SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
BCA END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - V
20UCAET5RM1 - Resource Management Techniques

Total Duration : 2 Hrs 30 Mins.   Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks$)$

1. Sketch the role of Computers in O.R

2. Given the restrictions
   $x \geq 0$, $y \geq 0$
   $2x + y \leq 20$
   $x + 2y \leq 20$
   Indicate the feasible region on a graph and maximise the function x+ 3y.

3. Solve the following transportation problem by Row Minima and Column Minima.

Factories	W1	W2	W3	W4	Supply
F1	6	4	1	5	14
F2	8	9	2	7	16
F3	4	3	6	2	05
Demand	6	15	15	4	35

4. Find the sequence that minimise the total elapsed time required to complete the following jobs.

Jobs:	1	2	3	4	5
Processing time machine A:	5	7	6	9	5
(in hours) Machine B :	2	1	4	5	3
Machine C:	3	7	5	6	7

5. Four jobs can be processed on four different machines, one job on one machine. Resulting times in minutes vary with assignments. They are given below.

		A	**B**	**C**	**D**
	I	42	35	28	21
Jobs	**II**	30	25	20	15
	III	30	25	20	15
	IV	24	20	16	12

   Machines (header above A B C D)

   Find the optimum assignment of jobs to machines and the corresponding time.

6. Consider a modified form of matching 'biased coins; problem. The matching player is paid Rs.8 if two coins turn both heads and Rs.1 if the coins turns both tails. The non-matching player is paid Rs.3 when two coins do not match. Given the choice of being the matching on non-matching player, which one would you choose and what would be your strategy?

7. Following is the pay off matrix for player A

		Player B				
		B1	**B2**	**B3**	**B4**	**B5**
Player A	**A1**	2	4	3	8	4
	A2	5	6	3	7	8
	A3	6	7	9	8	7
	A4	4	2	8	4	2

Using dominance property, obtain the optimum strategies for both the players and determine the value of the game.

8. Construct PERT network for the following project and determine the critical path and project duration.

Activity	Duration in days	Immediate Predecessors
A	4	None
B	1	None
C	1	A
D	1	B
E	6	C
F	8	E
G	2	F
H	4	F
I	1	G
J	5	H, I
K	5	D, G
L	2	K

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks$)$

9. A dealer wishes to purchase a number of fans and sewing machines. He has only Rs.5760 to invest and has space almost for 20 items. A fan costs him Rs.360 and a sewing machine Rs.240. His expectation is that he can sell a fan at a profit of Rs.22 and a sewing machine at a profit of Rs.18. Assuming that he can sell all the items that he can buy, how should he invest this money in order to maximize his profit? Formulate this problem as a linear programming problem and then use graphical method to solve it.

10. A company has three plants supplying the same product to the five distribution centers. Due to peculiarities inherent in the set of cost of manufacturing, the cost/unit will vary from plant to plant. Which is given below? There are restrictions in the monthly capacity of each plant, each distribution center has a specific sales requirement, capacity requirement and the cost of transportation is given below.

Factories	W1	W2	W3	W4	W5	Supply
F1	5	3	3	6	4	200
F2	4	5	6	3	7	125
F3	2	3	5	2	3	175
Demand	60	80	85	105	70	500

11. A travelling salesman has to visit 5 cities. He wishes to start from a particular city, visit each city once and return to his starting point. The travelling cost for each city from a particular city is given below.

	To City				
	A	B	C	D	E
From City	∞	4	7	3	4
	4	∞	6	3	4
	7	6	∞	7	5
	3	3	7	∞	7
	4	4	5	7	∞

12. Solve the following game using graphical method

	B1	B2
A1	-6	7
A2	4	-5
A3	-1	-2
A4	-2	5
A5	7	-6

13. A project scheduling has the following characteristics

Activity Time	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Days	4	1	1	1	6	5	4	8	1	2	5	7

Summarise the CPM calculations in a tabular form and determine the critical path.

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