B. A manufacturing company has three factories F1, F2 and F3 with monthly manufacturing capacities of 7000, 4000 and 10,000 units of a product. The product is to be supplied to seven stores. The manufacturing costs in these factories are slightly different but the important factor is the shipping cost from each factory to a particular store. The following table represents the factory capacities, store requirements and unit cost (in rupees) of shipping from each factory to each store. Here, slack is the difference between the total capacity and the total requirement. Find the optimal transportation plan so as to minimize the transportation cost.

		Stores							Factory Capacity
		S1	S2	S3	S4	S5	S6	S7	
Factory	F1	5	6	4	3	7	5	4	7000
	F2	9	4	3	4	3	2	1	4000
	F3	8	4	2	5	4	8	3	10000
Store demand		1500	2000	4500	4000	2500	3500	3000	(10)

IV. A. Vehicles are passing through a toll gate at the rate of 70 per hour. The average time to pass through the gate is 45 seconds. The arrival rate and service rate follow Poisson distribution. There is a complaint that the vehicles wait for long duration. The authorities are willing to install one more gate to reduce the average time to pass through the toll gate to 35 seconds if the idle time of the toll gate is less than 9% and the average queue length at the gate is more than 8 vehicles. Check whether the installation of the second gate is justified.   (10)

OR

B. Consider the following 3 machines and 5 jobs flow shop problem. Check whether Johnson's rule can be extended to this problem. If so, what is the optimal schedule and the corresponding make span?

Job	Machine 1	Machine 2	Machine 3
1	11	10	12
2	13	8	20
3	15	6	15
4	12	7	19
5	20	9	7

(10)

V. A. Consider the following table summarizing the details of a project :

Activity	Predecessor(s)	Duration (weeks)		
		a	m	b
A	-	4	4	10
B	-	1	2	9
C	-	2	5	14
D	A	1	4	7
E	A	1	2	3
F	A	1	5	9
G	B, C	1	2	9
H	C	4	4	4
I	D	2	2	8
J	E, G	6	7	8
K	F, H	2	2	8
L	F, H	5	5	5
M	I, J, K	1	2	9
N	L	6	7	8

(i)   Find the critical path and expected project completion time.   (8)
(ii) What is the probability of completing the project on or before 35 weeks? (2)

OR

B. (i)   Define simulation and explain different types of simulation.   (5)
    (ii) Illustrate the application of Monte Carlo simulation with an example.   (5)

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