

Solve by Big M-method

Q22. Maximize subject to $Z = x_1 + 2x_2 + 3x_3 - x_4$,
 $x_1 + 2x_2 + 3x_3 = 15$,
 $2x_1 + x_2 + 5x_3 = 20$,
 $x_1 + 2x_2 + x_3 + x_4 = 10$,
 $x_1, x_2, x_3, x_4 \geq 0$

Q23. Maximize subject to $Z = x_1 + 2x_2 + 3x_3$,
 $x_1 - x_2 + x_3 \geq 4$,
 $x_1 + x_2 + 2x_3 \leq 8$,
 $x_1 - x_3 \geq 2$,
 $x_1, x_2, x_3 \geq 0$

Q24. A manufacturer produces three products A, B, and C. Each product requires processing on two machines I & II. The time required to produce one unit of each product on a machine is:

Product	Time to produce one unit (hrs.)	
	Machine I	Machine II
A	0.5	0.6
B	0.7	0.8
C	0.9	1.05

There are 850 hrs are available on each machine. The operating cost is Rs.5/hr. for machine I and Rs.4/hr. for machine II. The market requirements are at least 90 units of A, at least 80 units of B and at least 60 units of C. The manufacturer wishes to meet the requirement at minimum cost. Solve the problem by simplex method.

Q25. A factory has decided to diversify its activities. The data collected by sales and production department is summarized below.
 Potential demand exist for three products A,B and C. market can take any amount of A and C. whereas the share of B for this organization is expected to be not more than 400 units a month.

For every 3 units of C produced, there will be one unit of by-product which sells at a contribution of Rs.3 a unit and only 100 units of this by-product can be sold per month. Contribution per unit of products A,B &C is expected to be Rs. 6, 8 ,4 respectively.

These products require three different processes and the time required per unit product is given in the table below:

Process	Hours/unit			Available hours
	Product A	Product B	Product C	
I	2	3	1	900
ii		1	2	600
III	3	2	2	1200

Determine the optimum product mix for maximizing the contribution.