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.Sc. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - IV
20USTCT4008 - Operations Research

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Solve Graphically:
   Minimize Z=10x+4y
   Sub to 4x+y $\geq$ 80
   2x+y $\geq$ 60
   x,y $\geq$ 0

2. Solve the Transportation Problem by Least Cost Method.

	D1	D2	D3	D4	Supply
O1	1	2	3	4	6
O2	4	3	2	0	8
O3	0	2	2	1	10
Demand	4	6	8	6	

3. Solve the following Assignment Problem:

	Machine				
		A	B	C	D
Operator	1	50	50	-	20
	2	70	40	20	30
	3	90	30	50	-
	4	70	20	60	70

4. Solve the game whose pay – off matrix is given by

   Player B

   Palyer A $\begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix}$

5. Construct a Network Diagram for the following Situation:
   A $<$ D,E;B,D $<$ F; C $<$ G and B $<$ H

6. Determine the Sequence for performing jobs that would minimize the total elapsed time.

Job	1	2	3	4	5	6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

Contd...

7. Explain briefly about the Models in OR.
8. Describe Travelling Salesman Problem in Assignment.

Section B

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

9. Solve by Big M Method:

Maximize $Z = 6x_1 + 4x_2$

Sub to $2x_1 + 3x_2 \leq 30$

$3x_1 + 2x_2 \leq 24$

$x_1 + x_2 \geq 3$

$x_1, x_2 \geq 0$

10. Solve the Maximization Transportation Problem.

Auditor	Project			Time Available
	I	II	III	
1	1200	1500	1900	160
2	1400	1300	1200	160
3	1600	1400	1500	160
Time Required	130	140	160	

11. Solve the Assignment Problem.

	A	B	C	D	E	F
1	80	140	80	100	56	98
2	48	64	94	126	170	100
3	56	80	120	100	70	64
4	99	100	100	104	80	90
5	64	80	90	60	60	70

12. Determine a Sequence of these four jobs minimizes the total elapsed time.

Jobs	Machines					
	M1	M2	M3	M4	M5	M6
A	18	8	7	2	10	25
B	17	6	9	6	8	19
C	11	5	8	5	7	15
D	20	4	3	4	8	12

Contd...

13. Construct the project network for the following data and evaluate the following

Activity (i-j)	Estimated Duration (Weeks)		
	Optimistic	Most Likely	Pessimistic
1 - 2	1	1	7
1 - 3	1	4	7
1 - 4	2	2	8
2 - 5	1	1	1
3 - 5	2	5	14
4 - 6	2	5	8
5 - 6	3	6	15

i) Expected Duration and Variance for each activity.
ii) Calculate CPM
iii) Expected Project Length and Variance of the Project Length.
iv) The probability that the project will be completed at least four weeks earlier than expected.
v) If the project due date is 19 weeks, what is the probability of not meeting the due date?

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