

**C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),**

**MELVISHARAM - 632 509.**

**SEMESTER EXAMINATIONS, NOVEMBER - 2018**

**B.B.A.,**

**SEMESTER III**

**U15MBA303 / U14MBA303 – OPERATIONS RESEARCH**

Time: Three Hours

Maximum: 75 Marks

**SECTION - A (10 X 2 = 20 Marks)**

Answer **ALL** Questions.

1. Define Operations research.
2. What is a constraint in LPP model?
3. What is meant by balanced assignment problem?
4. How to convert an unbalanced transportation problem into a balanced one?
5. What is dominance property?
6. What is meant by a pure strategy?
7. What is idle time?
8. Give examples for items whose efficiency deteriorates suddenly.
9. Expand CPM.
10. What is an event?

**SECTION - B (5 X 5 = 25 Marks)**

Answer **ALL** Questions.

11. a) Enumerate the applications of OR.  
(Or)

b) A company has three operational departments with capacity to produce three different types of clothes namely suiting, shirting and woollens yielding profit Rs 2, Rs 4 and Rs 3 per meter respectively. One meter suiting requires 3 minutes in weaving, 2 minutes in processing and 1 minute in packing. Similarly one meter shirting requires 4 minutes in weaving, 1 minute in processing and 3 minutes in packing, while one meter woollen requires 3 minutes in each department. In a week, total runtime of each department is 60, 40 and 80 hours for weaving, processing and packing departments respectively. Formulate the LPP to find the product mix to maximize the profit.

12. a) Solve using LCM.

	1	2	3	4	Supply
A	0	2	3	4	6
B	4	3	2	0	8
C	0	2	2	1	10
Demand	4	6	8	6	

(Or)

b) A computer centre has got three expert programmers. Assign programmers to programmes in such that total computer time is least.

	Programmes			
	A	B	C	D
1	20	28	19	13
2	15	30	31	28
3	40	21	20	17
4	21	28	26	12

13. a) Six jobs must go through two machines A and B in the order AB. using the given processing time in hours, determine the sequence that will minimize elapsed time.

Job	1	2	3	4	5	6
Machine A	2	4	9	6	7	4
Machine B	6	7	4	3	3	11

(Or)

- b) A company purchases a machine for Rs 80000 and its scrap value is Rs 100. Based on the maintenance cost, determine at which time the machine should be replaced.

Year	1	2	3	4	5	6	7
Maintenance cost (RS)	100	250	400	600	900	1,200	1,600

14. a) Solve the game and find best strategies for company A & B:

	Company B			
Company A	2	4	2	
	1	-5	-4	
	2	6	-2	

(Or)

- b) Determine optimal strategies and value of the game.

	Player B	
Player A	5	2
	3	4

15. a) Draw the network for the following information.

Activity	A	B	C	D	E	F
Immediate predecessor	-	-	A	B	C,D	C

(Or)

- b) List out the rules for constructing a network diagram.

## SECTION - C (3 X 10 = 30 Marks)

### Answer ANY THREE Questions.

16. Solve graphically.

$$\text{Maximize } Z = 6x_1 + 4x_2, \text{ subject to constraints}$$

$$2x_1 + 3x_2 \leq 120; \quad 2x_1 + x_2 \leq 60; \quad x_1, x_2 \geq 0$$

17. Obtain solution using VAM

Destination	A	B	C	D	supply
I	4	2	7	3	250
Origin	II	3	7	5	8
III	9	4	3	1	500
Demand	200	400	300	300	

18. Use dominance property and solve the game.

	Player B			
Player A	1	3	11	
	8	5	2	

19. Find the sequence that minimizes total elapsed time in performing the following jobs on three machines in the order ABC:

Job	1	2	3	4	5	
Machine A	3	12	5	2	9	11
Machine B	8	6	4	6	3	1
Machine C	13	14	9	12	8	13

20. For the following activities, construct a network diagram.

Activity	Normal time (days)
1-2	5
1-3	3
1-4	6
2-3	8
2-5	7
3-5	2
4-5	6

Find critical path, project time and float time.

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