Short Answer Questions

[2 marks]

Q.1. A small firm manufactures necklaces and bracelets. The total number of necklaces and bracelets that it can handle per day is at most 24. It takes one hour to make a bracelet and half an hour to make a necklace. The maximum number of hours available per day is 16. If the profit on a necklace is ₹100 and that on a bracelet is ₹300. Formulate an LPP. for finding how many of each should be produced daily to maximise the profit? It is being given that at least one of each must be produced.

Ans.

Let x and y be the number of necklaces and bracelets manufactured by small firm per day. If P be the profit, then objective function is given by

$P = 100x + 300y$ which is to be maximised under the constrains

$x + y \leq 24$ ...(*i*)

$12x+y \leq 16$ ...(*ii*)

$x \geq 1, y \geq 1$ ...(*iii*)

Q.2. Two tailors, *A* and *B*, earn ₹300 and ₹400 per day respectively. *A* can stitch 6 shirts and 4 pairs of trousers while *B*can stitch 10 shirts and 4 pairs of trousers per day. To find how many days should each of them work and if it is desired to produce at least 60 shirts and 32 pairs of trousers at a minimum labour cost, formulate this as an LPP.

Ans.

Let *A* and *B* work for x and y days respectively.

Let Z be the labour cost.

$Z = 300x + 400y$

Subject to constraints

$6x + 10y \geq 60$

$4x + 4y \geq 32$

$x, y \geq 0$

Q.3. A company produces two types of goods *A* and *B*, that require gold and silver. Each unit of type *A* requires 3 g of silver and 1 g of gold while that of type *B* requires 1 g of silver and 2 g of gold. The company can produce a maximum of 9 g of silver and 8 g of gold. If each unit of type *A* brings a profit of ₹40 and that of type *B* ₹50, formulate LPP to maximize profit.

Ans.

Let x and y be the number of goods A and goods B respectively. If P be the profit then

$P = 40x + 50y$ which is to be maximised under constraints

$3x + y \leq 9$

$x + 2y \leq 8$

$x \geq 0, y \geq 0$

Q.4. A firm has to transport atleast 1200 packages daily using large vans which carry 200 packages each and small vans which can take 80 packages each. The cost for engaging each large van is ₹400 and each small van is ₹200. Not more than ₹3,000 is to be spent daily on the job and the number of large vans cannot exceed the number of small vans. Formulate this problem as a LPP given that the objective is to minimize cost.

Ans.

Let the number of large vans and small vans be x and y respectively.

here transportation cost Z be objective be function,

$Z = 400x + 200y$ which is to be minimized under constraints

$200x + 80y \geq 1200 \quad \Rightarrow \quad 5x + 2y \geq 30$

$400x + 200y \leq 3000 \quad \Rightarrow \quad 2x + y \leq 15$

$x \leq y, x \geq 0, y \geq 0$