



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.B.A.DEGREE EXAMINATION – BUSINESS ADMINISTRATION

FOURTH SEMESTER – APRIL 2019

16/17UBU4MC01– ELEMENTS OF OPERATIONS RESEARCH

Date: 02-04-2019
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** the questions:

(10 X 2=20)

1. List out the applications of operations research.
2. Explain any two limitations of Operations research.
3. Expand and explain LPP.
4. What do you mean by Objective function?
5. Define simplex method.
6. Write a note on Linear Programming Model.
7. What is meant by degenerate solution?
8. What do you mean by unbalanced transportation problem?
9. List out the types of games.
10. Write a note on mixed strategy.

PART – B

Answer any **FOUR** Questions:

(4X10=40)

11. Explain the origin and history of Operation Research.
12. A company manufactures two types of products, P1 and P2. Each product uses lathe and milling machine. The processing time per unit of P1 on the lathe is 5 hours and on the milling machine is 4 hours. The processing time per unit of P2 on the lathe is 10 hours and on the milling machine is 4 hours. The maximum number of hours available per week on the lathe and the milling machine are 60 hours and 40 hours respectively. Also the profit per unit of selling P1 and P2 are Rs. 6.00 and Rs. 8. 00 respectively. Formulate the problem as a LP model to determine the production volume of each of the products such that the total profit is maximised.
13. Use graphical method to solve the following LP Problem.
Maximize $Z = 6x + 8y$
Subject to $5x + 10y \leq 60$
 $4x + 4y \leq 40$
and $x, y \geq 0$
14. Solve the following transportation problem by Least Cost Cell Method.

		To			Availability
		P	Q	R	
From	I	50	30	220	1
	II	90	45	170	3
	III	250	200	50	4
Requirement		4	2	2	

15. Consider the 4X4 game which represents the payoff matrix of Player A and solve it optimally:

		Player B			
		1	2	3	4
Player A	1	6	2	4	8
	2	2	-1	1	12
	3	2	3	3	9
	4	5	2	6	10

16. Five different Jobs are to be assigned to five different operators such that the total processing time is minimized. The matrix represents processing time in hours.

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

17. Consider the payoff matrix of Player A and solve it optimally using graphical method:

		Player B				
		1	2	3	4	5
Player A	1	3	6	8	4	4
	2	-7	4	2	10	2

PART – C

Answer any **TWO** Questions:

(2 X 20 = 40)

18. Briefly explain the advantages and disadvantages of Linear Programming.

19. Use simplex method to solve the LPP

$$\begin{aligned} &\text{Maximize } Z = 6X_1 + 8X_2 \\ &\text{Subject to } 5X_1 + 10X_2 \leq 60 \\ &\quad \quad \quad 4X_1 + 4X_2 \leq 40 \\ &\text{and } X_1, X_2 \geq 0 \end{aligned}$$

20. A company has four factories from which it ships its product units to four warehouses W_1, W_2, W_3 and W_4 which are the distribution centres. Transportation costs per unit between various combination of factories (F_1, F_2, F_3 and F_4) and warehouses are

	W_1	W_2	W_3	W_4	Availability
F_1	48	60	56	58	140
F_2	45	55	53	60	260
F_3	50	65	60	62	360
F_4	52	64	55	61	220
Requirement	200	320	250	210	

Find the transportation cost using VAM.

21. Five different subjects are to be assigned to five different faculties such that total number of class hours required is minimized. Solve using Hungarian Method.

		<i>Subject</i>				
		1	2	3	4	5
<i>Faculty</i>	1	30	39	31	38	40
	2	43	37	32	35	38
	3	34	41	33	41	34
	4	39	36	43	32	36
	5	32	49	35	40	37
	6	36	42	35	44	42

