplex (b) Hungarian (c) North-west corner (d) none
 - 8 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
 - 9 In sequencing if smallest time for a job belongs to machine – 1 then that job has to place _____ of the sequence.
(a) in the middle (b) at the end (c) in the starting (d) none
 - 10 Burst and merge are types of _____ in networking.
(a) activity (b) event (c) arrows (d) none

- Q2** Attempt any ten from the following: [20]
- 1 Define operation research.
 - 2 Define: (a) solution, (b) unbounded solution.
 - 3 Define lpp in the mathematical form.
 - 4 Define: (a) slack variable, (b) surplus variable.
 - 5 When is Big- M method useful?
 - 6 What are the conditions for entering variable in the simplex table?
 - 7 What is transportation problem?
 - 8 What do you mean by balanced transportation problem?
 - 9 What is travelling salesman problem?
 - 10 State Bellman's principle of optimality in dynamic programming.
 - 11 Write down any two assumptions used for solving sequencing problem.
 - 12 Define: (a) dummy activity, (b) total float.

- Q3 A Give the limitations of linear programming problem. [05]
 B A firm manufactures two types of products A and B and sells them at a profit of Rs. 200 on type A and Rs. 300 on the type B. Each product is processed on two machines G and H. Type A requires 1 minutes of processing time on G and 2 minutes on H; type B requires 1 minutes on G and 1 minutes on H. The machine G is available for not more than 6 hours, while machine H is available for 10 hours during any working day. Formulate this as a lpp. [05]

OR

- Q3 A Discuss scopes of OR in brief. [05]
 B Solve the following lpp by graphical method: [05]
 Max $Z = 2x + 5y$
 Subject to,
 $x \leq 4$
 $y \leq 3$
 $x + 2y \leq 8$
 $x, y \geq 0$

- Q4 A Write the algorithm of simplex method. [04]
 B Solve the following lpp by simplex method: [06]
 Max $Z = 40x + 35y$
 Subject to
 $2x + 3y \leq 60$
 $4x + 3y \leq 96$
 $x, y \geq 0$

OR

- Q4 A Write the algorithm of Big - M method. [04]
 B Solve the following by Big - M method: [06]
 Min $Z = 60x + 80y$
 subject to
 $20x + 30y \geq 900$
 $40x + 30y \geq 1200$
 $x, y \geq 0$

- Q5 A Give the algorithm of North-west corner method to obtain the initial basic feasible solution to the transportation problem. [04]
 B Obtain the initial basic feasible solution by lowest cost entry method and hence find the optimal solution of the following TP. [06]

sources	destinations				supply
	D1	D2	D3	D4	
S1	1	2	1	4	30
S2	3	3	2	1	50
S3	4	2	5	9	20
demand	20	40	30	10	

OR

Q5 A Discuss the assignment problem and give its mathematical form. [04]

B Solve the following assignment problem: [06]

Jobs → workers ↓	A	B	C	D
W1	45	40	51	67
W2	55	40	61	53
W3	49	52	48	64
W4	41	45	60	55

Q6 A For the following: [10]

Find the job sequence, total elapsed time and idle time for both machines M1 and M2.

Machines	Processing Time For Jobs				
	A	B	C	D	E
M1	4	13	7	12	6
M2	3	15	5	6	11

OR

Q6 A Draw the network diagram for the following: [10]

activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	8-9
Time(months)	2	2	1	4	8	5	3	1	5	4	3

And determine:

- (a) the critical path,
- (b) earliest start and earliest finish time
- (c) latest start and finish time
- (d) total floats, free float

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