DHANALAKSHMI SRINIVASAN COLLEGE OF ARTS & SCIENCE FOR WOMEN (AUTONOMOUS)

(For Candidates admitted from 2020-2021 onwards)

PG DEGREE EXAMINATIONS -APRIL 2021

M.B.A- BUSINESS ADMINISTRATION

OPERATION RESEARCH

Time: 3 Hrs

Max.Marks: 75

PART - A

CHOOSE THE CORRECT ANSWER (10X1=10)

1. The objective function, the set of constraints and the non negative constraints together form a _____.

    (a) LPP   (b) TP   (c) Game theory   (d) AP

2. A pivot element is also called

    (a) common element   (b) variable   (c) key element   (d) element

3. $\sum a_i \neq \sum b_j$ this problem is called

    (a) balanced TP   (b) unbalanced TP   (c) balanced AP   (d) unbalanced AP

4. Assignment problem is a special case of

    (a) simplex problem   (b) Sequencing problem

    (c) Transportation problem   (d) Game theory

5. _____ represents the starting and ending of an activity.

    (a) Branch   (b) Network   (c) Event   (d) Node

6. PERT means

    (a) Project Evaluation and Review Technique   (b) Problem evolution and Review Techniqu

    (c) Programme evolution and Review Technique   (d) None of these

7. In purchase problem without shortages, the number of orders per year is equal to

    (a) Q/D   (b) D/Q   (c) Q   (d) Q/2

8. If the availability of information for a decision environment is partial, the decision taken under such environment is called as

    (a) Decision under certainty   (b) Decision under uncertainty

    (c) Decision under risk   (d) minimum criterion

9. If the game has a saddle point, then the value of the cell at the saddle point is called

    (a) value of the game   (b) pure strategy

    (c) mixed strategy   (d) two person zero sum game

10. In a game with two players, if the gain of one player is equal to the loss of another player, then the game is called

    (a) value of the game   (b)pure strategy   (c) mixed strategy   (d) two person zero sum game

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ANSWER ALL THE QUESTIONS

11. (a). Explain unbounded solution, infeasible solution and degenerate solution.

(OR)

(b). Describe the application of operation research in public system.

12. (a). Obtain the initial basic feasible solution for the following TP using VAM

Destination

		1	2	3	4	Supply
	1	3	1	7	4	300
Source	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	1200

(OR)

(b). Solve the following assignment problem

Operator

		1	2	3	4	5
	1	10	12	15	12	8
	2	7	16	14	14	11
Job	3	13	14	7	9	9
	4	12	10	11	13	10
	5	8	13	15	11	15

13. (a). Find the critical path and project completion time for the following project:

Activity	Immediate Predecessor	Duration(Weeks)
A	–	4
B	–	3
C	–	2
D	A, B, C	5
E	A, B, C	6
F	D	7
G	D, E	6
H	D. E	9
I	F	4
J	G	6
K	H	8

(OR)

(b). Write the rules for network construction.

14. (a). Alpha industry needs 15,000 units per year of a bought–out component which will be used in its main product. The ordering cost is Rs. 125 per order and the carrying cost per unit per year is 20 % of

the purchase price per unit. The purchase price per unit is Rs. 75. Find the economic order quantity, number of orders per year and time between successive orders.

(OR)

(b). Consider the details of two competing alternatives as shown in the following table. The initial outlay of each of the alternatives is Rs. 10,00,000. The life of each alternative is 10 years. Find the best alternative, when the interest rate is 0%.

Annual revenue of alternatives			
Alternative 1		Alternative 2	
Annual revenue(Rs.)	Probability	Annual revenue(Rs.)	Probability
3,00,000	0.3	4,00,000	0.1
4,00,000	0.4	5,00,000	0.5
5,00,000	0.3	6,00,000	0.4

15. (a). Solve the following game optimally.

Player B

		1	2
Player A	1	6	9
	2	8	4

(OR)

(b). Write the algorithm for 2 x n games.

PART – C (3 X 10 = 30)

ANSWER ANY THREE QUESTIONS

16. Solve the following LPP using simplex method.

   Maximize $Z = 10x_1 + 15x_2 + 20x_3$

   Subject to $2x_1 + 4x_2 + 6x_3 \leq 24$; $3x_1 + 9x_2 + 6x_3 \leq 30$; $x_1, x_2, x_3 \geq 0$.

17. Write the algorithm for Hungarian method.

18. For the following project, (i) Construct the project network, (ii) Find the expected duration and variance of each activity, (iii) Find the critical path and the expected project completion time, (iv) What is the probability of completing the project on or before 35 weeks?

Activity	Immediate predecessor	Duration (weeks)		
		a	m	b
A	–	4	4	10
B	–	1	2	9
C	–	2	5	14
D	A	1	4	7
E	A	1	2	3
F	A	1	5	9
G	B, C	1	2	9
H	C	4	4	4
I	D	2	2	8
J	E, G	6	7	8

19. The annual demand for a component is 7200 units. The carrying cost is Rs. 500/unit/year, the ordering cost is Rs. 1500 per order and the shortage cost is Rs. 2000/unit/year. Find the optimum values of economic order quantity, maximum inventory, maximum shortage quantity, cycle time(t), inventory period(t_1) and shortage period(t_2).

20. Solve the following game optimally using graphical method.

Player B

		1	2
	1	1	3
Player A	2	3	1
	3	5	-1
	4	6	-6