**BEP Problems**

1. Following information related to the limited company.

Selling price per unit Rs.50

Variable cost per unit Rs.30

Fixed cost Rs.40000

From the above information calculate

1. Contribution
2. Profit volume Ratio (P/V)
3. Breakeven point of sales (BEP Sales)

**Solution:**

1. **Contribution Per unit** = Sales -Variable cost

= 50 – 30 = 20/-

1. Profit volume Ratio ( P/V Ratio ) = Contribution / sales X 100

= 20/50\*100 = 40%

1. Breakeven point of sales (BEP Sales) =
2. BEP (Units ) = Fixed cost /Contribution Per unit

= 40000/20 = 2000 Units

BEP ( Rs) = Fixed cost /PV ratio

= 40000/40% = 100000/-

or

=**BEP Unit\* selling price per unit = (2000\*50 = 100000)**

1. Given that

Sales Rs.50000

Variable cost Rs.25000

Fixed cost Rs. 35000

From the above information calculate

1. Contribution
2. Profit volume Ratio (P/V)
3. Breakeven point of sales (BEP Sales)

**Solution:**

**1. Contribution =** Sales -Variable cost

= 50000 -25000=25000

2. Profit volume Ratio ( P/V Ratio ) = Contribution / sales X 100

= 25000/50000\*100=50%

Breakeven point of sales (BEP Sales) = Fixed cost/ PV ratio

= 35000/50/100=70000/-

1. **If sales are 10,000 units and selling price is Rs. 20 per unit, variable cost Rs. 10 per unit and fixed cost is Rs. 80,000. Find out BEP in units and sales revenue. What is profit earned? What should be the sales for earning a profit of Rs. 60,000/-.**

Solution:

**BEP Sales (Units) = Fixed cost / contribution per unit**

(I) Contribution Per unit = Sales -variable cost

= 20-10=10

BEP(Units) = 80000/10=8000 Units

BEP sales (Rs.) = Fixed cost /PV ratio

PV Ratio = contribution / Sales \*100

= 10/20\*100=50%

BEP(Rs) = 80000/50%= 160000/-

Profit =Total sales \* P/v ratio -Fixed cost

Total sales = (10000\*20) =200000/-

= 200000\*50/100-80000= 20000/-

(V) Expected sales (Rs) = (Fixes cost + Expected Profit) / P/v ratio

= (80000+60000)/50% = 280000/-

Expected sales (units) = (Fixes cost + Expected Profit) / Contribution per unit

=(80000+60000)/10 = 14000 Units

**Verification**

**\*\*\* Profit = Sales \* P/v ratio -fixed cost**

**= 280000\*50/100-80000**

**= 60000/-**

1. **XYZ Company has supplied you the following information.**

**Selling price per unit Rs. 30**

**No. of units sold 20,000**

**Fixed cost Rs. 2, 40, 000**

**Variable cost per unit Rs. 15**

**Find out: (i) BEP in units & Rs.**

**(ii) Margin of safety**

**(iii) Sales to get a profit of Rs. 2,00,000**

Solution:

**( I ) a. BEP ( Units ) = Fixed cost / Cont.per unit**

**Contribution = Sales – variable**

**= 30-15=15**

**= 240000/15 = 16000 Units**

**b. BEP (Rs) = Fixed cost/P/v ratio**

**P/v ratio = C/S\*100 = 15/30\*100 = 50%**

**= 240000/50%= 480000/-**

( ii) Margin of safety = Total sales- BEP sales

=(20000\*30 -480000 = 120000/-

( iii) Expected sales = (Fixed cost + Expected profit) / P/v ratio

= (240000 + 200000)/50% = 880000/-

Expected sales(Units) = (Fixed cost + Expected profit) / contribution per unit

= (240000 + 200000) /15 = 29333.33 Or 29334 Units

**5.**.From the following information calculate

1. Total variable cost
2. BEP Sales
3. Sales to earn a profit of Rs.50000
4. Margin of safety

Selling price per unit Rs.90

Direct materials Rs.20

Direct labor Rs.20

Other variable cost 100% on labor

Total sales Rs.400000

Fixed cost Rs.50000

**Solution:**

1. Total variable cost = Direct Materials + Direct Labor + Other variable cost

= 20 + 20 + ( 20 \*100/100)

= 60/-

1. (B) Sales(Units) = Fixed cost/Cont.per unit

Cont.per unit = Sales – Veriable

= 90-60 = 30

BEP Sales(Units) = 50000/30= 1666.66 or 1667 Units

1. BEP sales = Fixed cost/P/v ratio

P/v ratio = C/S\*100= 30/90\*100= 33.33% or 331/3%

= 90000/1/3 = 270000/-

(C) Expected sales = ( Fixed cost + Expected profit) P/v ratio

=(90000+50000)/1/3 = 420000/-

(D) Margin of safety = Total sales – BEP sales

= 400000- 270000= 130000/-

A High-tech Train carries 36000 passengers per annum. Fare of each passenger Rs.400 and Variable cost for each passenger Rs. 250.Fixed cost Rs.25,00, 000.Calculate BEP of fare collection In Rupees as well as in Units (Passengers).

**Solution:**

**BEP (Units) = Fixed cost/Cont.per unit**

**Contribution = Sales – Variable cost**

**= 400-250= 150 per passenger.**

**BEP (Units) = 2500000/150 = 16666.66 Or 16667 Passengers.**

**BEP(Rs.) = Fixed cost /P/v ratio**

**P/v ratio = C/S\*100**

**150/400\*100= 37.5%**

**BEP(Rs.) = 2500000/37.5%**

**= 6666666.66 Or 6666667/-**

**A company estimates its fixed costs for the year at Rs.8,00,000 and its profit target at Rs.2,00,000. Each unit of product is sold at Rs.10 and variable cost per unit is Rs.8. What sales level must the company achieve in order to realize its profit goal?**

**Solution:**

**Expected sales(Units) =( Fixed cost + Expected profit)/ Cont.per unit**

**Cont.per unit = sales –variable**

**= 10-8= 2/-**

**Expected sales (Units) = (800000 + 200000) / 2 = 500000 Units.**

**Expected sales (Rs.) =( Fixed cost + Expected profit)/ P/v ratio**

**P/v ratio = C/S\*100**

**2/10\*100= 20%**

**Expected sales (Rs.) = (800000+200000) /20% = 5000000/-**

1. **From the following information calculate:**
2. **Margin of safety**
3. **Total sales**
4. **Total variable cost**

**Fixed costs Rs. 12,000**

**Profit Rs. 1,000**

**Break-Even Sales Rs.60, 000**

**Solution:**

BEP Sales (Rs) = Fixed cost /P/v ratio

60000 = 12000/P/v ratio

P/v ratio = 12000/60000\*100 = 20%

1. MOS = Profit /P/v ratio

= 1000/20%

= 1000\*100/20

= 5000/-

1. MOS= Total sales – BEP sales

Total sales = BEP sales + MOS

= 60000 + 5000 = 65000/-

1. Total variable cost = Total sales – Contribution

Contribution = Fixed cost + Profit

= 12000 + 1000 =13000/-

Total variable cost = 65000 – 13000 = 52000/-

1. **A company reported the following results for two periods.**

|  |  |  |
| --- | --- | --- |
| **Period** | **Sales** | **Profit/Loss** |
| **I** | **Rs.20,00,000** | **Rs.2,00,000** |
| **II** | **Rs.25,00,000** | **Rs.3,00,000** |

**Ascertain the BEP, P/V Ratio, Fixed cost and Margin of Safety**

**Solution:**

BEP (Rs.) = Fixed cost /P/v ratio

P/V ratio = Change in profit / Change in sales \* 100

= (300000-200000) /2500000-2000000\*100

100000/500000\*100 = 20%

Fixed Cost = Sales \* P/v ratio –Profit

Period 1 = 2000000\*20%-200000= 200000/-

Period 2 = 2500000\*20% - 300000= 200000/-

BEP (Rs.) = Fixed cost /P/v ratio

= 200000/20% = 1000000/-

MOS = Total sales – BEP Sales

Period 1 = 2000000-1000000= 1000000/-

Period 2 = 2500000 – 1000000 = 1500000/-

1. **A company reported the following results for two Years.**

|  |  |  |
| --- | --- | --- |
| **Period** | **Sales** | **Total cost/Cost of sales** |
| **2019** | **Rs.20,00,000** | **Rs.18,00,000** |
| **2020** | **Rs.25,00,000** | **Rs.22,00,000** |

**Ascertain the BEP, P/V Ratio, Fixed cost and Margin of Safety**

**Solution:**

**Profit = Sales – Total cost**

**Year 2019 = 2000000 – 1800000 = 200000/-**

**Year 2020 = 2500000 – 2200000 = 300000/-**

**9) A ltd company manufactures and sells goods in two successive years.1st year they sold 7000 Units and 2nd year 9000 Units respectively. 1st year they suffered loses with Rs.10000 and 2nd year they earned a profit of Rs. 10.000.Selling price per unit Rs.100**

**From the above information**

**Calculate BEP, P/V Ratio, Fixed cost and Margin of Safety**

**Solution:**

|  |  |  |
| --- | --- | --- |
| **Particulars** | **Sales** | **Profit/Loss** |
| **1st year** | **7000\*100= 700000** | **-10000** |
| **2nd year** | **9000\*100= 900000** | **10000** |

**BEP Sales = Fixed cost/P/V ratio**

**P/V ratio = Change in profit/Change in sales \* 100**

**= {(10000-(- 10000)}/200000 \*100= 10%**

**Fixed cost= Sales\*P/V Ratio-Profit**

**= 700000\*10% -(-10000) =80000/-**

**BEP Sales = 80000/10% = 800000/-**

**MOS = Total sales-BEP Sales**

**1st year = 700000-800000= Mos is not there**

**2nd year = 900000-800000= 100000/-**

**\*\* BEP Sales(Units) = BEP sales in Rs./Selling price per unit**

**= 800000/100= 8000 Units.**

1. **You are given the following information about two companies.**

|  |  |  |
| --- | --- | --- |
| **Particulars** | **Company A** | **Company B** |
| **Sales** | **Rs.5,00,000** | **Rs.5,00,000** |
| **Fixed Expenses** | **Rs.1,20,000** | **Rs.1,70,000** |
| **Variable Expenses** | **Rs.3,50,000** | **Rs.3,00,000** |

**You are required to Calculate (For Both Companies)**

* + - 1. **BEP (in Rs.)**
      2. **P/V Ratio**
      3. **Margin of safety**
      4. **What is the BEP and Margin of safety when selling price increases by 10%**

**e) Profit when the variable cost is increased by 5%.**

**COMPANEY-A**

1. **BEP Sales (Rs.) = Fixes cost/P/V ratio**
2. **P/V Ratio = Cont/Sales\*100**

**Cont = Sales-Variable cost**

**= 500000-350000= 150000**

**P/V Ratio =150000/500000\*100= 30%,**

1. **BEP Sales (Rs.) =120000/30% = 400000/-**
2. **Margin of safety = Total sales- BEP sales**

**= 500000-400000=100000/-**

**D)** BEP and Margin of safety when selling price increases by 10%

Revised selling price = 500000\*110/100= 550000/-

OR

\*\* {500000+(500000\*10/100)} = 550000

BEP Sales= Fixed cost/P/V Ratio

P/V Ratio = C/S\*100

New Cont =Revised Sales – Variable= 550000-350000= 200000

P/V Ratio = 200000/550000\*100 = 36.37%

BEP Sales(Rs.) = 120000/36.37% =329942.26/-

MOS = Total Revised Sales –Revised BEP sales= 550000-329942.26= 220057.74/-

* + - 1. Profit= Sales\*P/V Ratio-Fixed cost

P/V Ratio= C/S\*100

Cont=Sales-Variable

Revised variable cost= 350000\*105/100= 367500/-

Cont= 500000-367500=132500

P/V Ratio = 132500/500000\*100= 26.5%

Profit=500000\*26.5%-120000=12500/-

1. **A firm manufactures two products viz. P and Q. The firm wants to drop the product Q as it is yielding less contribution per unit and add the product R. By adding the product R, the new fixed cost is likely to be Rs. 2, 50,000/- and the sales volume will increase to Rs.18,00,000/- Consider the following information and suggest whether the firm should change the product or not.**

****

*Solution:*

1. **Existing Product-mix**

Contribution ratio for product P & Q =

(Selling price – Variable cost / Selling price) x percentage of total sales

Product P = (80 – 32 / 80) x 0.60 = 0.36

Product Q = (100 – 40 / 100) x 0.40 = 0.24

Total contribution ratio for P & Q = P + Q = 0.36 + 0.24 = 0.60

Total contribution = sales x contribution ratio = 1600000 x 0.60 = 960000

Profit = total contribution – fixed cost = 960000 – 200000 = **760000**

b) **Proposed Product-mix**

Contribution ratio for product P & R =

(Selling price – Variable cost / Selling price) x percentage of total sales

Product P = (100 – 40 / 100) x 0.30 = 0.18

Product R = (120 – 48 / 120) x 0.70 = 0.42

Total contribution ratio for P & Q = P + Q = 0.18 + 0.42 = 0.60

Total contribution = sales x contribution ratio = 1800000 x 0.60 = 1080000

Profit = total contribution – fixed cost = 1080000 - 250000 = **830000**

***Recommendation:***

The profit in proposed product-mix is higher than the existing product mix(Rs.830000>R.760000) and hence the firm can change the product mix.

1. Given that

Selling price per unit – Rs.100

Variable cost per unit 50% of sales

Fixed cost Rs.20000.

From the above information calculate

1. BEP sales.
2. If sales are 500000/- what will be the Profit?
3. What will be the selling price if BEP of sales comes down to 250 Units.

Solution:

1. BEP Sales = Fixed cost/P/V ratio

P/V ratio= Cont/Sales\*100

Contribution = Sales – Variable cost

=100-(100\*50/100)= 50/-

P/V ratio = 50/100\*100= 50%

OR

P/V ratio = 100-%of variable of Cost

=100% – 50% = 50%.

BEP(Rs) = 20000/50% = 40,000/-

BEP(Units) = Fixed Cost/Cont.Per unit

= 20000/50= 400 Units

1. Profit = Sales\*P/V ratio – Fixed cost

=500000\*50/100-20000 = Rs.230000.

1. BEP(Units) = Fixed cost/Cont.per unit

250 = 20000/Cont.per unit

Cont.per unit = 20000/250 = 80/-

Cont per unit = Sales – Variable cost

80 = Sales – 50

Selling price per unit = 130/-

1. Given that

Fixed cost Rs.150000, Percentage of variable cost of sales 66 2/3 %.

100% Capacity of sales 900000/-

From the above information calculate:

1. Variable cost
2. Profit volume ratio
3. BEP Sales and
4. Profit at 100% and 80% Capacity of sales

Solution : a) Variable cost = 900000\*2/3= 600000/-

b) P/V ratio = C/S\*100 OR 100-%of variable

= 100-662/3 % = 331/3%.

1. BEP Sales = Fixed cost/P/V ratio

= 150000/1/3 = 450000/-.

1. **Profit if sales at 100% capacity**

Profit= Sales\*P/V ratio – Fixed cost

900000\*1/3-150000= 150000/-

**Profit at 80% capacity**

Profit= Sales\*80% \* 1/3 –Fixed cost

= (900000\*80%)\*1/3-150000

= 720000\*1/3-150000

=240000-150000= 90000/-

14) Given that

|  |  |  |
| --- | --- | --- |
| **Particulars** | **% Of Variable cost on sales** | **Fixed cost** |
| Direct Materials | 32.8 |  |
| Direct Labour | 28.4 |  |
| Factory overheads | 12.6 | 189000 |
| Selling and distribution overheads | 3.1 | 58400 |
| Office and administrative over heads | 2.1 | 66700 |

Budgeted sales Rs.18,50,000

From the above information calculate:

1. Total variable cost
2. Profit volume ratio
3. BEP Sales
4. Profit at Budgeted Sales
5. What will be the Profit if Budgeted sales reduced by10%?

Solution:

1. Total variable cost = Budgeted sales\*%of variable cost

= 1850000\*79/100 = 1461500/-

1. P/V Ratio = 100-% of variable cost

= 100-79=21%

1. BEP Sales = Fixed cost/P/V ratio

= 314100/21% =1495714.03/-

1. Profit = Sales\*P/V ratio –Fixed cost

= 1850000\*21%-314100 =74400/-

1. Revised Sales = 18,50,000\*90%= 16,65,000/-

Profit= Revised sales\*P/V Ratio-Fixed cost

= 16,65,000 \* 21% - 314100 = 35,550/-

15). Given that:

Sales Rs.20,00,000 (1,00,000 Units)

Variable cost Rs,10,00,000

Contribution Rs.10,00,000

Fixed cost Rs.4,00,000

**Plane-A:**

1. Selling price increased by 20%.
2. Sales Volume decreased by 25%.
3. Variable cost per unit increased by 10%
4. Fixed cost decreased by Rs.50000/-

**Plane-B:**

1. Selling price decreased to 80%.
2. Sales volume increased by 20%.
3. Variable cost Per unit decreased by 10%.
4. Fixed cost valued at Rs.4,50,000.

From the above information suggest to the management Which plane is best plane?

Solution:

Selling price per Unit =2000000/100000=20/-

Variable cost per unit=10,00,000/1,00,000 = 10/-

**Plane A:**

1. Revised selling Price Per Unit = 20\*120/100 Or[ 20+20\*20/100]= 24/-
2. Revised sales volume = 1,00,000\*75/100 Or[ 1,00,000-100000\*25/100]= 75000 Units
3. Revised variable cost = 10/110/100 Or [ 10+10\*10/100] =11/-
4. Revised fixed cost = 4,00,000-50,000 = 3,50,000/-

Profit= Sales\*P/V Ratio-Fixed cost

P/V Ratio= C/S\*100

Contribution= Sales –Variable cost

= 24-11=13/-

P/V Ratio = 13/24\*100= 54.16% Or 54.17%

Revised total sales= 75000\*24= 18,00,000/-

Profit= (18,00,000\*54.17/100)-3,50,000/-= **6,25,060/-**

**Plane-B :**

1. **Revised Sales =** 20\*80/100= 16/-
2. **Revise sales volume=** 100000\*120/100=120000 units
3. **Revised variable cost= 10\*90/100= 9/-**
4. **Revised fixed cost=4,50,000/-**

Profit =(Revised sales\*P/V Ratio)-Revised fixed cost

P/V Ratio= C/S\*100

Contribution= Sales-Variable cost

= 16-9= 7/-

P/V Ratio = 7/16\*100= 43.75%

Profit= [(120000\*16)43.75%-450000

=**390000/-**

**Decision= Plane ‘A’ is the best plane because Plane ‘A ’profit is more than Plane ’B’**

16). Given that

|  |  |  |
| --- | --- | --- |
| Particulars | Product- A | Product-B |
| Direct materials per unit | Rs.10 | Rs.9 |
| Direct labour Per Unit | Rs.3 | Rs.2 |
| Selling price per unit | Rs.20 | Rs.18 |

Other variable over heads 100% on labour and Fixed cost Rs.800

Sales Mix:

1. Manufactured and sold 100 Units of Product-A and 200 Units of Product-B
2. Manufactured and sold 150 Units of Product-A and 150 Units of Product-B
3. Manufactured and sold 200 Units of Product-A and 100 Units of Product-B

From the above information suggest to the management which Sales Mix is the Best

Solution:

**Product A**

Contribution = Sales-Variable cost

Total variable cost=( DM +DL +Other variable over heads100% on labour)

= (10+3+3)=16

Cont= 20-16=4/-

**Product B:**

Contribution = Sales-Variable cost

Total variable cost=( DM +DL +Other variable over heads100% on labour)

= (9+2+2)=13/-

Cont= 18-13=5/-

**Total Profit = Total Contribution-Fixed cost**

1. Manufactured and sold 100 Units of Product-A and 200 Units of Product-B

Profit =[( 100\*4 + 200\*5)-800]

=400+1000-800=600/-

1. Manufactured and sold 150 Units of Product-A and 150 Units of Product-B

Profit = [(150\*4+150\*5)-800]=

= 600+750-800 = 550/-

1. Manufactured and sold 200 Units of Product-A and 100 Units of Product-B

Profit = [(200\*4+100\*5)-800

=800+500-800= 500/-

**First mix is the best mix because its shows more profit**

17) A ltd Company manufactured and sells two product X & Y In the same market. There Budgeted profit and loss account as follows.

|  |  |  |
| --- | --- | --- |
| Particulars | Company “X” | Company “Y” |
| Sales | 300000 | 300000 |
| (-) Variable cost | 240000 | 200000 |
| (-) Fixed cost | 30000 270000 | 70000 270000 |
| Profit | 30000 | 30000 |

From the above information calculate

1. BEP of both the companies
2. Which company is more profitable from the following situation
3. In Low demand situation. (ii) In High demand situation.