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. Statistics - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - IV
20USTCT4008-Operations Research

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

Section B

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

1. Solve the following LPP graphically
   Maximize $Z = 100x_1 + 40x_2$
   Subject to $5x_1 + 2x_2 \leq 1000$
   $3x_1 + 2x_2 \leq 900$
   $x_1 + 2x_2 \leq 500$ and $x_1, x_2 \geq 0$.
2. List out the Limitations of Linear Programming Problem.
3. Find the stating solution of the following transportation model using Least cost method.

	To Supply			
	1	2	6	7
From	0	4	2	12
Demand	3	1	5	11
	10	10	10	

4. Determine the optimum assignment schedule.

	Job				
	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

5. Solve the following 2x2 game $\begin{pmatrix} 5 & 1 \\ 3 & 4 \end{pmatrix}$
6. Describe the steps in determining the optimal sequence for n jobs on 2 machines.
7. What are the three main phases of a project?
   Construct a network diagram for the data given below and number the events.
   A<C, B; B<D,E; C<F ; E<G ; F<I ,J ; J<K; G<L ; K,L<M

Contd...

8. Write short notes on three time estimates on PERT.

Section C

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

9. Apply Penalty method to solve
   Maximize $Z = 4x_1 + 3x_2$
   Subject to $2x_1 + x_2 \geq 10$
   $-3x_1 + 2x_2 \leq 6$
   $x_1 + 2x_2 \geq 6$ and $x_1, x_2 \geq 0$.

10. Solve the Transportation problem.

		To			Supply
From	1	2	3	4	6
	4	3	2	0	8
demand	0	2	2	1	10
	4	6	8	6	

11. Solve the following travelling salesman problem.

	A	B	C	D
A	-	46	16	40
B	41	-	50	40
C	82	32	-	60
D	40	40	36	-

12. Explain the sequencing problem of n jobs on m machines.

13. A Project consists of the following activities and time estimates:

Activity	1-2	2-3	1-4	2-5	2-6	3-6	4-7	5-7	6-7
Optimistic time(days)	3	2	6	2	5	3	3	1	2
Pessimistic time (days)	15	14	30	8	17	15	27	7	8
Most likely time (days)	6	5	12	5	11	6	9	4	5

(a) Draw the network and find the critical path, expected project length and expected variance of the project length.
(b) What is the probability that the project will be completed in 27 days?

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