

	C	3	4	0	0	
Basis	Cb	X1	X2	S1	S2	B
X2	4	1	1	1	0	6
S2	0	1	0	-1	1	2
	Zj-Cj	1	0	4	0	24

Answer the following with justification:

- If S1 and S2 are slack in resource A and B respectively, which resource is scarce and which one is abundant?
- How many units of two products X1 and X2 are being produced as per this solution and what is the total profit?
- If a customer wants a unit of X1, what price should the company quote to ensure no reduction in profit?
- If a resource A is not available for 2 hours next week, what will be the drop in profit?

Q.6 a In a transport company, trucks of the company arrive at a transshipment yard for unloading in a pattern which is characterized by the Poisson Distribution. The average rate of arrival is 5 per hour. A batch of loaders unload the parcels from the trucks and the level of service is 8 trucks per hours on an average. The driver is paid Rs 100 per shift of 8 hours and the batch of load men are paid Rs. 72 per shift of 8 hours.

- How much expense on an average is incurred by the company for idle time on the part of each driver each time he is at transshipment yard?
- Find the optimum number of batches of loaders to be employed for transshipment.

Q. 6 b A computer has a large number of components all of which have to be fully working and failures have to be replaced to maintain operational efficiency. Past observations have shown the following mortality pattern. If the component is replaced individually, then cost of a single replacement is Rs. 20, whereas if all components are replaced concurrently, the cost of a single component is Rs.7. Decide whether it would be worthwhile to have a group replacement policy and, if so, find the optimal replacement frequency.

Mortality Statistics: Observed Number – 500 Components

End of Week	1	2	3	4	5	6
No. of components Servicing	455	375	250	75	15	0

Q. 7 a A surplus fund of Rs. 40 crores is available for retail lending by a co-operative bank. The bank is considering five types of loans: personal loans, auto loans, home loans, educational loans and loans against gold. The prevailing interest rates for these loans is as under:

Type of Loan	Interest rate p.a
Personal Loan	18%
Auto loan	15%
Home loan	12%
Educational loan	9%
Loan against gold	13%

7.2
6
4.8
3.6
5.2

The bank has to decide on the amount to lend in each of the above credit types in order to maximize its return. However, it has to keep in view the following restrictions evolved by the management considering the risk profile of the loans: