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| **CLASS 12** | **APPLIED MATHEMATICS 241** |  |
| **QUESTION BANK** | **CHAPTER::L.P.P** |  |

1. Solve the following LPP graphically:  
Minimise Z = 5x + 10y subject to the constraints  
x + 2y ≤ 120  
x + y ≥ 60,  
x – 2y > 0 and x, y ≥

2. Maximise and minimise Z = x + 2y subject to the constraints  
x + 2 y ≥ 100  
2x – y ≤ 0  
2x+ y ≤ 200  
x, y ≥ 0

3. A manufacturer has employed 5 skilled men and 10 semi-skilled men and makes two models A and B of an article. The making of one item of model A requires  
2 h work by a skilled man and 2 h work by a semi-skilled man. One item of model B requires 1 h by a skilled man and 3 h by a semi-skilled man. No man is expected to work more than 8 h per day. The manufacturer profit on an item of model A is t 15 and on an items of model B is ? 10. How many of items of each models should be made per day in order to maximize daily profit? Formulate the above LPP and solve it graphically and find the maximum profit.

4. 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 use at the most 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, find the number of units of each type that the company should produce to maximize profit. Formulate the above LPP and solve it graphically and also find the maximum profit.

5. A factory manufactures two types of screws A and B, each type requiring the use of two machines, an automatic and a hand-operated. It takes 4 min on the automatic and 6 min on the hand-operated machines to manufacture a packet of screw ‘A’ while it takes 6 min on the automatic and 3 min on the hand-operated machine to manufacture a packet of screw ‘B’. Each machine is available for atmost 4 h on any day. The manufacturer can sell a packet of screw A’ at a profit of 70 paise and screw ‘B’ at a profit of U.  
Assuming that he can sell all the screws he manufactures, how many packets of each type should the factory owner produce in a day in order to maximise his profit? Formulate the above LPP and solve it graphically and find the maximum profit.

6.  manufacturer produces two products A and B. Both the products are processed on two different machines. The available capacity of first machine is 12 h and that of second machine is 9 h per day. Each unit of product A requires 3 h on both machines and each unit of product B requires 2 h on first machine and 1 h on second machine. Each unit of product A is sold at a profit of ₹ 7 and B at a profit of ₹ 4. Find the production level per day for maximum profit graphically.

7. A manufacturer produces nuts and bolts. It take 2 hours work on machine A and 3 hours on machine B to produce a package of nuts. It takes 3 hours on machine A and 2 hours on machine B to produce a package of bolts. He earns a profit of ₹ 24 per package on nuts and ₹ 18 per package on bolts. How many package of each should be produced each day so as to maximise his profit, if he operates his machines for at most 10 hours a day? Make an LPP and solve it graphically.

9. One kind of cake requires 200 g of flour and 25 g of fat, another kind of cake requires 100 g of flour and 50 g of fat. Find the maximum number of cakes which can be made from 5 kg of flour and 1 kg of fat, assuming that there is no shortage of the other ingredients used in making the cakes. Make it as an LPP and solve it graphically.

10. A decorative item dealer deals in two items A and B. He has ₹ 15000 to invest and a space to store at the most 80 pieces. Item A costs him ₹ 300 and item B costs him ₹ 150. He can sell items A and B at respective, profits of ₹ 50 and ₹ 28. Assuming he can sell all he buys, formulate the linear programming problem in order to maximise his profit and solve it graphically.

11. A manufacturer produces nuts and bolts. It takes 1 hour of work on machine A and 1 hours on machine B to produce a package of nuts while it takes 3 hours on machine A and 1 hour on machine B to produce a package of bolts. He earns a profit of ₹ 2.50 per package of nuts and ₹ 1.00 per package of bolts. How many packages of each type should he produce each day so as to maximise his profit, if he operates his machines for at most 12 hours a day? Formulate this problem as a linear programming problem and solve it graphically.