Name of Course	: **CBCS B.Sc. Mathematical Sciences**
Unique Paper Code	: **42353604**
Name of Paper	: **SEC-4: Transportation and Network Flow Problems**
Semester	: **VI**
Duration	: **3 hours**
Maximum Marks	: **55 Marks**

Attempt any four questions. All questions carry equal marks. All Symbols have usual meaning.

1. Consider the transportation model is given in the table. Use Vogel Approximation Method (VAM) to find the starting basic feasible solution. Hence find optimal solution by the method of multipliers.

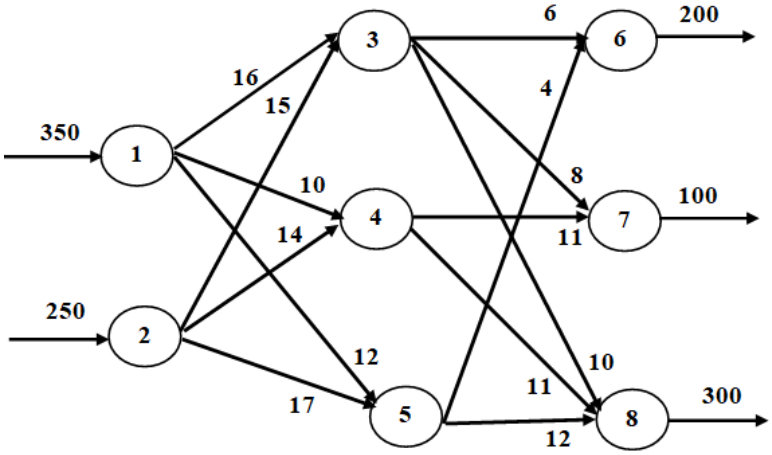
		Destinations						
		D_1	D_2	D_3	D_4	D_5	D_6	Availability
Sources	S_1	5	3	7	3	8	5	3
	S_2	5	6	12	5	7	11	4
	S_3	2	8	3	4	8	2	2
	S_4	9	6	10	5	10	9	8
Requirement		3	3	6	2	1	2	

2. Consider the following cost matrix of assigning five jobs to four persons:

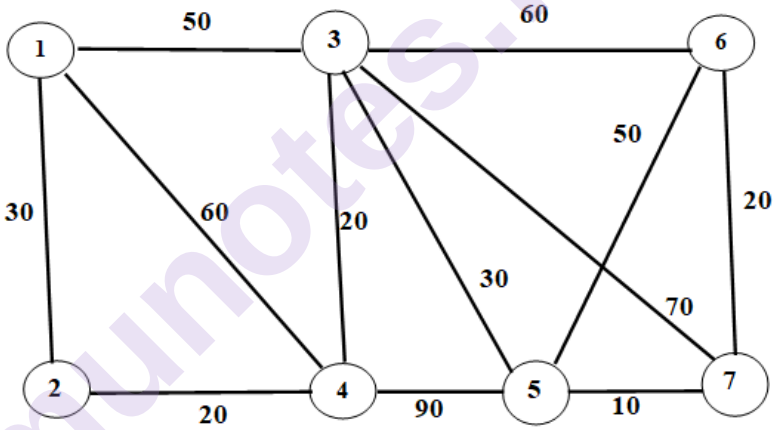
		Jobs				
		J_1	J_2	J_3	J_4	J_5
Persons	P_1	8	9	12	11	8
	P_2	4	3	6	7	5
	P_3	13	20	17	18	12
	P_4	23	26	25	33	20

Use Hungarian method to find an optimal assignment of the above problem.

3. Develop the transshipment model for the following network. Also identify pure supply nodes, pure demand nodes, transshipment nodes and the buffer amount.

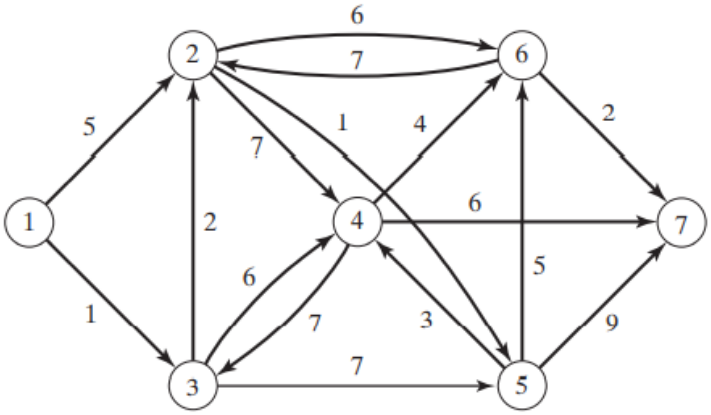


4. Consider the following network:



In the above network, Find 2 paths, 2 tree, a spanning tree and the minimal spanning tree.

5. Find the shortest route between node 1 to node 7 using Dijkstra's algorithm.



6. Determine the critical path for the project network: