Attempt any Four questions. All questions carry equal marks.

1. MG Auto has three plants in Delhi, Mumbai and Bangalore and four distribution centres at Goa, Chennai , Haryana and Kolkata. The capacities of the three plants during the next quarter are 500,600 and 250 cars respectively. The quarterly demands at the four distribution centres are 600, 400, 200 and 150 cars respectively. The transportation cost per car on the different routes is given in the table:

Factory	Goa	Chennai	Haryana	Kolkata
Distribution Center				
Delhi	3	2	7	6
Mumbai	7	5	2	3
Bangalore	2	5	4	5

(a) Compare the starting solution (Initial basic feasible solution) obtained by the North-West Corner Method & Least-Cost Method for the above transportation problem.

(b) Find the starting solution (Initial basic feasible solution) using Vogel Approximation Method (VAM) and hence find the optimal solution by the method of multipliers.

2. Solve the following cost minimization assignment problem:

Jobs	I	II	III	IV	V
			Men		
A	2	3	5	5	6
B	4	5	7	7	8
C	7	8	8	10	9
D	3	5	3	6	5
E	4	3	5	2	1

Does this problem has more than one solution? If yes, then find any two possible solutions.

3. Solve the following travelling-salesman problem:

From city	I	II	III	IV	V
			To city		
I	M	5	8	4	5
II	5	M	7	4	5
III	8	7	M	8	6
IV	4	4	8	M	8
V	5	5	6	8	M

4. Use Dijkstra's algorithm to find the shortest path from source 'a' to destination 'i' from the following network:
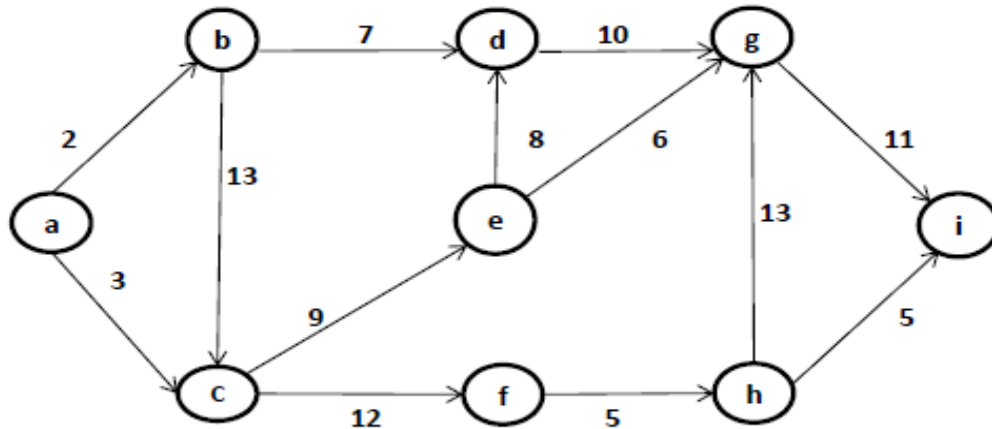
5. The Midwest TV Cable company is in the process of providing cable services to new six housing development areas. The adjoining figure depicts possible T V linkages among the six areas. The cable miles are shown on each arc. Determine the most economical cable network for the company starting at node 7. Also determine the minimal spanning tree starting at node1 for the given network when Nodes 3 and 5 are linked by 3 miles and Node 2 cannot be linked directly to node 3.
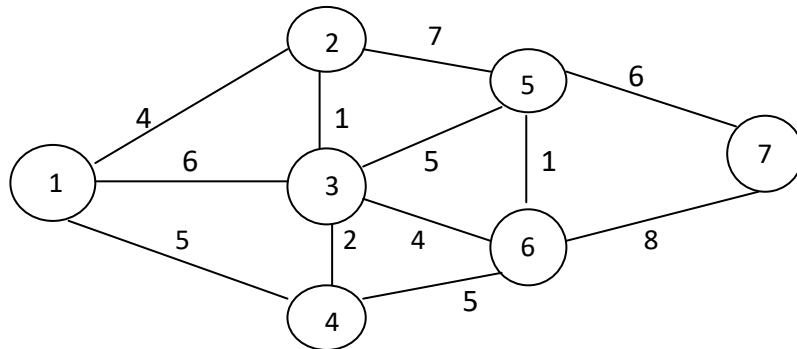
6. The activities associated with a certain project are given below:

Activity	Predecessor Activity	Duration (Weeks)
A	--	4
B	--	3
C	A, B	2
D	A, B	5
E	B	6
F	C	4
G	D	3
H	F, G	7
I	F, G	4
J	E, H	3

Develop the Associated Network for the project and find the minimum time of completion of the project. Also determine a critical path and critical activities for the project network. Find Early start time and Latest finish time of each activity.