|  |  |
| --- | --- |
| **7** | **Pricing Decision** |

Unsolved questions solution

**Q3:** At a price of $200, a company will be able to sell 1,000 units of its product in a month. If the selling price is increased to $220, the demand will fall to 950 units. It is also known that the product has a variable cost of $140 per unit, and fixed costs will be $36,000 per month.

**Required:**

1. Find an equation for the demand function (that is, price as a function of quantity demanded)
2. Write down the marginal revenue function
3. Write down the marginal cost
4. Find the quantity that maximize profit
5. Calculate the optimum price

What is the maximum profit?

**Solution:**

1. Let Q = quantity produced/sold

Gradient ‘b’ =

b

b = -0.1

Price = a – 0.1Q; $160 = a – 0.1 (2,000) therefore a = $360

P = $360 – 0.1Q

MR = $360 – 0.2Q

Mc = $64

❖ ❖ ❖

**Case Scenario**

**Q4:** Netcom Ltd. manufactures and sells a number of products. All of its products have a life cycle of less than one year. Netcom Ltd. uses a four stage life cycle model (Introduction, Growth, Maturityand Decline).

Netcom Ltd. has recently developed an innovative product. It was decided that it would beappropriate to adopt a market skimming pricing policy for the launch of the product.

However, Netcom Ltd. expects that other companies will try to join the market very soon.

This product is currently in the Introduction stage of its life cycle and is generating significant unit profits. However, there are concerns that these current unit profits will not continue during theother stages of the product’s life cycle.

**Required**

EXPLAIN, with reasons, the changes, if any, to the unit selling price and the unit production cost that could occur when the products move from the previous stage into each of the following stagesof its life cycle:

1. Growth
2. Maturity

**Solution**

Growth Stage

Compared to the introduction stage the likely changes are as follows:

**Unit Selling Prices:**

These are likely to be reducing for a number of reasons:

* The product will become less unique as competitors use reverse engineering to introduce their versions of the product.
* Netcom may wish to discourage competitors from entering the market by lowering the price and thereby lowering the unit profitability.
* The price needs to be lowered so that the product becomes attractive to different market segments thus increasing demand to achieve the growth in sales volume.

**Unit Production Costs:**

These are likely to reduce for a number of reasons:

* Direct materials are being bought in larger quantities and therefore Netcom may be able to negotiate better prices from its suppliers thus causing unit material costs to reduce.
* Direct labour costs may be reducing if the product is labour intensive due to the effects of the learning and experience curves.
* Other variable overhead costs may be reducing as larger batch sizes reduce the cost of each unit.
* Fixed production costs are being shared by a greater number of units.

**Maturity Stage**

Compared to the growth stage the likely changes are as follows:

**Unit Selling Prices:**

These are unlikely to be reducing any longer as the product has become established in the market place. This is a time for consolidation and whilst there may be occasional offers to tempt customers to buy the product the selling price is likely to be fairly constant during this period.

**Unit Production Costs:**

Direct material costs are likely to be fairly constant in this phase and may even rise as the quantities required diminish compared to those required in the growth stage with the consequential loss of negotiating power.

Direct labour costs are unlikely to be reducing any longer as the effects of the learning and experience curves have ended. Indeed the workers may have started working on the next product so that their attention towards this product has diminished with the result that these costs may increase.

Overhead costs are likely to be similar to those of the end of the growth phase as optimum batch sizes have been established and are more likely to be used in this maturity stage of the product life cycle where demand is more easily predicted.

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**Q7:** A company is launching a new product. Market research shows that if the selling price of the product is $100 the demand will be 1,200 units, but for every $10 increase in selling price there will be a corresponding decrease in demand of 200 units and for every $10 decrease in selling price there will be a corresponding increase in demand of 200 units. The estimated variable costs of the product are $30 per unit. There are no specific fixed costs but general fixed costs are absorbed using an absorption rate of $8 per unit.

Calculate the selling price at which profit is maximized.

Note: when price = a – bx then Marginal Revenue = a – 2bx (P= 95)

**Solution:** The question states that the formula for the demand curve and for marginal revenue. What you need to do is work out the values of ‘a’ and ‘b’ to substitute into the two formulae. You can then work out the profit – maximizing price using MR = MC. Remember that ‘a’ is the price at which demand would be nil and ‘b’ is the amount by which price falls for each stepped change in demand.

**Step 1**

Assuming demand is linear, each increase of $10 in the price would result in a fall in demand of 200 units. So, if the price goes up by $60, the demand will fall by:

200 units x 6 = 1,200. Therefore a = $160.

**Step 2**

We know that P = a-bx and a = $160. We have also defined b above. So taking data from the question, and ignoring currency

b =

So the demand equation will be:

P = 160 – 0.05x

And the MR equation will be:

MR = 160 – 0.10x

**Step 3**

MR = MC so

160 – 0.10x = 30

X = 1,300

Substitute this value of x into the demand equation to obtain the profit-maximising selling price

P = 160 – 0.05 x 1,300 = $95

❖ ❖ ❖

**Q8:** A company is considering price of a new product. It has determined that the variable cost of making the item will be $24 per unit. Market research has indicated that if the selling price were to be $60 per unit then the demand would be 1,000 units per week.

However, for every $10 per unit increase in selling price, there would be a reduction in demand of 50 units; and for every $10 reduction in selling price there would be an increase in demand of 50 units.

Calculate the optimal selling price.

Note. If price P = a – bx then Marginal Revenue = a – 2bx (P=142, X= 590)

**Solution**

P = 260 – 0.2x

MR = 260 – (2 x 0.2)x = 260 – 0.4x

Profit is maximized (optimal selling price and output) when MR = MC

Marginal cost = variable cost per unit = $24

Optimal output:

260 – 0.4x = 24

0.4x = 260 – 24

X = 590 units

Optimal selling price:

P = 260 – 0.2 x 590 = $142

❖ ❖ ❖

**Q9:** A company is considering the price of one of its products for next year. It expects that the variable cost of making the item will be $15 per unit. It has also determined that if the selling price were to be $35 per unit then the demand would be 500 units per week.

However, for every $5 increase in selling price, there would be a reduction in demand of 50 units per week; and for every $5 reduction in selling price, there would be an increase in demand of 50 units per week.

Calculate the optimal selling price.

Note. If price P = a – bx then Marginal Revenue = a – 2bx (a=85, P=50, X=350)

**Solution:-**

A = the price at which demand is zero

B = the amount by which price falls foe each stepped change in demand

**Step 1**

Assuming demand is linear, for every $5 increase in selling price demands falls by 50 units per week and vice versa.

For demand to be zero, demand must fall by 500 units (which means that price must go up by (500 ÷50) x 5 = $50). Therefore a = $35 + $50 = $85.

Alternative approach

You could use the formula approach to replace step 1 above.

P = a – bx

35 = a – 0.1 x 500

35 = a – 50

A = 85

**Step 2**

P = a – bx

A = 85 (from step 1 above)

b = 5 ÷50 = 0.1

The demand equation is:

P = 85 – 0.1x

Marginal revenue = 85 – 0.2x

**Step 3**

This occurs when MR = MC (where marginal cost is assumed to be the variable cost per unit)

85 – 0.2x = 15

0.2x = 85 – 15

X = 350

Substitute this value of x into the demand equation to obtain the optimal selling price

P = 85 – (0.1 x 350)

P = $50

❖ ❖ ❖

**Q10:** A company is launching a new product. Market research shows that if the selling price of the product is $100 then demand will be 1,200 units, but for every $10 increase in selling price there will be a corresponding decrease in demand of 200 units and for every $10 decrease in selling price there will be a corresponding increase in demand for 200 units. The estimated variable costs of the product are $30 per unit. There are no specific fixed costs but general fixed costs are absorbed sing an absorption rate of $8 per unit.

Calculate the selling price at which profit is maximized.

Note:- When Price = a - bx then Marginal Revenue = a-2bx.

**Solution:** The question states the formulate for the demand curve and for marginal revenue. What you need to do is work out the values of “a” and “b” to substitute into the two formulae. You can then work out the profit-maximizing price using MR=MC. Remember that “a” is the price at which demand would be nil and “b” is the amount by which price falls for each stepped change in demand.

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**Q11:** TQ manufactures and retails second generation mobile (cell) phones. The following details relate to one model of phone:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | **$/unit** |
| Budgeted selling Price |  |  | 60 |
| Budgeted variable cost |  |  | 25 |
| Budgeted fixed cost |  |  | 10 |
| **Period** | **Period1** | **Period 2** | **Period 3** |
| Budgeted production and sales (units) | 520 | 590 | 660 |
| Fixed overhead volume variance | $1,200 (A) | $1,900(A) | $2,600(A) |

There was no change in the level of stock during any of periods 1 TO 3.

The Board of Directors has expected sales to keep on growing but, instead, they appeared to have stablised. This has led to the adverse fixed overhead volume variances. It is now the start of period 4 and the Board of Directors is concerned at the large variances that have occurred during the first three periods of the year. The Sales and Marketing Director has confirmed that the past trend of sales is likely to continue unless changes are made to the selling price of the product. Further analysis of the market for the mobile phone suggest that demand would be zero if the selling price was raised to $100 or more.

**Required:**

1. Calculate the price that TQ should have charged for the phone assuming that it wished to maximize the contribution from this product.

Note. If price = a- bx then marginal revenue = a- 2bx.

1. Calculate the difference between the contribution that would have been earned at the optimal price and the actual contribution earned during period 3, assuming the variance costs per unit were as budgeted.

**Answer: TQ**

1. (i) P = a-bx

When P = 100, x = 0

Therefore, using above equation, a = 100

Using fixed overhead volume variance to find actual sales units:

Fixed overhead volume variance = (budgeted units – actual units) × standard fixed overhead rate

**Rearranging:**

Actual units = budgeted units –

|  |  |  |  |
| --- | --- | --- | --- |
| Period | Budgeted units |  | Actual units |
| 1 | 520 |  |  |
| 2 | 590 |  |  |
| 3 | 660 |  |  |

Using high-low method to calculate b:

When

P = 60, x= 400

= 100, x = 0

= 0.10

So, we can now write equation as:

P = 100 – 0.1x

MR = 100 – 0.2x

To maximize contribution: MR = MC

We assume that MC = variable cost per unit of $25

100 – 0.2x = 25

X = 375

To sell 375 units:

P = 100 – (0.1 x 375)

= $62.50 (this is the price at which contribution will be maximised).

(ii)

|  |  |  |
| --- | --- | --- |
|  | **Optimal price** | **Actual price** |
|  | **$** | **$** |
| Selling price | 62.50 | 60.00 |
| Variable cost | 25.00 | 25.00 |
| Contribution per unit | 37.50 | 35.00 |
| Units sold | 375 units | 400 units |
| Total contribution | $14,062.50 | £14,000 |

Difference in contribution = $62.50.

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**Q12:** State the appropriate pricing policy in each of the following independent situations:

(i) ‘A’ is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.

(ii) ‘B’ is a new product for the company, but not for the market. B’s success is crucial for the company’s survival in the long term.

(iii) ‘C’ is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the usual sources of capital have uncertainties blocking them.

(iv) ‘D’ is a perishable item, with more than 80% of its shelf life over.

Solution:

|  | Situation | Appropriate Pricing Policy |
| --- | --- | --- |
| (i) | ‘A’ is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic. | Penetration Pricing |
| (ii) | ‘B’ is a new product for the company, but not for the market. B’s success is crucial for the company’s survival in the long term. | Market Price or Price Just Below Market Price |
| (iii) | ‘C’ is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the unusual sources of capital have uncertainties blocking them. | Skimming Pricing |
| (iv) | ‘D’ is a perishable item, with more than 80% of its shelf life over. | Any Cash Realizable \* Value |

(\*) this amount decreases every passing day.

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**Q13**: State the appropriate pricing policy in each of the following independent situations:

1. 'W' is a new product for the company and the market and meant for large scale
2. 'X' is a new product for the company, but not for the market. X's success is crucial for the company's survival in the long term.
3. 'Y' is a new product to the company and the market. It has an inelastic market.

There needs to be an assured profit to cover high initial costs and the usual sources of capital have uncertainties blocking them.

1. 'Z' is a perishable item, with more than 80% of its shelf life over.

**Answer:**

|  |  |
| --- | --- |
| **Situation** | **Appropriate Pricing Policy** |
| ‘W’ is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic. | Penetration Pricing |
| ‘X’ is a new product for the company, but not for the market. X’s success is crucial for the company’s survival in the long term. | Market Price or Price Just  Below Market Price |
| ‘Y’ is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the unusual sources of capital have uncertainties blocking them. | Skimming Pricing |
| ‘Z’ is a perishable item, with more than 80% of its shelf life over. | Any Cash Realizable Value\* |

*(\*) this amount decreases every passing day.*

❖ ❖ ❖

**Q16:** An organization manufactures a product, particulars for which are detailed below:

|  |  |
| --- | --- |
| Annual Production | 20,000 units |
| Material cost | `60,000 |
| Other Variable Costs | `1,20,000 |
| Fixed Costs | `40,000 |
| Total Costs | `2,20,000 |
| Apportioned Investment | `2,00,000 |

**Determine the unit selling price under each of the following strategies:**

I:- 20% return on investment

II:- 30% mark-up based on total cost

III:- 20% profit on net sales price;

IV:- 15% profit on list sales when trade discount is 35%

V:- 40% mark-up based on incremental cost;

VI:- 50% mark-up based on value added by manufacturer.

Assume that the organizations’ tax rate is 52%.

**Solution:** Let S be the Sales revenue

(1) 20% on investment

(S- 2,20,000) (1-0.52) = 0.20 \* 2,00,000

S = 2,20,000 + 40,000 /0.48 = 2,20,000 + 83,333.33

= 3,03,333.33

Selling Price per unit = S/20,000

= 3,03,333.33/20,000

= `15.17

(2) 30% mark-up based on total cost:

Selling Price = ( S- 2,20,000) (1-0.52) = 1.30 \* 2,20,000

= ` 17.875

(3) 20% Profit on net sales price:

(S-2,20,000) (1-0.52) = 0.20\*S

S = 0.48\*2,20,000/(0.48-0.20) = 1,50,600/0.28

Selling Price = 3,77,142.86/20,000 = `18.86

(4) 15% Profit on list price with trade discount of 35%

(S (1-035)-2,20,000) (1-0.52) = 0.15S

(0.65S – 2,20,000) 0.48 = 0.15S

S = 1,05,600/0.162 = 6,51,851.85

Selling Price = 6,51,851.85/20,000

= `32.59 gross `21.18 net

(5) 40% mark-up based on incremental cost

Selling Price =(S-2,20,000) (1-0.52) = 40% (60,000 + 1,20,000)

= `18.50

(6) 50% mark-up based on value added by manufacture:

Value added by manufacture = 2,20,000 – 60,000

= 1,60,000

(S-2,20,000) (1-0.52) = 50% 160,000

= `19.33

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**Q21:** Excel Ltd specializes in the manufacture of Printers. They have recently developed a technology to design a new Printer. They are quite confident of selling all of the 4,000 units that they would be making in a year. The capital equipment that would be required will cost `12.5 Lakhs. It will have an economic life of 4 years and no significant terminal salvage value.

During each of the first four years promotional expenses are planned as under:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **1** | **2** | **3** | **4** |
| Advertisement (`) | 50,000 | 50,000 | 30,000 | 15,000 |
| Other expenses (`) | 25,000 | 25,000 | 45,000 | 60,000 |

Variable costs of producing & selling the unit would be ` 125 per unit.

Additional fixed operating costs incurred because of this new product are budgeted at` 37,500 per year.

The company profit goals call for a discounted rate of return of 15% after taxes on investment s on new products. The income tax rate on an average works out to 30%. You can assume that the straight line method of depreciation will be used for tax and reporting. Workout an initial selling price per unit of the product that may be fixed for obtaining the desired rate of return on investment.

Present value annuity of ` 1 received or paid in a steady throughout 4 years in the future at 15% is 2.854.

**Answer:-**

Determination of Initial selling price

Let the selling price be ` X

Sales Value: ` 4,000 X

|  |  |
| --- | --- |
| Annual ash Costs are: | ` |
| Variable Cost : 4,000 units X `125 | 5,00,000 |
| Advertisement & other expenses | 75,000 |
| Additional Fixed Cost | 37,500 |
| Total Cash Cost | 6,12,500 |

**Depreciation per annum = `12,50,000/4**

Profit for taxation :`4,000 X ` X – (`6,12,500 + `3,12,500)

= ` 4,000 X - `9,25,000

Tax at 30% on profit:

30% of (`4,000 X - ` 9,25,000 ) = ` 1,200 X ` 2,77,500

Total annual cash outflow:

`6,12,500 + (`1,200 X - `2,77,500) = `1,200 X + ` 3,35,000

Net annual cash Inflow:

`4,000 X – (`1,200 X + ` 3,35,000)

`2,800 X - `3,35,000

Now, present value of initial cash outflow = Present value of cash inflow

Or Rs 12,50,000 = (`2,800 X - ` 3,35,000) X 2.854

Or X = `276.06

Hence selling Price should be ` 276.06 per unit.

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**Q22:** RST Ltd. are specialists in the manufacture of sports goods. They manufacture croquet mallets but purchase the wooden balls, iron arches and stakes required to complete a croquet set.

Mallets consist of a head and handle. Handles use 2.5 board feet per handle at `50 per board foot. Spoilage loss in negligible for the manufacture of handles. Heads frequently split and create considerable scrap.

A head requires 0.40 board feet of high quality lumber costing `60 per board foot. Spoilage normally works out to 20% of the completed heads. 4% of the spoiled heads can be salvaged and sold as scrap at `10 per spoiled head.

In the department machining and assembling the mallets, 6 men work 8 hours per day for 25 days in a month. Each worker can machine and assemble 12 mallets per uninterrupted 40 minutes time frame. In each 8 hours working day, 15 minutes are allowed for coffee-break, 8 minutes on an average for training and 9 minutes for supervisory instructions. Besides 10% of each day is booked as idle time to cover checking in and checking out changing operations, getting materials and other miscellaneous matters. Workers are paid at a comprehensive rate of `6 per hour.

The department is geared to produce 20,000 mallets per month and the monthly expenses of the department are as under:

|  |  |
| --- | --- |
|  | ` |
| Finishing and painting of the mallets | 20,000 |
| Lubricating oil for cutting machines | 600 |
| Depreciation for cutting machine | 1,400 |
| Repairs and maintenance | 200 |
| Power to run the machines | 400 |
| Plant Manager’s salary | 9,400 |
| Other overheads allocated to the department | 60,000 |

As the mallets are machined and assembled in lots of 250, prepare a total cost sheet for one lot and advise the management on the selling price to be fixed per mallet in order to ensure a minimum 33.33% margin on the selling price. (238.68)

Solution:

RST Ltd.

Cost Sheet of one lot of 250 Croquet Mallets

|  | ` |
| --- | --- |
| **Direct Material:** |  |
| Handles (2.5 feet × 250 units × `50) | 31,250 |
| Heads (1.20 × 250 × 0.40 × `60) | 7,200 |
| (Refer to working note 1) |  |
| **Less: Scrap recovery** (4% × 50 ×`10) | (20) |
| **Direct Labour:**  (8 Hrs × `6 × 250/120)  (Refer to working note 2) | 100 |
| Prime Cost | 38,530 |
| **Factory & other Overheads:** |  |
| **Variable, Finishing & painting**  (20,000 × 250/20,000)  (Refer to working note 3) | 250 |
| **Fixed**  (`72,000 × 250/18,000)  (Refer to working note 4) | 1,000 |
| **Total Cost** | **39,780** |
| **Price Quotation:** |  |
| Cost per mallet (`39,780/250 Units) | 159.12 |
| Add: Profit 50% on  (33.33% margin on selling price means 50% on cost) | 79.56 |
| Selling price | 238.68 |

Working Notes:

1. Since 20% of completed heads are spoiled, output of 1 unit requires input of 1 + 0.20 = 1.20 units; so, total heads processed: 1.20 × 250 = 300, of which spoiled heads are 50.

2.

|  |  |  |
| --- | --- | --- |
| Total Time in a day: | 8 × 60 | 480 minutes |
| Less: Idle Time | 48 minutes |  |
| Coffee break | 15 minutes |  |
| Instructions | 9 minutes |  |
| Training | 8 minutes | 80 minutes |
| Productive time per day: |  | 400 minutes |

Therefore, mallets to be produced per man per day: (400/40 × 12) = 120 units

Since mallets are produced at the rate of 120 mallets per man day, so total monthly production will be: 120 units × 6 men × 25 days = 18,000 mallets

3. Finishing and painting overheads are assumed to be variable for the production of 20,000 mallets.

All the other expenses are fixed and are to be absorbed by 18,000 mallets of monthly production.

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**Pricing decision and learning curve**

**Q23:** The Q organization is a large worldwide respected manufacturer of consumer electrical and electronic goods. Q constantly develops new products that are in high demand as they represent the latest technology and are ‘must haves’ for those consumers who want to own the latest consumer gadgets.

Recently Q has developed a new handheld digital DVD recorder and seeks your advice as to the price it should charge for such a technologically advanced product.

Market research has discovered that the price/demand relationship for the item during the initial launch phase will be as follows:

|  |  |
| --- | --- |
| **Price ($)** | **Demand (units)** |
| 100 | 10,000 |
| 80 | 20,000 |
| 69 | 30,000 |
| 62 | 40,000 |

Production of the DVD recorder would occur in batches of 10,000 units, and the production director believes that 50% of the variable manufacturing cost would be affected by a learning and experience curve. This would apply to each batch produced and continue at a constant rate of learning up to a production volume of 40,000 units when the learning would be complete.

Thereafter, the unit variable manufacturing cost of the product would be equal to the unit cost of the fourth batch. The production director estimates that the unit variable manufacturing cost of the first batch would be $60 ($30 of which is subject to the effect of the learning and experience curve, and $30 of which is unaffected), whereas the average unit variable manufacturing cost of all four batches would be $52.71.

There are no non- manufacturing variable costs associated with the DVD recorder.

You are Q’s Senior Management Accountant and have recently received the following email:

From: Gianfranco Bolatelli

Sent: 03 June, 10.23 a.m.

To: Senior Management Accountant

Subject: Pricing

I am unclear about the best price to charge for our product. Would it have to change, now and then? Please draft me a report that, first of all, explains the relevance of the product life cycle to the consideration of alternative pricing policies that might be adopted by Q.

You have recently met the Production Director and looked at this figures: what rate of learning does he expect? What would be the optimum price at which Q should sell the DVD recorder be, in order to maximize its profits during the initial launch phase of the product?

Personally, I expect that after the initial launch phase, the market price will be $57 per unit. Estimated product specific fixed costs during this phase of the product life cycle would be $15000 p.m. Q wishes to achieve a target monthly profit from the product of $30,000.

How many units do we need to sell each month during this phase in order for Q to achieve our target monthly profit?

**Answer**

Report

From Senior Management Accountant to G> Bal otelli

Re: Pricing

1. The price of the product is likely to change over the four stages of life cycle. We shall each stage in turn:

Introduction stage

When a new innovative product is launched to a market there are two commonly used pricing strategies used:

* **Market skimming**

This strategy involves selling the product at a very high price during the introduction stage. This policy is likely to be successful if the product is brand new and innovative. Also, if demand is inelastic, then the product will generate a much higher return at an initial high price. Market skimming will generate a high net cash in-flow initially, which hopefully will help recover the high development costs quickly.

Q may be able to take advantage of this pricing policy as its new DVD recorder incorporates the latest technology and Q is likely to be the first on the market with this cutting-edge item.

Selling at a very high price will attract strong competition to the product.

* **Price penetration**

Q may choose to launch the product at a very low price or penetration price. Advantages of this approach include high growth is encouraged, competition is discouraged, and economies of scale may be taken advantage of. However, for this strategy to generate high profits, Q would need a high volume of sales, and be the dominant player in the market (high market share). Achieving high sales volume may be difficult with a brand new product.

* **Growth stage**

During this stage of the product life cycle, the sales of the DVD player would be expected to grow rapidly. As the product starts to become acceptable and established by the mass market, competition usually significantly increases. In order to maintain market share and dominance Q will find it necessary to lower the initial market skimming launch price.

* **Maturity stage**

As product sales growth begins to slow down and level off, an established market price for the DVD recorder will become apparent. The price will often reach its lowest point during this stage. An average/going-rate price may be charged. However, be able to charge a premium price based on its reputation and a certain level of brand loyalty.

Q may try to extend the maturity phase by launching upgrades or by trying to sell in new markets.

The product must achieve its lowest unit cost during this stage. Profits are likely to be highest in the maturity stage.

* **Decline**

The decline stage is the final stage of the product’s life cycle. The initial new innovative technology has now been superseded by superior products.

The DVD recorder may hold on to a small niche market. The group of loyal customers still purchasing the original DVD player may be willing to pay a price that is reasonable. Alternatively Q may use product bundling.

At the final withdrawal of the product, prices may be slashed to sell off any surplus stock.

(b) (i) variable cost affected by the learning curve for the first batch = $60 - $30 = $30

Let ‘r’ be the learning curve rate.

|  |  |
| --- | --- |
| **Output in batches** | **Cumulative average cost per unit** |
| X | Y |
| 1 | 30 |
| 2 | 30r |
| 4 | 30r2 = 22.71 |

If 30 r2  = 22.71

r2 = 0.757

r = 0.87

the learning curve rate is 87%.

Note: this answer could be determined using the formula but this is much more cumbersome method when doubling is possible. The approach using the formula would be:

Y = axb so 22.71 = 30 x 4b

4b = 22.71/30 = 0.757

b = log 0.757/log 4 = -0.20000

b = log learning rate/log2

so log learning rate = -0.200 x log2 = -0.06045

learning rate = 0.87

(ii)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Price**  **$** | **Demand**  **(000s)** | **LC variable cost p.u.**  **$** | **Non-LC variable cost p.u.**  **$** | **Total V. C. p.u.**  **$** | **Contribution per unit**  **$** | **Total contribution**  **($000)** |
| 100 | 10 | 30.00 | 30.00 | 60.00 | 40.00 | 400.0 |
| 80 | 20 | 26.10 | 30.00 | 56.10 | 23.90 | 478.0 |
| 69 | 30 | 24.06 | 30.00 | 54.06 | 14.94 | 448.2 |
| 62 | 40 | 22.71 | 30.00 | 52.71 | 9.29 | 371.6 |

To maximize contribution the company should sell 20,000 units at $80 each.

**Learning curve workings**

|  |  |
| --- | --- |
| **Output in batches** | **Average cost per unit** |
| X | Y |
| 1 | 30.00 |
| 2 | 26.10 |
| 3 | 24.06\*\* |
| 4 | 22.71 |

Y = axb

A = 30

B = log 0.87 ÷ log 2 = -0.2009

X = 3 batches

Y = 30 x 3-0.2009

Y = 24.06

(iii) Target contribution = fixed costs + required profit

= $15,000 + $30,000

=$45,000 per month

The initial launch phase represent the first 20,000 units (as per (b) (ii) above). However the learning effect continues until 40,000 units hence the unit cost decreases (and therefore unit contribution increase) until the 40,000 units have been completed.

The average unit cost of the batch of units from 20,001 – 30,000 is:

((30,000 × $54.06) – (20,000 × $56.10)) ÷ 10,000 = $49.98

Thus giving a unit contribution of $57.00 - $49.98 = $7.02 and a monthly sales target of:

$45,000 ÷ $7.02 = 6,411 units

The average unit cost for 30,001 units and more is:

((40,000 × $52.71) – (30,000 × $54.06)) ÷ 10,000 = $48.66

Thus giving a unit contribution of $57 - $48.66 = $8.34

And thus the monthly sales target becomes:

$45,000 ÷ $8.34 = 5,396 units

In the second month after the launch phase, the first 3,589 units (10,000 – 6,411) sold will generate a contribution of $7.02 per unit and the remaining units will generate a contribution of $8.34.

|  |  |
| --- | --- |
| Target contribution | $45,000 |
| Contribution from first | 3,589 x $7.02 ($25,195) |
| Contribution still required | $19,805 |

Number of units still to be sold $19,805 ÷ $8.34

Total unit sales in 2nd month = 3,589 + 2,375 = 5,964

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**Q24:** Heat co specialize in the production of a range of air conditioning appliances for industrial premises. It is about to launch a new product, the “Energy Buster’, a unique air conditioning unit which is capable of providing unprecedented levels of air conditioning using a minimal amount of electricity. The technology used in the Energy Buster is unique so Heat Co has patented it so that no competitors can enter the market for two years. The company’s development costs have been high and it is expected that the product will only have a five-year life cycle.

Heat co is now trying to ascertain the best pricing policy that it should adopt for the Energy Buster’s launch onto the market. Demand is very responsive to price changes and research has established that, for every $15 increase in price, demand would be expected to fall by 1,000 units. If the company set the price at $735, only 1,000 units would be demanded.

The cost of producing each air conditioning unit are as follows:

|  |  |
| --- | --- |
|  | $ |
| Direct materials | 42 |
| Labour | 12 |
| Fixed overheads | 6 |
| Total cost | 60 |

Note: the first air conditioning unit took 1.5 hours to make and labour cost $8 per hour. A 95% learning curve exists, in relation to production of unit, although the learning curve is expected to finish after making 100 units. Heat Co’s management have said that any pricing decisions about the Energy Buster should be based on the time it takes to make the 100th unit of the product. You have been told that the learning co-efficient, b = - 0.0740005.

All other costs are expected to remain the same up to the maximum demand levels.

**Required:**

(a) (i) Establish the demand function for air conditioning units.

(ii) Calculate the marginal cost for each air conditioning unit after adjusting the labour cost as required by the note above.

(iii) Determine the optimum price and quantity to maximize profits.

(b) Explain what is meant by a “penetration pricing” strategy and a “market skimming” strategy and discuss whether either strategy might be suitable for Heat Co when launching the Energy Buster.

**MC = 49.744 (Approx) (399.87 =P, 23,341= Qty)**

**Solution:**

1. Optimum price and quantity
2. Establish the demand function

b = change in price ÷ change in quantity = $15 ÷ 1,000 = 0.015

we know that if price = $735, quantity = 1,000 units.

Establish “a” by substituting these values for P, Q and b into the demand function:

735 = a – 0.015Q

15 + 735 = a

Therefore a = 750

Demand function is therefore P = 750 – 0.015Q

1. Establish marginal cost

The labour cost of the 100th unit needs to be calculated as follows:

Formula = y = axb

a = 1.5

therefore, if x = 100 and b = - .0740005, then y = 1.5 x 100 -0.0740005 = 1.0668178

therefore cost per unit = 1.0668178 x $8 = $8.5345

total cost for 100 units = $853.45

if x = 99, y = 1.5 x 99-0.0740005 = 1.0676115

therefore cost per unit = $8.5408

total cost for 99 = $845.55

therefore cost of 100th unit = $853.45 - $845.55 = $7.90

therefore total marginal cost = $42 + $7.90 = $49.90

fixed overheads have been ignored as they are not part of the marginal cost.

1. Optimum price and quantity

Tutorial note: the optimum price is where marginal revenue equates to marketing cost.

MR = a-2bQ

MR = 750 – 0.03 Q

Equating MC and MR:

49.90 = 750 – 0.03Q

0.03Q = 700.1

Q= 23,337

Therefore the optimum price is:

P = 750 – (0.015 x 23,337) = $399.95 (i.e.$400)

1. **Penetration pricing**

With penetration pricing a low price would initially be charged for the Energy Buster. The idea behind this is that the price will make the product accessible to a larger number of buyers and therefore the high sales volume will compensate for the lower prices being charged. A large market share would be gained and possibly, the energy buster might become accepted as the only industrial air conditioning unit worth buying.

Circumstances that would favour a penetration pricing policy

* Highly elastic demand for the Energy Buster (i.e the lower the price, the higher the demand). The preliminary result does suggest that demand is elastic.
* If significant economies of scale could be achieved by Heat, then higher sales volumes would result in sizeable reduction in costs. This is not the case here, since learning ceases at 100 units.
* If Heat was actively trying to discourage new entrants into the market. In this case, new entrants cannot enter the market anyway, because of the patent.
* If Heat wished to shorten the initial period of the Energy Buster’s life cycle so as to enter the growth and maturity stage quickly. We have no evidence that this is the case for Heat, although it could be.

From the above, it can be seen that this could be a suitable strategy in some respects but it is not necessarily the best one.

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**PRICING WITH LEARNING CURVE**

**Q25:** During the current year AB Ltd planned to produce 150,000 units of its main product, a cordless hand drill. Nearing the end of the current year, activity so far has corresponded to budget and it is anticipated that average costs for the whole year will be as shown below:

Average cost per unit (for 150,000 activity level)

|  |  |
| --- | --- |
|  | $ |
| Direct material | 18 |
| Direct labour | 10 |
| Variable overhead | 10 |
| Fixed overhead | 10 |
|  | 48 |

The budget for next year is being developed and the following cost changes have been forecast:

Direct material: price increase of 33.3%

Direct labour: rate increase of 10%

Variable overhead: increase of 5%

Fixed overhead: increase of 15%

The substantial price increase for materials is causing concern and alternative sources are being considered. One source quotes a material cost per unit of $20 but tests on samples shows that the cheaper materials would increase labour cost by an additional 50c per unit and would lead to a reject rate of 5%. It would also be necessary to install a test and inspection department at the end of manufacturing to identify the faulty items. This would increase fixed costs by an additional $200,000 per year.

Selling prices are also considered when the budget is being developed. Normally, selling prices are determined on a cost-plus basis, the mark-up being 50% on unit cost, but there is concern that this is too inflexible as it would lead to a substantial price rise for next year. The sales director estimates the demand varies with price thus:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | $ | $ | $ | $ | $ | $ | $ |
| Price/unit | 64 | 68 | 72 | 76 | 80 | 84 | 88 |
| Demand  (000 units) | 190 | 170 | 150 | 140 | 125 | 110 | 95 |

Calculate:

The number of units where the variable cost saving is equal   
to the incremental fixed costs:

the selling price that would maximize profit for next year $

the maximum profit achievable $

it has been realized that, through better organization, it would be possible to reduce the extra fixed costs of $200,000 originally estimated in connection with the cheaper material.

Required:

The increase in fixed costs at which the company would $  
be indifferent as to its choice of suppliers for materials.

**Answer**

| **Current material** | **Cheaper material**  **$ per unit** | **$** |
| --- | --- | --- |
| Direct material | 24.00 | 20.00 |
| Direct labour | 11.00 | 11.50 |
| Variable overhead | 10.50 | 10.50 |
| Total variable cost | 45.50 | 42.00 |
|  |  | For 0.95 of a unit |
|  |  | = $44.21 per unit |
| Fixed cost last year: | $10 x 150,000 | = $1,500,000 |
|  | $1,500,000 x 1.15 | = $1,725,000 |
| If use cheaper material fixed costs increase by $200,000: |  | $1,925,000 |

When the company switches from the current material to the cheaper material, the cost per unit will decrease but the fixed cost will increase.

At low level of activity the cheapest material would be the current one, taking advantage of the low fixed cost.

However, as production increases the cheaper material becomes more attractive, as one wishes to take advantage of the lower unit cost. At high levels of activity the cheaper material is preferable, the lower unit cost more than compensates for the higher fixed cost.

So, in conclusion, the material choice is dependent upon the activity level.

Ascertain the level of activity where the purchaser would be indifferent between the two materials.

When switch from regular to cheaper:

Saving in variable cost is $45.50 - $44.21 = $1.29 per unit.

Increase in fixed cost is $200,000.

Therefore the number of units where the variable cost saving is equal to the incremental fixed cost is:

$200,000 ÷ 1.29 = 155,038.8 units

**Conclusion**

If production is expected to be 155,038 units or less, use the regular supplier. If production is expected to be 155,039 or more, use the cheaper material.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Price** | **Demand** | **Variable cost per unit** | **Contribution per unit** | **Total contribution** | **Fixed costs** | **Profit** |
| **$** | **000s** | **$** | **$** | **$000** | **$000** | **$000** |
| 64 | 190 | (44.21) | 19.79 | 3,760.1 | (1,925) | 1,835.1 |
| 68 | 170 | (44.21) | 23.79 | 4,044.3 | (1,925) | 2,119.3 |
| 72 | 150 | (45.50) | 26.50 | 3,975.0 | (1,725) | 2,250.0 |
| 76 | 140 | (45.50) | 30.50 | 4,270.0 | (1,725) | 2,545.0 |
| 80 | 125 | (45.50) | 34.50 | 4,312.5 | (1,725) | 2,587.5 |
| 84 | 110 | (45.50) | 38.50 | 4,235.0 | (1,725) | 2,510.0 |
| 88 | 95 | (45.50) | 42.50 | 4,037.5 | (1,725) | 2,312.5 |

From the table above, it can be seen that profit is maximized when 125,000 units are sold for $80 each.

The maximum profit is $2,587,500.

The regular supplier should be retained.

At 125,000 units the saving in variable costs ‘it the firm switches to be cheaper supplier is

125,000 x $1.29 = $161,250

The company would be indifferent between the two suppliers if fixed costs increased by $161,250.

New fixed cost level = $1,725,000 + $161,250

= $1,886,250

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**Q26:** ABC plc is about to launch a new product. Facilities will allow the company to produce up to 20 units per week. The marketing department has estimated that at a price of

$8,000no units will be sold, but for each $150 reduction in price one additional unit per week will be sold.

Fixed costs associated with manufacture are expected to be $12,000 per week.

Variable costs are expected to be $4,000 per unit for each of the first 10 units ; thereafter each unit will cost $400 more than the preceding one. The most profitable level of output per week for the new product is:

* 1. 10units
  2. 11units
  3. 13units
  4. 14units
  5. 20units

**Solution:** The best approach is to calculate the profit for a range of outputs from 10 units upwards, then select the output with the highest profit.

### The answer is B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| units | Total variable  costs | Selling price  per unit (W1) | Total select  revenue | Total  contribution |
| 10 | $40,000 | $6,500 | $65,000 | $25,000 |
| 11 | $44,400 | $6,350 | $69,850 | $25,540 |
| 12 | $49,200 | $6,200 | $74,400 | $25,200 |
| 13 | $54,400 | $6,050 | $78,650 | $24,250 |
| 14 | $60,000 | $5,900 | $82,600 | $22,600 |
| 20 | $102,000 | $5,000 | $100,000 | ($2,000) |

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**Q27:** The budgeted cost data of a product manufactured by Ayudhya Ltd. is furnished as below:

|  |  |
| --- | --- |
| Budgeted units to be produced | 2,00,000 |
| Variable cost (`) | 32 per unit |
| Fixed cost (`) | 16 lacs |

It is proposed to adopt cost plus pricing approach with a mark-up of 25% on full budgeted cost basis.

However, research by the marketing department indicates that demand of the product in the market is price sensitive. The likely market responses are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Selling price (` per unit) | 44 | 48 | 50 | 56 | 60 |
| Annual Demand (units) | 1,68,000 | 1,52,000 | 1,40,000 | 1,28,000 | 1,08,000 |

**Required:** ANALYSE the above situation and DETERMINE the best course of action.

**Solution**

Analysis of Cost plus Pricing Approach

The company has a plan to produce 2,00,000 units and it proposed to adopt Cost plus Pricing approach with a markup of 25% on full budgeted cost. To achieve this pricing policy, the company has to sell its product at the price calculated below:

|  |  |
| --- | --- |
| Qty. | 2,00,000 units |
| Variable Cost (2,00,000 units × ` 32) | 64,00,000 |
| Add: Fixed Cost | 16,00,000 |
| Total Budgeted Cost | 80,00,000 |
| Add: Profit (25% of ` 80,00,000) | 20,00,000 |
| Revenue (need to earn) | 1,00,00,000 |
| Selling Price per unit  ` 1,00,00,000  ——————  2,00,000 units | 50 p.u. |

However, at selling price ` 50 per unit, the company can sell 1,40,000 units only, which is 60,000 units less than the budgeted production units.

After analyzing the price-demand pattern in the market (which is price sensitive), to sell all the budgeted units market price needs to be further lowered, which might be lower than the total cost of production.

**“Statement Showing “Profit at Different Demand & Price Levels”**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | I | II | III | IV | Budgeted |
| Qty. (units) | 1,68,000 | 1,52,000 | 1,40,000 | 1,28,000 | 1,08,000 |
|  | ` | ` | ` | ` | ` |
| Sales | 73,92,000 | 72,96,000 | 70,00,000 | 71,68,000 | 64,80,000 |
| Less: Variable Cost | 53,76,000 | 48,64,000 | 44,80,000 | 40,96,000 | 34,56,000 |
| Total Contribution | 20,16,000 | 24,32,000 | 25,20,000 | 30,72,000 | 30,24,000 |
| Less: Fixed Cost | 16,00,000 | 16,00,000 | 16,00,000 | 16,00,000 | 16,00,000 |
| Profit (`) | 4,16,000 | 8,32,000 | 9,20,000 | 14,72,000 | 14,24,000 |
| Profit  (% on total cost) | 5.96 | 12.87 | 15.13 | 25.84% | 28.16% |

**Determination of the Best Course of Action**

1. Taking the above calculation and analysis into account, the company should produce and sell 1,28,000 units at ` 56. At this price company will not only be able to achieve its desired mark up of 25% on the total cost but can earn maximum contribution as compared to other even higher selling price.
2. If the company wants to uphold its proposed pricing approach with the budgeted quantity, it should try to reduce its variable cost per unit for example by asking its supplier to provide a quantity discount on the materials purchased.

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**Q28:** Swift Tech Ltd. (STL) is a leading IT security solutions and ISO 9001 certified company. The solutions are well integrated systems that simplify IT security management across the length and depth of devices and on multiple platforms. STL has recently developed an Antivirus Software and company expects to have life cycle of less than one year. It was decided that it would be appropriate to adopt a market skimming pricing policy for the launch of the product. This Software is currently in the Introduction stage of its life cycle and is generating significant unit profits.

**Required**

EXPLAIN, with reasons, the changes, if any, to the unit selling price that could occur when the Software moves from the Introduction stage to Growth stage of its life cycle.

(ii) Also IDENTIFY necessary strategies at this stage.

**Answer:** Following acceptance by early innovators, conventional consumers start following their lead. New competitors are likely to now enter the market attracted by the opportunities for large scale production and profit. STL may wish to discourage competitors from entering the market by lowering the price and thereby lowering the unit profitability. The price needs to be lowered so that the product becomes attractive to different market segments thus increasing demand to achieve the growth in sales volume.

**Strategies** at this stage may include the following:-

(i) Improving quality and adding new features such as Data Theft Protection, Parental Control, Web Protection, Improved Scan Engine, Anti Spyware, Anti Malware etc.

(ii) Sourcing new market segments/ distribution channels.

(iii) Changing marketing strategy to increase demand.

(iv) Lowering price to attract price-sensitive buyers.

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**Pricing with Learning Curve**

**Q29:** Bosch Ltd. has developed a special product. Details are as follows: The product will have a life cycle of 5,000 units. It is estimated that market can absorb first 4,500 units at ` 64 per unit and then the product will enter the "decline" stage of its life cycle.

The company estimates the following cost structure:

Direct Labour…………………………….. ` 6 per hour

Other variable costs……………………..` 19 per unit

Fixed costs will be ` 40,000 over the life cycle of the product. The ‘labour rate’ and both of these costs will not change throughout the product's life cycle.

The first batch of 100 units will take 1,000 labour hours to produce. There will be an 80% learning curve that will continue until 2,500 units have been produced. Batches after this level will each take thesame amount of time as the 25th batch. The batch size will always be 100 units.

**Required: CALCULATE** average selling price of the final 500 units that will allow the company to earn a total profit of ` 80,000 from the product if average time for 24 batches is 359.40 hours.

(Note: Learning coefficient is –0.322 for learning rate of 80%).

The values of Logs have been given for calculation purpose:

log 2 = 0.30103; log3 = 0.47712; log5 = 0.69897; antilog of 2.534678 = 342.51; antilog of 2.549863 = 354.70; antilog of 2.555572 = 359.40; antilog of 2.567698 = 369.57

**Solution**

**Average ‘Selling Price’ of the final 500 units**

|  |  |
| --- | --- |
| Particulars | Amount (` ) |
| Direct Labour [(8,867.50 hrs. + 241.90 hrs. × 25 batches) × ` 6] | 89,490 |
| Add: Other Variable Costs (5,000 units × ` 19) | 95,000 |
| Add: Fixed Costs | 40,000 |
| Total Life Cycle Cost | 2,24,490 |
| Add: Desired Profit | 80,000 |
| Expected Sales Value (5,000 units × ` 19) | 3,04,490 |
| Less: Sales Value (4,500 units × ` 64) | 2,88,000 |
| Sales Value (Decline Stage) …(A) | 16,490 |
| Sales Units (Decline Stage) …(B) | 500 |
| Average Sales Price per unit …(A)/ (B) | 32.98 |

**Workings**

1. The cumulative average time per batch for the first 25 batches

The usual learning curve model is

Y = axb

Where

Y = average time per batch (hours) for x batches

a = time required for first batch (hours)

x = cumulative number of batches produced

b = learning coefficient

The Cumulative Average Time per batch for the first 25 batches

Y = 1,000 × (25) –0.322

Log y = log 1,000 – 0.322 x log 25

Log y = log 1,000 – 0.322 x log (5 x 5)

Log y = log 1,000 – 0.322 x [2 x log 5]

Log y = 3 – 0.322 x [2 x 0.69897]

Log y = 2.549863

Y = antilog of 2.549863

Y = 354.70 hours

1. The time taken for the 25th batch

Total time for first 25 batches = 354.70 x 25 batches

= 8,867.50 hours

Total time for the first 24 batches = 359.40 x 24 batches

= 8,625.60 hours

Time taken for 25th batch = 8,867.50 hours – 8,625.60 hours

= 241.90 hours.

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**Q32:** which of the following statement best explains the difference between market skimming and penetration pricing?

* Penetration pricing is a strategy that is often uses in the decline phase of a product’s life cycle whereas market skimming is a strategy that is mainly used in the introduction phase of the product life cycle.
* Market skimming is a strategy that is often used in the decline phase of a product’s life cycle whereas penetrations pricing is a strategy that is mainly used in the introduction phase of the product life cycle.
* Penetration pricing is a locality of charging high prices when the product is first launched in order to obtain sufficient penetration in the market whereas market skimming is a policy of charging low prices when a product is first launched and attracting customers though heavy advertising and sales promotion.
* A strategy of penetration pricing could be effective in discouraging potential new entrants to the market whereas the strategy of market skimming is to gain high unit profits early in the products life cycle.

**Answer:** The correct answer is: A strategy of penetration pricing could be effective in discouraging potential new entrants to the market by charging a low price when the product is first launched whereas the strategy of market skimming is to gain high unit profits early in the products life cycle, thus allowing the costs of developing the product to be recovered.

Penetration pricing is a strategy that is often used in the introduction phase of a product life cycle. A low price is charged to penetrate an existing market when the product is first launched to gain market share.

Market skimming is a strategy that us mainly used in the introduction phase of the product life cycle when the product is unique, technologically advanced. A high price can be charged at launch in order to recover the research and developments costs already incurred.

Penetration pricing is a policy of charging low prices when the product is first launched in order to obtain sufficient penetration in the market whereas market skimming is a policy of charging high prices when a product is first launched and attracting customers through heavy advertising and sales promotion.

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**Q33:** When is market skimming pricing appropriate?

1. If demand is very elastic
2. If the product is new and different
3. If these is little chance of achieving economies of scale
4. If demand is inelastic
5. If these is little competition and high barriers to entry

**Answer: B and E**

A:- If demand is very elastic, high market share and a market presence could be achieved quickly by charging a low penetration pricing.

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**Q34:** Which of the following circumstances favour a penetration pricing policy?

1. There are significant economics of scale from high volume output
2. Demand is relatively inelastic
3. The firm wishes to discourage new entrants to the market
4. The product life cycle is relatively short.

A (i) and (iii) only

B (ii) and (iv) only

C (i), (ii) and (iii) only

D (ii) and (iii)

E (i) and (iv)

**Answer:** A

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**Q35:** For which one of the following reasons would the choice of penetration by unsuitable for a product during the initial stage of its life cycle?

* To discourage new entrants to the market.
* To increase the length of the initial stage of the life cycle
* To achieve economies of scale
* To set a price for a product that has a high price elasticity of demand.

**Answer:** The correct answer is: To increase the length of the initial stage of the life cycle.

Penetration pricing, by encouraging more customers to buy the product at an early stage in tis life cycle, should shorten the length of the initial stage of the life cycle. As demand picks up, the product will enter into its growth stage more quickly.

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**Q36:** The budgeted cost data of a product manufactured by TJ Ltd. is furnished as below:

|  |  |
| --- | --- |
| Budgeted units to be produced | 2,00,000 |
| Variable cost (`) | 32 per unit |
| Fixed cost (`) | 16 lacs |

It is proposed to adopt cost plus pricing approach with a mark-up of 25% on full budgeted cost basis.

However, research by the marketing department indicates that demand of the product in the market is price sensitive. The likely market responses are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Selling Price (` per unit)** | 44 | 48 | 50 | 56 | 60 |
| **Annual Demand (units)** | 1,68,000 | 1,52,000 | 1,40,000 | 1,28,000 | 1,08,000 |

***Required***

Analyse the above situation and DETERMINE the best course of action.

**Solution:**

**Analysis of Cost *plus* Pricing Approach**

The company has a plan to produce 2,00,000 units and it proposed to adopt **Cost *plus* Pricing** approach with a markup of 25% on full budgeted cost. To achieve this pricing policy, the company has to sell its product at the price calculated below:

|  |  |
| --- | --- |
| Qty. | 2,00,000 units |
| Variable Cost (2,00,000 units × ` 32) | 64,00,000 |
| *Add:* Fixed Cost | 16,00,000 |
| Total Budgeted Cost | 80,00,000 |
| *Add:* Profit (25% of ` 80,00,000) | 20,00,000 |
| Revenue (need to earn) | 1,00,00,000 |
| Selling Price *per unit* | 50 p.u. |

However, at selling price ` 50 per unit, the company can sell 1,40,000 units only, which is 60,000 units less than the budgeted production units.

After analyzing the price-demand pattern in the market (which is price sensitive), to sell all the budgeted units market price needs to be further lowered, which might be lower than the total cost of production.

**Statement Showing “Profit at Different Demand & Price Levels”**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **I II III IV** | | | | | **Budgeted** |
| Qty. (units) | 1,68,000 | 1,52,000 | 1,40,000 | 1,28,000 | 1,08,000 |
|  | ` | ` | ` | ` | ` |
| Sales | 73,92,000 | 72,96,000 | 70,00,000 | 71,68,000 | 64,80,000 |
| *Less:* Variable Cost | 53,76,000 | 48,64,000 | 44,80,000 | 40,96,000 | 34,56,000 |
| Total Contribution | 20,16,000 | 24,32,000 | 25,20,000 | 30,72,000 | 30,24,000 |
| *Less:* Fixed Cost | 16,00,000 | 16,00,000 | 16,00,000 | 16,00,000 | 16,00,000 |
| Profit (`) | 4,16,000 | 8,32,000 | 9,20,000 | **14,72,000** | 14,24,000 |
| Profit (% on total cost) | 5.96 | 12.87 | 15.13 | **25.84%** | 28.16% |

**Determination of the Best Course of Action**

Taking the above calculation and analysis into account, the company should produce and sell 1,28,000 units at ` 56. At this price company will not only be able to achieve its desired mark up of 25% on the total cost but can earn maximum contribution as compared to other even higher selling price.

(ii) If the company wants to uphold its proposed pricing approach with the budgeted quantity, it should try to reduce its variable cost per unit for example by asking its supplier to provide a quantity discount on the materials purchased.

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