Q.1 Four factories A, B, C and D produce sugar and the capacity of each factory is given below:
Factory A produces 10 tons of sugar and B produces 8 tons of sugar, C produces 5 tons of sugar and that of D is 6 tons of sugar. The sugar has demand in three markets X, Y, Z. The demands of market X is 7 tons, that of market y is 12 tons and the demand of market Z is 4 tons. The following matrix gives the returns the factory can get, by selling the sugar in each market, Formulate a transformation problem and solve for maximizing returns.

	Profit in Rs. per ton (x 100) Markets			Availability in tons
Factories	X	Y	Z	
A	4	3	2	10
B	5	6	1	8
C	6	4	3	5
D	3	5	4	6
Req. in tons.	7	12	4	$\Sigma b = 29$, $\Sigma d = 23$

Soln :-
Here, Σb is greater than Σd hence we have to open a dummy colouron whoose requirement constraint is 6. that total of availability will be equal to the total demand.

	X	Y	Z	d	Availability
A	4	3	2	0	10
B	5	6	1	0	8
C	6	4	3	0	5
D	3	5	4	0	6
req	7	12	4	6	29

	X	Y	Z	D	
A	4	3	2	0	10 (1)
B	5	6	1	0	8 (1)
C	(5) 6	4	2	0	(2) 5 (2) ←
D	3	5	4	0	6 (1)
	7	12	5	5	29
	1	1	2	0	

	X	Y	Z	D	
A	4	3	2	0	10 1
B	5	6	1	0	8 1
D	3	5	4 (5)	0	6 1
	7	12	5	5	24
	1	1	2	0	
			↑		

	X	Y	D	
A	4	3	0	10 1
B	5	6	0	8 1
D	3	5 (1)	0	1 2 ←
	2	12	5	19
	1	1	0	

	X	Y	D	
A	4	3	0	10 1
B	5	6 (8)	0	8 1
	2	11	5	
	1	3	0	
		↑		

	X	Y	D	
A	4	3	0	10
	②	③	⑤	$\lceil 10$
	2	3	5	

Total returns in RS = $5\times6 + 4\times5 + 5\times1 + 6\times8 + 4\times2 + 3\times3 + 0\times5 = 120$

∴ Total return is 120 RS.