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.
B.Com.Honours - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - II
23UBHCT2007 - Operations Research

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

Section B

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

1. Explain the Scope of Operations Research.

2. Find the Initial basic feasible solution to the following transportation problem using north west corner rule.

SOURCE	**DESTINATION**				**SUPPLY**
	D1	D2	D3	D4	
S1	3	1	7	4	300
S2	2	6	5	9	400
S3	8	3	3	2	500
DEMAND	250	350	400	200	

3. Solve the following assignment problem. Cell values represent cost of assigning job A, B, C and D to the machines I, II, III and IV.

MACHINES					
JOBS		I	II	III	IV
	A	10	12	19	11
	B	5	10	7	8
	C	12	14	13	11
	D	8	15	11	9

4. Explain the classification of games based on different criteria.

5. An executive has to make a decision. He has four alternatives D_1, D_2, D_3 and D_4. When the decision has made events may lead such that any of the four results may occur. The results are R_1, R_2, R_3 and R_4. Probabilities of occurrence of these results are as follows:
$R_1 = 0.5$, $R_2 = 0.2$, $R_3 = 0.2$, $R_4 = 0.1$

Contd...

The matrix of pay-off between the decision and the results is indicated below:

	R_1	R_2	R_3	R_4
D_1	14	9	10	5
D_2	11	10	8	7
D_3	9	10	10	11
D_4	8	10	11	13

Show this decision situation in the form of a decision tree and indicate the most preferred decision and corresponding expected value.

6. Solve the Pay-Off Matrix

	Y		
X	4	-2	3
	0	5	6

7. Solve the following LPP by graphical method

   Maximize $Z = 4x_1 + 3x_2$
   subject to
   $x_1 + 2x_2 \leq 6$
   $2x_1 + x_2 \leq 8$
   $x_1 \geq 7$
   $x_1, x_2 \geq 0$

8. Construct the network diagram for following set of activities:

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor Activity	-	-	A	B	C	C	C, D	F, G	E	I	H

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Solve and find the maximal and minimal value of $z = 6x + 9y$ when the constraint conditions are,

   $2x + 3y \leq 12$
   x and $y \geq 0$
   $x + y \leq 5$

10. Compute the initial basic feasible solution of the following transportation problem using Vogel's Approximation Method:

Contd...

SOURCE	DESTINATION				SUPPLY
	D1	D2	D3	D4	
S1	20	22	17	4	120
S2	24	37	9	7	70
S3	32	37	20	15	50
DEMAND	60	40	30	110	

11. Distinguish between PERT and CPM.

12. Solve and find Solution of game theory problem using dominance method.

Player B / **Player A**	**B1**	**B2**	**B3**	**B4**
A1	3	5	4	2
A2	5	6	2	4
A3	2	1	4	0
A4	3	3	5	2

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. In a self-service store with one cashier, 8 customers arrive on an average of every 5 mins and the cashier can serve 10 in 5 mins. If both arrival and service time are exponentially distributed,then determine
    a) Average number of customers waiting in the queue.
    b) Expected waiting time in the queue
    c) What is the probability of having more than 6 customers in the system?

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