SULIT

UNIVERSITI TEKNIKAL MALAYSIA MELAKA
PEPERIKSAAN SEMESTER II
SESI 2010/2011

[QUIZ -1]

KOD MATA PELAJARAN : **BMFP 3582**

MATA PELAJARAN : **EKONOMI PEMBUATAN (MANUFACTURING ECONOMY)**

PENYELARAS : **EN. H HAERY IP**

KURSUS : **BMFU**

MASA : **25 MENIT**

NAME :

MATRIX NO

B	**0**	**5**	**0**						

Arahan kepada calon:

1. **Kertas soalan ini mengandungi 1 Soalan**

KERTAS SOALAN INI TERDIRI DARIPADA (3) MUKA SURAT SAHAJA (TERMASUK MUKA SURAT HADAPAN)

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1A. A company produces circuit boards used to update outdated computer equipment. The fixed cost is RM 39,000 per month, and variable cost is RM 55 per circuit board. The selling price per unit is p = RM160 – 0.03D.

a) Determine the demand of circuit boards/month.
b) Determine the profit or loss
c) Find the volume at which breakeven occurs and the range (domain) of profitable demand.
d) What the range (domain) of profitable demand if the fixed cost are reduced to 10%

(a) p = 160 - 0.03D; C_F = RM 39,000; c_V = RM 55/circuit board

$$D^* = \frac{a - c_v}{2b} = \frac{160 - 55}{2(0.03)} = \underline{1{,}750 \text{ circuit boards/month}}$$

(b) Profit (loss) = Total Revenue - Total Cost
= 160D - 0.03D^2 - (39,000 + 55D)
= 160(1,750) - 0.03$(1{,}750)^2$ - 39,000 - 55(1,750)
= $\underline{\$ 52{,}875/\text{month}}$ (maximum profit)

(c) Breakeven occurs when profit = 0.
-0.03D^2 +160D = 39,000+ 55D
Profit = 0 = -0.03D^2 +160D - 39,000 – 55D
= -0.03D^2 + 105D – 39,000

$$D' = \frac{-105 \pm \sqrt{(105)^2 - 4(-0.03)(-39{,}000)}}{2(-0.03)}$$

$$D'_1 = 3{,}077.592 \approx 3{,}078 \text{ circuit boards/month}$$

$$D'_2 = 422.08 \approx 422 \text{ circuit boards/month}$$

The range of profitable demand is 78 to 3,078 circuit boards per month.

(d)

$$D' = \frac{-105 \pm \sqrt{(105)^2 - 4(-0.03)(-39{,}000 * 90\%)}}{2(-0.03)}$$

$$D'_1 = 3{,}125.682 \approx 3{,}126 \text{ circuit boards/month}$$

$$D'_2 = 374.3184 \approx 374 \text{ circuit boards/month}$$

The range of profitable demand is 374 to 3,126 circuit boards per month.

1B. A large wood products company is negotiating a contract to sell ply wood overseas. The fixed cost that can be allocated to the production of plywood is RM 900,000 per month. The variable cost per thousand board feet is RM 131.50. The price charged will be determined by p = RM 600,000 – 0.05D per 1,000 board feet.

a) Determine the optimal monthly sales volume for this product
b) Calculate the profit (loss) at the optimal volume.
c) Find the volume at which breakeven occurs and the range (domain) of profitable demand.
d) What the range (domain) of profitable demand if the variable cost are reduced to 10%

(a) p = 600 - 0.05D; C_F = RM 900,000/month; c_v = RM 131.50 per unit

The unit demand (D) is 1,000 (one thousand) board feet.

$$D^* = \frac{a - c_v}{2b} = \frac{600 - 131.50}{2(0.05)} = \underline{4{,}685 \text{ units/month}}$$

(b) Profit (loss) = Total Revenue - Total Cost
= 600 D - 0.05D^2 - (900,000 + 131.50D)
= [600(4,685) - 0.05(4,685)^2] - [RM 900,000 + RM 131.50(4,685)]
= RM 197,461.25 / month (maximum profit)

(c) Breakeven occurs when profit = 0.
-0.05D^2 +600D = 900,000+ 131.50D
Profit = 0 = -0.05D^2 +600D - 900,000 – 131.50D
= -0.05D^2 + 468.50D – 900,000

$$D' = \frac{-468.5 \pm \sqrt{(468.5)^2 - 4(-0.05)(-810{,}000{,}000{,}000)}}{2(-0.05)}$$

$$D_1' = \frac{-468.5 - 198.7266}{-0.1} = 6{,}672.266 \text{ units/month}$$

$$D_2' = \frac{-468.5 + 198.7266}{-0.1} = 2{,}697.734 \text{ units/month}$$

Range of profitable demand is <u>2,698 units to 6,672 units</u> per month.

(d) Breakeven occurs when profit = 0.
-0.05D^2 +600D = 900,000+ (131.50D*0.9)
Profit = 0 = -0.05D^2 +600D - 900,000 – 131.50D
= -0.05D^2 + 481.650D – 900,000

$$D' = \frac{-481.65 \pm \sqrt{(481.65)^2 - 4(-0.05)(-810{,}000{,}000{,}000)}}{2(-0.05)}$$

$$D_1' = \frac{-481.65 - 198.7266}{-0.1} = 7{,}096.56 \text{ units/month}$$

$$D_2' = \frac{-481.65 + 198.7266}{-0.1} = 2{,}536.44 \text{ units/month}$$

Range of profitable demand is <u>2,536 units to 7,097 units</u> per month.

1C. The annual fixed cost for a plant is RM 100,000 and the variable costs are RM 140,000 at 70% utilization of available capacity, with annual net sales is RM 280,000. The selling price is RM 40.

a) Find the volume at which breakeven occurs.
b) Calculate the % capacity of production.
c) Determine the % capacity of production if the utilization is 80%.
d) Due to economy crisis, the annual fixed cost and variable cost is increased 10%, but the annual net sales is decreased by 10%, what is the breakeven point of production if the utilization is maintained in 70% and selling price per unit is RM 40 ?

(a) C_F = RM 100,000/yr; C_V = RM 140,000/yr (70% of capacity)
Sales = RM 280,000/yr (70% of capacity); p = RM 40/unit
Annual Sales (units) = RM 280,000 / RM 40 = 7,000 units/yr (70% capacity)
c_v = RM 140,000 / 7,000 = RM 20/unit

$$D' = \frac{C_F}{p - c_v} = \frac{\text{RM } 100{,}000}{(\text{RM } 40 - \text{RM } 20)} = \underline{5{,}000 \text{ units/yr}}$$

(b) In terms of capacity, we have: 7,000units/0.7 = x units/1.0
Thus, x (100% capacity) = 7,000/0.7 = 10,000 units/yr

$$D'(\%\text{ of capacity}) = \frac{\text{RM } 5{,}000}{(10{,}000)} = \underline{0.5 \text{ or } 50\% \text{ of capacity}}$$

(c) Annual Sales (units) = RM 280,000 / RM 40 = 7,000 units/yr (80% capacity)
in terms of capacity, we have: 7,000units/0.8 = 8,750 units

$$D'(\%\text{ of capacity}) = \frac{\text{RM } 5{,}000}{(8{,}750)} = \underline{0.571249 \text{ or } 57\% \text{ of capacity}}$$

(d) C_F = RM 100,000/yr (1.1); C_V = RM 140,000/yr (1.1) (70% of capacity)
Sales = RM 280,000/yr (0.9) (70% of capacity); p = RM 40/unit
Annual Sales (units) = RM 252,000 / RM 40 = 6,300 units/yr (70% capacity)
c_v = RM 144,000 / 6,300 = RM 22.85714/unit ≈ RM 23/unit

$$D' = \frac{C_F}{p - c_v} = \frac{\text{RM } 110{,}000}{(\text{RM } 40 - \text{RM } 23)} = \underline{6{,}470.588 \text{ units/yr}} = 6{,}471 \text{ units/yr}$$

(a) C_F = RM 200,000/yr; C_V = RM 150,000/yr (80% of capacity)
Sales = RM 300,000/yr (80% of capacity); p = RM 50/unit
Annual Sales (units) = RM 300,000 / RM 50 = 6,000 units/yr (80% capacity)
c_v = RM 150,000 / 6,000 = RM 25/unit

$$D' = \frac{C_F}{p - c_v} = \frac{\text{RM } 200{,}000}{(\text{RM } 50 - \text{RM } 25)} = \underline{8{,}000 \text{ units/yr}}$$

(b) In terms of capacity, we have: 6,000 units/0.8 ,
Thus, x (100% capacity) = 6,000 /0.8 = 7,500 units/yr

$$D'(\%\text{ of capacity}) = \frac{\text{RM } 8{,}000}{(7{,}500)} = \underline{1.06667 \text{ or } 100.67\% \text{ of capacity}}$$

NO !!!

(c) Annual Sales (units) = RM 300,000 / RM 50 = 6,000 units/yr (40% capacity)
in terms of capacity, we have: 6,000units/0.4 = 15,000 units

$$D'(\%\text{ of capacity}) = \frac{\text{RM } 13{,}333.3}{(15{,}000)} = \underline{0.8889 \text{ or } 88.89\% \text{ of capacity}}$$

(d) C_F = RM 200,000/yr (1.05); C_V = RM 150,000/yr (1.05) (50% of capacity)
Sales = RM 300,000/yr (0.9) (50% of capacity); p = RM 40/unit
Annual Sales (units) = RM 270,000 / RM 40 = 6,750 units/yr (50% capacity)
c_v = RM 157,500 / 6,750 = RM 23.333/unit ≈ RM 23/unit

$$D' = \frac{C_F}{p - c_v} = \frac{\text{RM } 231{,}000}{(\text{RM } 40 - \text{RM } 23)} = \underline{13{,}588.24 \text{ units/yr}} = 13{,}588 \text{ units/yr}$$