Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – June 2021
VI Semester

Class : III UG **Time : 3 Hours**
Major : Mathematics / Special Education and Mathematics **Max. Marks: 100**

18BMAC24 /18BSMC16 Operations Research

Part A **10 X 1 = 10**

Choose the Correct Answer

1. The optimum solution must satisfies CO1 K2
   a.only constraints b. at least one constraints
   c. only objective function d. None of the above

2. Operations research is a CO1 K4
   a. Science b. Art
   c. Mathematics d. Science and Art

3. All the parameters in the LPP are assumed to be ---------- CO2 K2
   a. Variables b.Constraints
   c. Functions d. None of the above

4. For maximization LPP, the objective fuction coefficient for an artificial variable is CO2K4
   a. M b. -M c. One d. Zero

5. A feasible solution is called a basic feasible solution if the number of non negative allocations is equal to CO3 K1
   a. m – n +1 b. m + n -1 c.m + n +1 d. m – n -1

6. What method do you apply in order to obtain optimum solution? CO3 K5
   a. MODI b. VAM
   c. Optimality solution d. None of the above

7. The size of the pay off matrix of a game can be reduced y using the principle of CO4 K2
   a. Dominance b. Algebraic
   c. Game inversion d. Game transpose

8. Games which involves more than two players are called CO4 K5
   a. Biased games b. Negotiable games
   c.Conflicting games d. n-person games

9. Sequencing problem involving processing of two jobs on n machines, CO5 K4
   a. Can be solved by graphically
   b. cannot be solved by graphically
   c.The processing of two jobs must be the same order
   d. none of the above

10. Which one indicates time required for a job CO5 K5
    a. Total elapsed time b.Processing time
    c. Pessimistic time d.Optimistic time

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11. a. An animal feed company must produce at least 200 kgs of a mixture consisting of ingredients X and Y daily. X costs Rs. 3 per kg and Y Rs. 8 per kg. No more than 80 kg of X can be used and at least 60 kgs of Y must be used. Formulate LPP. CO1 K5

(or)

11. b. Solve by graphical method: Max z =10 x +30y; subject to constraints $2x + y \leq 20$ $x + 2y \leq 20,\ x \geq 0\ and\ y \geq 0$ CO1 K3

12. a. Solve by simplex method: Max z = $7x_1 + 5x_2$; subject to constraints $x_1 + 2x_2 \leq 6$ $4x_1 + 3x_2 \leq 12,\ x_1 \geq 0\ and\ x_2 \geq 0$ CO2 K3

(or)

12. b. Use Two phase method to maximize z = 5x+3y; subject to constraints 2x+y≤ 1, x+4y≥ 6; $x \geq 0\ and\ y \geq 0$. CO2 K4

13. a. Find initial basic feasible solution by Vogel's Approximation method CO3 K5

		To			
	W	X	Y	Z	SUPPLY
A	190	300	500	100	70
B	700	300	400	600	90
C	400	100	600	200	180
Demand	50	80	70	140	

(or)

13. b. Solve the assignment problem: CO3 K3

		Men		
		x	y	z
	A	2	6	2
Job	B	1	4	1
	C	5	3	8

14. a. Find the value of the game CO4 K5

	Y	
X	6	2
	−1	−4

(or)

14. b. Explain Games with and without saddle points. CO4 K2

15. a. Distinguish between Processing time and Total Elapsed time CO5 K2

(or)

15. b. Determine the sequence for the jobs that would minimize the total elapsed time. CO5 K5

Job:	1	2	3	4	5	6	7
Machine A:	10	12	13	7	14	5	16
Machine B:	15	11	8	9	6	7	16

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Solve by Graphical method: Max z = $7x_1 + 5x_2$; subject to constraints $x_1 + 2x_2 \leq 6$ CO1 K3

$4x_1 + 3x_2 \leq 12,\ x_1 \geq 0\ and\ x_2 \geq 0$

(or)

16. b. A home resourceful decorator manufacturer's two types of lamps A and B. Both lamps go through two technicians first a cutter and second a finisher. Lamp A requires 2 hrs of the cutter's and 2 hr of the finisher's time. Lamp B requires 1 hr of cutter's time and 2 hrs of finisher's time. The cutter has 104 hrs and finisher has 76 hrs of available time each month. Profit on the lamp A is Rs 6 and on one B lamp is Rs. 11. Formulate LPP. CO1 K5

17. a. Explain the Simplex Algorithm. CO2 K2

(or)

17. b. Use big M method to solve Max z= 6x +4y; subject to constraints CO2 K3

2x+3y≤30, 3x+2y≤24; $x + y \geq 3$

$x \geq 0\ and\ y \geq 0$

18. a. Find the initial basic feasible solution to the transportation problem by North West Corner method: CO3 K5

Origins	D1	D2	D3	Supply
O1	2	7	4	5
O2	3	3	1	8
O3	5	4	7	7
O4	1	6	2	14
Demand	7	9	18	34

(or)

18. b. What are the assignments which will maximize the profit? CO3 K4

		Courses			
		1	2	3	4
	A	6	4	6	7
Instructors	B	2	6	5	7
	C	2	3	4	6
	D	3	1	3	4

19. a. Determine the value of the game. CO4 K5

		Player B				
		I	II	III	IV	V
	1	2	4	3	3	4
Player A	2	5	6	3	7	8
	3	6	7	9	8	7
	4	4	2	8	4	3

(or)

19. b. Find the optimum strategies and value of the game CO4 K5

		Y			
	6	3	-1	0	-3
X	3	2	-4	2	-1

20. a. Calculate the optimum sequence and Total Elapsed time. CO5 K2

Job:	J1	J2	J3	J4	J5	J6
Machine A:	1	3	8	5	6	3
Machine B:	5	6	3	2	2	10

(or)

20. b. Construct optimum sequence and calculate Total Elapsed time. CO5K3

Job:	1	2	3	4	5	6
Machine A:	30	120	50	20	90	100
Machine B:	80	100	90	60	30	10

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