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 NOVEMBER-2022
SEMESTER - V
20UCSET5001 - Resource Management Techniques

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

Section A

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

1. What are the characteristics of an O.R problem?
2. What is feasibility region in LP problem? Is it necessary that it should always be a convex set?
3. Solve the transportation problem:

	To				**Supply**
From	1	2	3	4	6
	4	3	2	0	8
	0	2	2	1	10
Demand	4	6	8	6	

4. Define an unbalanced assignment problem. Find the job assignment that will minimize the cost.

	1	**2**	**3**	**4**
A	18	24	28	32
B	8	13	17	19
C	10	15	19	22

5. There are 7 jobs, each of which has to go through the machines A and B in the order AB. Processing times (in hours) are given as follows:

Job	1	2	3	4	5	6	7
M/c A	3	12	15	6	10	11	9
M/c B	8	10	10	6	12	1	3

Determine a sequence of these jobs that will minimise the total elapsed time. Also calculate the various idle times.

6. Solve by graphical method:

	B1	**B2**	**B3**
A1	4	-1	0
A2	-1	4	2

Contd...

7. Draw the network for the project whose activities and their precedence relationships are as given below:

Activities	A	B	C	D	E	F	G	H	I
Immediate Predecessors	-	A	A	-	D	B,C,E	F	E	G,H

8. For the following project, draw the network and find the critical path. Also calculate the earliest, latest and slack times for all events

Activity	1-2	2-3	2-4	2-5	3-5	4-6	5-7	6-7
Duration (in weeks)	5	8	7	5	2	9	6	3

Section B

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

9. Find the non-negative values of x_1 x_2 and x_3 which

$Max\ z = 3x_1 + 2x_2 + 5x_3$

$subject\ to\ x_1 + 4x_2 \leq 420;$

$3x_1 + 2x_3 \leq 460$;

$2x_1 + 2x_2 + x_3 \leq 430.$

10. Solve the transportation problem

	Destination				
		A	**B**	**C**	**D**	**Supply**
Source	1	11	20	7	8	50
	2	21	16	20	12	40
	3	8	12	18	9	70
	Demand	30	25	35	40	

11. Determine the minimum time needed to process the two jobs on four machines m1,m2,m3,m4. The technological order for these jobs is as given below:

Job1	m1	m2	m3	m4
Job2	m4	m2	m1	m3

Processing time(hours) are as given below:

	m1	m2	m3	m4
Job1	5	7	8	4
Job2	5	8	6	9

Contd...

12. Using the dominance property obtain the optimal strategies for both the players and determine thevalue of the game. The pay off matrix for player A is given below

		Player B				
		I	**II**	**III**	**IV**	**V**
Player A	**I**	2	4	3	8	4
	II	5	6	3	7	8
	III	6	7	9	8	7
	IV	4	2	8	4	3

13. The data for a small project is given below:

Activity(i-j) days	**A**	**B**	**C**	**D**	**E**	**F**
optimistic time	9	14	16	24	28	18
most likely time	10	20	20	30	36	20
pessimistic time	14	26	22	36	46	21

Precedence relationships: A,B can start immediately.
A$<$ C,D; B $<$ C,D ; C $<$ E ; D, E $<$ F.
Find the expected activity time and their variances. Calculate the earliest and latest expected time to reach node.

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