**SAP** Ltd manufactures one standard product and in common with other

companies in the industry is suffering from the current depression in the market. Currently it is operating at a normal level of activity of 70%, which represents an output of 6300 units, but the sales director believes that a realistic forecast for the next budget period would be a level activity of 50%.

|  |  |  |  |
| --- | --- | --- | --- |
| Level of activity (%) | 60 | 70 | 80 |
| Direct materials (£). | 37,800 | 44,100 | 50,400 |
| Direct wages (£). | 16,200 | 18,900 | 21,600 |
| Production overhead (£). | 37,600 | 41,200 | 44,800 |
| Administration overhead (£) | 31,500 | 31,500 | 31,500 |
| Selling overhead (£) | 42,300 | 44,100 | 45,900 |

Profit is 25% of total costs

**Required:**

|  |
| --- |
|  |

**a) Calculate cost per unit for the following at the 50% activity level:**

* Direct cost/prime costs per unit
* Variable production cost unit
* Production cost per unit
* Variable cost per unit
* Total cost per unit
* Selling price per unit

b) Budgeted marginal costing profit statement based on a 50% activity level.

c) Budgeted absorption costing profit statement based on a 50% activity level

**Workings to answer the above questions in (a)**

1) 70% activity = 6300 units

100% = 6300/0.7 = 9000 units

60% = 9000 x 0.6 = 5400 units or [6300/0.7] x 0.6 = 5400 units

80% = 9000 x 0.8 = 7200 units

50% activity = 9000 x 0.5 = 4500 units.

2) Direct/prime costs per unit: All direct/prime costs are variable costs.

Total prime costs for 6300 units = £ [44,100 + 18,900] = £63,000

Prime costs per unit = £63,000 / 6300 unit = £10 per unit

[Note – the same result from using the prime costs figures for 60% or 80% activity:

Example: Direct cost/prime costs per unit at 60% activity = [37800 + 16200] / 5400

= £10 per unit]

3) Variable production cost unit. This will the total of the prime costs and variable production overhead

Is production overhead a semi-variable cost?

Use the high-low method to analyse this overhead; this can be used to test whether it is a

semi- variable cost.

Variable production overhead per unit = £ [44,800 – 37,600] / [7200 – 5400] units

= £7,200 / 1800 = £4 per unit

Fixed production overhead = £37,600 - £4 x 5400 or £41,200 - £4 x 6300 OR £44,800 – 7200 x £4

= £16,000

Proof: Check: For 6300 units x £4 + £16,000 = £41,200; Conclusion: It is a semi-variable cost.

Variable production cost per unit = Prime cost/unit + Variable production overhead per unit

= £ [10 + 4] = £14 per unit.

4) Production cost per unit = Variable production cost per unit + Fixed production overhead per unit

Fixed production per unit at 50% activity level [4500 units]

= £16,000 / 4500 units = £3.555..or £3.56

Production cost per unit = £14 + £3.56 = £17.56 per unit

5) Variable cost per unit = Variable production cost per unit + Variable selling overhead.

Note: The administration overhead is the same for 3 activity levels and so it a fixed cost.

Variable selling overhead per unit = £ [45,900 – 42,300] / [7200 – 5400] units = £2 per unit

Variable cost per unit = £14 + £2 = £16 per unit

Check: 6300 x £2 + £31,500 = £44,100; Conclusion: It is a semi-variable cost.

6) Total cost per unit = Total costs at 50% activity level = Variable costs per unit + Fixed cost per unit

Fixed selling overhead = £45,900 – £2 x 7,200 units = £31,500

Fixed administration overhead = £31,500

Fixed production overhead = £16,000

Total fixed cost = £ [31,500 + 31,500 + 16,000] = £79,000

Fixed cost per unit = £79,000 / 4500 units = £17.56

Total cost per unit = £ [16 + 17.56] = £33.56 per unit.

7) Selling price per unit = Total cost per unit + 25% of total cost = £33.56 + £8.39 = £41.95 per unit

**NOTES TO SUPPORT/EXPLAIN THE ABOVE CALCULATIONS**

**Cost classification**

**Production/manufacturing/factory costs**

e.g. Direct materials, direct labour, direct expense [or prime costs] + Indirect costs in the factory [production or factory overheads].

**Period costs**. [e.g. Administration, Distribution and Selling overheads or costs – these are written off as an expense in the Income Statement of the current accounting period.

**Cost behaviour** – There are 4 types of cost behaviour. These are variable costs, fixed costs, semi-variable costs and semi-fixed costs.

**Variable costs**:

Total variable costs vary with the activity level. e.g. Direct materials cost per unit = £10/unit, then 100 units will incur £1000 of total direct materials cost [100 units x £10].

Variable cost per unit is constant.

Examples: All direct costs; sales commission.

**Fixed costs:**

Total fixed costs remain constant within the relevant range. These costs vary with time and are independent of activity level.

Fixed cost per unit will decrease with increase in activity level.

Examples: Rent, rates, salaries, Insurance etc.

*If a cost varies with time then it is a fixed cost; If a cost varies with activity level [e.g. production volume or sales volume] then it is a variable cost.*

**Semi-variable costs:**

It will consist of both variable and fixed cost e.g. Salesman’s remuneration [salary + sales commission]; utility bills; power bills.

**Semi-fixed costs [step-fixed costs]:**

It is a fixed cost which increase at defined levels of activity level e.g. supervision labour costs

Example: 1 supervisor can manage a maximum of 10 direct workers

A factory with 100 direct workers will requre10 supervisors.

Where the number of direct workers increase to 105 direct workers – 11 supervisors will be required. Hence supervision labour costs [salaries] will step up/increase.

An understanding of how costs behave will help with cost estimation, cost budgeting, cost control, decision – making etc.

**How to analyse semi-variable costs into variable and fixed cost components: High-low method**

Example:

Activity [units]. 1000. 2000. 5000

Semi-variable costs [£]. 7000. 9000. 15000

Variable cost per unit = [£15,000 - £7,000] / [5000 – 1000] units

= £8000 / 4000 units = £2 per unit

Fixed costs within the semi-variable cost

= Total semi-variable costs – Total variable costs

Example: for 2000 units

£9000 - £2 per unit x 2000 units = £5000

Check: For 1000 units: the semi-variable costs = £2 x 1000 units + £5000 = £7000

Estimate the semi-variable costs for 2500 units: 2500 x £2 + £5000 =£10,000