

**Required:**

- (a) Calculate the contribution per unit for each product. (2 marks)  
 (b) Write down the objective function and the various inequalities that represent the constraints. (6 marks)  
 (c) Draw the constraints on a graph and depict the feasible region. (6 marks)  
 (d) Establish an optimum production programme for each product. (6 marks)  
**(Total = 20 marks)**

5. The Deman Company manufactures and sells pens. Currently 5,000,000 pens are sold per year at 50 FCFA per unit.

Fixed costs are 90,000,000 FCFA per year.

Variable costs are 30 FCFA per unit.

Consider each case separately.

**Required:**

- (a) (i) What is the current annual operating income?  
 (ii) What is the present breakeven point in revenues? (5 marks)

Compute the new operating income for each of the following changes:

- (b) A 4 FCFA per unit increase in variable costs. (3 marks)  
 (c) A 10 % increase in fixed costs and a 10 % increase in units sold (3 marks)  
 (d) A 20 % decrease in fixed costs, a 20 % decrease in selling price, a 10 % decrease in variable cost per unit, and a 40 % increase in unit sold. (4 marks)  
 (e) Compute the new breakeven point in units for each of the following changes:  
 (i) A 10 % increase in fixed costs  
 (ii) A 10 % increase in selling price and a 2,000,000 FCFA increase in fixed costs. (5 marks)  
**(Total = 20 marks)**

6. The directors of CARDENS are considering investing in one of these two machines to increase production capacity. The details are as follows:

|                       | Machine D  | Machine E  |
|-----------------------|------------|------------|
|                       | FCFA (000) | FCFA (000) |
| Capital cost          | 30,000     | 30,000     |
| Estimated cash flows: |            |            |
| Year 1                | 18,000     | 10,500     |
| Year 2                | 20,000     | 13,500     |
| Year 3                | 12,000     | 24,000     |
| Year 4                | 15,000     | 25,500     |

The cost of capital is 15 %.

Present value of 1 FCFA:

| Year | 15 %  |
|------|-------|
| 1    | 0.870 |
| 2    | 0.756 |
| 3    | 0.658 |
| 4    | 0.572 |

All costs and revenues occur at the end of each year.

**Required:**

- (a) Calculate for both machines, the:  
 (i) Payback period. (6 marks)  
 (ii) Net present values. (12 marks)  
 (b) Using your answer in (a), state with reasons, which machine you would recommend the director of CARDENS to purchase. (2 marks)  
**(Total = 20 marks)**