

# 3

## Pricing Decision

### Basic Concepts

<b>Competitive Pricing</b>	<p>When a company sets its price mainly on the consideration of what its competitors are charging, its pricing policy under such a situation is called competitive pricing or competition-oriented pricing.</p> <p>Different type of competitive pricing in vogue are as follows:</p> <ul style="list-style-type: none"><li>(i) Going Rate Pricing</li><li>(ii) Sealed Bid Pricing</li></ul>
<b>Cost Plus Pricing</b>	<p>In many businesses the common method of price determining is to estimate the cost of product &amp; fix a margin of profit. The term 'cost' here means full cost at current output and wage levels since these are regarded as most relevant in price determination. In arriving at cost of production, it is necessary to determine the size of the unit whose products are to be cost and priced. In order to frame a pricing policy, one of the elements that should receive consideration is the determination of normal capacity.</p> <p>It has following <i>advantages</i>:</p> <ul style="list-style-type: none"><li>(i) Fair method</li><li>(ii) Assured profit</li><li>(iii) Reduced risks and uncertainties</li><li>(iv) Considers market factors</li></ul> <p>Cost Plus Pricing has following <i>disadvantages</i>:</p> <ul style="list-style-type: none"><li>(i) Ignores demand</li><li>(ii) Ignores competition</li><li>(iii) Arbitrary cost allocation</li><li>(iv) Ignores opportunity cost</li><li>(v) Price-Volume relationships</li></ul>

<b>Distributors' Discounts</b>	It means price deductions that systematically make the net price vary according to buyer's position in the chain of distribution. These discounts are given to various distributors in the trade channel e.g., wholesalers, dealers and retailers.
<b>Freight-Absorption Pricing</b>	Under freight-absorption pricing, a manufacturer will quote to the customer a delivered price equal to its factory price plus the freight costs that would be charged by a competitive seller located near that customer.
<b>Geographic Pricing Strategies</b>	In pricing, a seller must consider the costs of shipping goods to the buyer. These costs grow in importance as freight becomes a larger part of total variable costs. It includes Point of Production Pricing, Uniform Delivered Pricing, Zone-Delivered Pricing and Freight – Absorption Pricing.
<b>Going Rate Pricing</b>	It is a competitive pricing method under which a firm tries to keep its price at the average level charged by the industry.
<b>Historical Pricing*</b>	Basing current prices on prior period prices, perhaps uplifted by a factor such as inflation.
<b>Incremental Pricing</b>	Incremental pricing is used because it involves comparison of the impact of decisions on revenues and cost. If a pricing decision results in a greater increase in revenue than in costs, it is favourable.
<b>Market-Based Pricing*</b>	Setting a price based on the value of the product in the perception of the customer. Also known as perceived value pricing.
<b>Market-Entry Strategies</b>	While preparing to enter the market with a new product, management must decide whether to adopt a skimming or penetration pricing strategy.
<b>Pareto Analysis</b>	Pareto Analysis is a rule that recommends focus on the most important aspects of the decision making in order to simplify the process of decision making. It is based on the 80: 20 rule that was a phenomenon first observed by Vilfredo Pareto, a nineteenth century Italian economist. He noticed that 80% of the wealth of Milan was owned by 20% of its citizens. The management can use it in a number of different circumstances to direct management attention to the key control mechanism or planning aspects.
<b>Penetration Pricing</b>	This policy is in favour of using a low price as the principal instrument for penetrating mass markets early. It is opposite to skimming price. The low price policy is introduced for the sake of long-term survival and profitability and hence it has

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	to receive careful consideration before implementation Penetrating pricing, means a pricing suitable for penetrating mass market as quickly as possible through lower price offers. This method is also used for pricing a new product.
<b>Point-of-Production Pricing</b>	In a widely used geographic pricing strategy, the seller quotes the selling price at the point of production and the buyer selects the mode of transportation and pays all freight costs.
<b>Predatory Pricing*</b>	Setting a low selling price in order to damage competitors. May involve dumping, i.e. selling a product in a foreign market at below cost, or below the domestic market price (subject to, for example, adjustments for taxation differences, transportation costs, specification differences).
<b>Premium Pricing*</b>	Achievement of a price above the commodity level, due to a measure of product or service differentiation.
<b>Pricing*</b>	Determination of a selling price for the product or service produced. A number of methodologies may be used.
<b>Price Discrimination</b>	Price discrimination means charging different prices and it takes various forms according to whether the basis is customer, product, place or time.
<b>Price Discrimination on the Basis of Customer</b>	In this case, the same product is charged at different prices to different customers. It is, however, potentially disruptive of customer relations.
<b>Price Discrimination Based on Product Version</b>	In this case, a slightly different product is charged at a different price regardless of its cost-price relationship.
<b>Price Discrimination Based on Place</b>	An example of this method is the seats in cinema theatre where the front seats are charged at lower rates than the back seats.
<b>Price Discrimination Based on Time</b>	An example of this method is the practice of giving off-season concession in sale of fans or refrigerators just after the summer season.
<b>Principles of Product Pricing</b>	Cost should not be considered as an important determinant of price. The tendency should be to lower the price in such a way so as to choose a right combination of price and output to maximise profits. The important determinants of price, therefore, are competitive situations prevailing in the market

	and elasticity. Taking the standard products into consideration, the pricing principles are much the same whether the product is a new one or the one already well established in the market. However the environmental situation and information base are different.
<b>Pricing Strategies</b>	Pricing strategy is defined as a broad plan of action by which an organisation intends to reach its goal. Some illustrative strategies are: <ul style="list-style-type: none"> <li>(i) Expanding product lines that enjoy substantial brand equity</li> <li>(ii) Offer quantity discounts to achieve increase in sales volume.</li> </ul>
<b>Quantity Discounts</b>	Quantity discounts are price reductions related to the quantities purchased. It may take several forms. It may be related to the size of the order which is being measured in terms of physical units of a particular commodity.
<b>Rate of Return Pricing</b>	Determination of return on capital employed is one of the most crucial aspects of price fixation process. In this process instead of arbitrarily adding a percentage on cost for profit, the firm determines an average mark up on cost necessary to produce a desired rate of return on its investment.
<b>Role of Pricing Policy</b>	The pricing policy plays an important role in a business because the long run survival of a business depends upon the firm's ability to increase its sales and device the maximum profit from the existing and new capital investment. Although cost is an important aspect of pricing, consumer demand and competitive environment are frequently far more significant in pricing decisions. Thus costs alone do not determine prices. Cost is only one of the many complex factors which determine prices. There must however, be some margin in prices over total cost if capital is to be unimpaired and production maximised by the utilisation of internal surplus.
<b>Selective Pricing*</b>	Setting different prices for the same product or service in different markets. Can be broken down as follows: <ul style="list-style-type: none"> <li>(i) Category Pricing: Cosmetically modifying a product such that the variations allow it to sell in a number of price categories, as where a range of "brands" are based on a common product.</li> <li>(ii) Customer Group Pricing: Modifying the price of a product or service so that different groups of consumers pay different prices.</li> </ul>

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	<ul style="list-style-type: none"> <li>(iii) Peak Pricing: Setting a price which varies according to level of demand.</li> <li>(iv) Service Level Pricing: Setting a price based on the particular level of service chosen from a range.</li> <li>(v) Time Material Pricing: A form of cost-plus pricing in which price is determined by reference to the cost of the labour and material inputs to the product/ service.</li> </ul>
<b>Sealed Bid-Pricing</b>	The bid is the firms offer price, and it is a prime example of pricing based on expectations of how competitors will price rather than on a rigid relation based on the concern's own costs or demand.
<b>Skimming Pricing</b>	It is a policy of high prices during the early period of a product's existence. This can be synchronised with high promotional expenditure and in the later years the prices can be gradually reduced.
<b>Uniform Delivered Pricing</b>	Under uniform delivered pricing, the same delivered price is quoted to all buyers regardless of their locations.
<b>Usefulness of Pareto Analysis</b>	<p>Pareto analysis is useful to:</p> <ul style="list-style-type: none"> <li>(i) Prioritize problems, goals, and objectives Identify root causes.</li> <li>(ii) Select and define key quality improvement programs Select key customer relations and service programs Select key employee relations improvement programs.</li> <li>(iii) Select and define key performance improvement programs Maximize research and product development time.</li> <li>(iv) Verify operating procedures and manufacturing processes.</li> <li>(v) Product or services sales and distribution.</li> <li>(vi) Allocate physical, financial and human resources.</li> </ul>
<b>Variable Cost Pricing</b>	Variable Costs which are considered as relevant costs and are used for pricing, by adding a mark up to include fixed costs allocation also.
<b>Zone-Delivered Pricing</b>	Zone-delivered pricing divides a seller's market into a limited number of broad geographic zones and then sets a uniform delivered price for each zone.

(\*)Source - CIMA's Official Terminology

# SECTION - A

## Pricing Policy/ Strategy

### Question-1

*Explain the concept of cost plus pricing. What are its advantages and disadvantages?*

 Answer

**Cost plus Pricing:** The most common method of price fixing in a business is to arrive at full cost, add a margin of profit and then set the selling price. During the world wars, the concept of cost plus pricing became very much prevalent, as most of the defence contracts were priced at full cost plus a pre-agreed quantum of profit. In cost plus pricing, the capacity utilisation of the concern has an important bearing and unless the same is considered on a realistic basis the determination of cost would get vitiated.

The advantages and disadvantages of cost plus pricing are as under:

#### Advantages

- (i) It is a fair method and recovery of full costs is assured under it.
- (ii) It leaves out scope for any uncertainty.
- (iii) After arriving at full cost, the profit percentage can be flexibly adjusted to take care of market competition.

#### Disadvantages

- (i) Covering full cost all the time may ignore the competition.
- (ii) It can lead to a distorted price fixation unless the cost is determined in a scientific manner.
- (iii) It ignores the concepts of Marginal Costing, Incremental Costing etc.
- (iv) It is difficult to predetermine capacity utilization.

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### Question-2

*Describe two pricing practices in which non-cost reasons are important, when setting prices.*

 Answer

Two pricing practices in which non-cost reasons are important when setting price are:

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- (i) **Price Discrimination:** This is the practice of charging to some customers a higher price than that charged to other customers e.g. Airlines tickets for business travellers and LTC travellers are priced differently.
  - (ii) **Peak Load Pricing:** This pricing system is based on capacity constraints. Under this pricing system a higher price for the same service or product is demanded when it approaches physical capacity limits e.g. telephones, tele-communication, hotel, car rental and electric utility industries are charged higher price at their peak load.
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#### Question-3

Briefly explain skimming pricing and penetration pricing policies with examples.

 Answer

#### Skimming Pricing

Policy of highly pricing a product at the entry level into the market and reducing it later.

For example: Electronic goods, mobile phone, Flat, TVs, etc.

It is used when market is price insensitive, demand inelastic or to recover high promotional costs.

#### Penetration Pricing

Policy of entering the market with a low price, then establishing the product and then increasing the price.

This is also used by companies with established markets, when products are in any stage of their life cycle, to avoid competition. This is also known as “stay-out pricing”.

For example: Entry of a new model small segment car into the market.

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#### Question-4

*Explain Skimming pricing strategy.*

 Answer

#### Skimming Pricing

It is a policy where the prices are kept high during the early period of a product's existence. This can be synchronised with high promotional expenditure and in the latter years the prices can be gradually reduced. The reasons for following such a policy are as follows:

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- (i) The demand is likely to be inelastic in the earlier stages till the product is established in the market.
  - (ii) The gradual reduction in price in the latter years will tend to increase the sales.
  - (iii) This method is preferred in the beginning because in the initial periods when the demand for the product is not known the price covers the initial cost of production.
  - (iv) High initial capital outlays needed for manufacture, results in high cost of production. In addition to this, the producer has to incur huge promotional activities resulting in increased costs. High initial prices will be able to finance the cost of production particularly when uncertainties block the usual sources of capital.
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#### Question-5

*What is Penetration pricing? What are the circumstances in which this policy can be adopted?*



#### Answer

**Penetration Pricing:** This pricing policy is in favour of using a low price as the principal instrument for penetrating mass markets early. It is opposite to skimming pricing. The low pricing policy is introduced for the sake of long-term survival and profitability and hence it has to receive careful consideration before implementation. It needs an analysis of the scope for market expansion and hence considerable amount of research and forecasting are necessary before determining the price.

Penetration pricing means a price suitable for penetrating mass market as quickly as possible through lower price offers. This method is also used for pricing a new product. In order to popularize a new product penetrating pricing policy is used initially. The company may not earn profit by resorting to this policy during the initial stage. Later on, the price may be increased as and when the demand picks up. Penetrating pricing policy can also be adopted at any stage of the product life cycle for products whose market is approached with low initial price. The use of this policy by the existing concerns will discourage the new concerns to enter the market. This pricing policy is also known as “stay-out-pricing”.

#### Circumstances for Adoption

The three circumstances in which penetrating pricing policy can be adopted are as under:

- (i) When demand of the product is elastic to price. In other words, the demand of the product increases when price is low.
- (ii) When there are substantial savings on large-scale production, here increase in demand is sustained by the adoption of low pricing policy.

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- (iii) When there is threat of competition. The prices fixed at a low level act as an entry barrier to the prospective competitions.
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#### Question-6

*What is Price Discrimination? Under what circumstances it is possible?*



Answer

Price discrimination is charging different prices with respect to customers, products, places and time.

It is possible when-

- (i) The market being capable of being segmented.
  - (ii) The customers are not able to resell the product at a higher price.
  - (iii) The competitors' underselling is not possible.
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#### Question-7

*List out the qualities required for a good pricing policy.*



Answer

The pricing policy plays an important role in a business because the long run survival of a business depends upon the firm's ability to increase its sales and device the maximum profit from the existing and new capital investment. Although cost is an important aspect of pricing, consumer demand and competitive environment are frequently far more significant in pricing decisions. The pricing policy structure should:

- (i) provide an incentive to producer for adopting improved technology and maximising production;
  - (ii) encourage optimum utilisation of resources;
  - (iii) work towards better balance between demand and supply;
  - (iv) promote exports; and
  - (v) avoid adverse effects on the rest of the economy.
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## Pareto Analysis

#### Question-8

*What is Pareto Analysis? Name some applications.*

 Answer

Vilfredo Pareto, an Italian economist, observed that about 70 – 80% of value was represented by 30 – 20% of volume. This observation was found to exist in many business solutions.

Analysing and focusing on the 80% value relating to 20% volume helps business in the following areas.

- (i) Pricing of a Product (in a Multi-Product Company)
  - (ii) Customer Profitability
  - (iii) Stock Control
  - (iv) Activity Based Costing (20% Cost Drivers are responsible for 80% of Total Cost)
  - (v) Quality Control
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**Question-9**

*Enumerate the uses of Pareto Analysis.*

 Answer

Pareto analysis is useful to:

- (i) Prioritize problems, goals and objectives.
  - (ii) Identify the root causes.
  - (iii) Select and define the key quality improvement programs, key employee relations improvement programs etc.
  - (iv) Verify the operating procedures and manufacturing processes.
  - (v) Allocate physical, financial and human resources effectively.
  - (vi) Maximise research and product development time.
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**Question-10**

*How Pareto analysis is helpful in pricing of product in the case of firm dealing with multi-products?*

 Answer

In the case of firm dealing with multi products, it would not be possible for it to analyse price-volume relationship for all of them. Pareto Analysis is used for analysing the firm's estimated

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sales revenue from various products and it might indicate that approximately 80% of its total sales revenue is earned from about 20% of its products. Such analysis helps the top management to delegate the pricing decision for approximately 80% of its products to the lower level of management, thus freeing them to concentrate on the pricing decisions for products approximately 20% of which is essential for the company's survival. Thus, a firm can adopt more sophisticated pricing methods for small proportion of products that jointly account for 80% of total sales revenue. For the remaining 80% products, which account for 20% of the total sales value the firm may use cost based pricing method.

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#### Question-11

*What are the applications of Pareto Analysis in customer profitability analysis?*



Answer

Customer Profitability Analysis identifies customer service activities and cost drivers. It also determines profitability of each customer or group of customers. Pareto Analysis i.e. the rule of 80 : 20 identified by the Vilfredo Pareto is also applied for the better analysis of the customers behavior and profitability. Pareto Analysis helps to group the customers into 20% high revenue generating customers and 80% low revenue customer group. Based on this proposition the Pareto Analysis can be applied in customer profitability analysis in the following manner:

- (i) Identify most profitable customers.
  - (ii) Manage each customer's costs-to-serve.
  - (iii) Discontinue unprofitable customer segment.
  - (iv) Shift a customer's purchase mix towards higher- margin products and service lines.
  - (v) Offer discounts to attract profitable customers.
  - (vi) Choose types of after sale services to provide.
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## SECTION - B

### Cost – Plus / Mark-up Pricing

#### Problem-1

*Technocraft has just completed repair work on Car No. DL 7CL 2001 of Mr. 'M'. The parts used to repair the vehicle cost ₹250. The company's 20% mark up rate on parts covers parts-related overhead costs. Labour involved 5 hours of time from a Technocraft service engineer whose wages are ₹80 per hour. The current overhead work up rate on labour is 80%.*

#### **Required**

*Compute how much Mr. 'M' will be billed for his car repairs?*

 Solution

#### Computation of the Billing Amount

	(₹)
Repairs - Parts used	250
Overhead Charges (20% of ₹250)	50
Labour Charges (5 hours @ ₹80 per hour)	400
Overhead Charges (80% of ₹400)	320
<b>Total Billing Amount</b>	<b>1,020</b>

#### Problem-2

*Computer Tec a manufacturing firm, has entered into an agreement of strategic alliance with Comp Inc. of United States of America for the manufacture of Super Computers in India. Broadly, the terms of agreement are:*

- (i) *Comp Inc. will provide Computer Tec with kits in a dismantled condition. These will be used in the manufacture of the Super Computer in India. On a value basis, the supply, in terms of the FOB price will be 50% thereof.*
- (ii) *Computer Tec will procure the balance of materials in India.*
- (iii) *Comp Inc will provide to Computer Tec with designs and drawings in regard to the materials and supplies to be procured in India. For this, Computer Tec will pay Comp Inc. a technology fee of ₹ 8 crores.*

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- (iv) *Comp Inc. will also be entitled total royalty at 10% of the selling price of the computers fixed for sales in India as reduced by the cost of standard items procured in India and also the cost of imported kits from Comp Inc.*
- (v) *Computer Tec will furnish to Comp Inc. detailed quarterly returns.*

*Other information available:*

- (a) *FOB price agreed \$2,040. Exchange rate to be adopted \$1 = ₹55.00*
- (b) *Insurance and freight – ₹2,000 per imported kit;*
- (c) *Customs duty leviable is 200% of the CIF prices; but as a concession, the actual rate leviable has been fixed at 40% of CIF.*
- (d) *The technology agreement expires with the production of 8,00,000 computers;*
- (e) *The quoted price on kits includes a 25% margin of profits on cost to Comp Inc.*
- (f) *The estimated cost of materials and supplies to be obtained in India will be 150% of the cost of supplies made by Comp Inc.*
- (g) *50% of the value in rupees of the locally procured goods represent cost of the standard items.*
- (h) *Cost of assembly and other overheads in India will be ₹8,000 per Super Computer.*

#### **Required**

*Calculate the selling price, of a personal computer in India bearing in mind that Computer Tec Ltd has targeted a profit of 20% to itself on the selling price.*

*Note: In making calculations, the final sum may be rounded to the next rupees.*

 **Solution**

#### Statement Showing "Selling Price of a Super Computer in India"

	(₹)
A. Landed Cost of a Dismantled Kit (Refer to Working Note: 4)	81,340
B. Cost of Local Procurement (Refer to Working Note: 3)	67,320
C. Cost of Assembly and Other Overheads <i>per computer</i>	8,000
D. Total Cost of Manufacture (A + B + C)	1,56,660
E. Technology Fee <i>per computer</i> (₹ 8,00,00,000 / 8,00,000 Computer)	100
F. Royalty Payment <i>per unit</i> (Refer to Working Note: 6)	9,251
G. Total Cost (D + E + F)	166,011

H. Profit (20% on Selling Price of 25% of Total Cost)	41,503
I. Selling Price <i>per computer</i>	207,514

**Working Notes****1. FOB Price of Dismantled Kit:**

FOB Price of Dismantled Kit	\$2,040
FOB Price of dismantled Kit [ $\$2,040 \times ₹55$ ]	₹1,12,200

**2. Cost of a Dismantled Kit to Comp Inc.:**

It is given that Quoted Price on Kits includes a 25% Margin on Profits.

Cost of Dismantled Kit to Comp Inc. ( $100 / 125 \times ₹1,12,200$ )	₹89,760
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**3. Cost of Local Procurements:**

150% of the Supplies made by Comp Inc. ( $150\% \times ₹89,760 \times 50\%$ )	₹67,320
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\*Being 50% of Cost of a Dismantled Kit to Comp Inc.

**4. Landed Cost of a Dismantled Kit:**

	(₹)
FOB Price ( $50\% \times ₹1,12,200$ ) (Refer to Working Note-1)	56,100
Add: Insurance & Freight	2,000
CIF Price	58,100
Add: Customs Duty ( $40\% \times ₹58,100$ )	23,240
Landed Cost of a Dismantled Kit	81,340

**5. Cost of the Standard Items Procured Locally:**

50% of the Cost of locally procured Goods ( $50\% \times ₹67,320$ )	₹33,660
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**6. Royalty Payment *per computer*:**

Let  $X =$  Selling Price *per unit of Super Computer*

$Y =$  Royalty Paid *per computer*

Since 20% is the Margin of Profit on Selling Price. It means Margin of 25% on Cost Price.

Therefore we have

$$X = 1.25 \times (\text{₹}81,340 + \text{₹}67,320 + \text{₹}8,000 + \text{₹}100 + Y)$$

$$Y = 10\% \times \{X - (\text{₹}33,660 + \text{₹}81,340)\}$$

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On solving the above equations we get:

$$X = ₹2,07,514 \text{ (Approx)}$$

$$Y = ₹9,251 \text{ (Approx)}$$

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#### Problem-3

*RST Ltd. is 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 is 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

#### **Required**

*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.*



**RST Ltd.**  
**Cost Sheet of One Lot of 250 Croquet Mallets**

Computation of Total Cost:		(₹)
Direct Material		
Handles (2.5 feet × 250 units × ₹50)		31,250
Heads (1.20 × 250 × 0.40 × ₹60) [W.N.-1]		7,200
Less: Scrap Recovery (4% × 50 × ₹10)		(20)
Direct Labour (8Hrs × ₹6 × 250 / 120) [W.N.-2]		100
	Prime Cost	38,530
Factory & Other Overheads		
Variable, Finishing & Painting (20,000 × 250 / 20,000) [W.N.-3]		250
Fixed (₹72,000 × 250 / 18,000) [W.N.-4]		1,000
	Total Cost	39,780
Price Quotation:		(₹)
Cost per mallet (₹39,780 / 250 Units)		159.12
Add: Profit (50% on Cost)		79.56
Selling Price		238.68

**Working Notes**

- Since 20% of completed heads are spoiled, output of 1 unit requires input of 1.20 units (1 + 0.20); so, total heads processed, 300 (1.20 × 250), of which spoiled heads are 50.
- |                                  |                   |                    |
|----------------------------------|-------------------|--------------------|
| Total Time <i>in a day</i>       | (8 × 60)          | 480 minutes        |
| Less: Idle Time                  | 48 minutes        |                    |
| Coffee Break                     | 15 minutes        |                    |
| Instructions                     | 9 minutes         |                    |
| Training 8 minutes               | <u>80 minutes</u> |                    |
| Productive Time <i>per day</i> : |                   | <u>400 minutes</u> |

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

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

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3. Finishing and painting overheads are assumed to be variable for the production of 20,000 mallets.
  4. All the other expenses are fixed and are to be absorbed by 18,000 (120 units × 6 men × 25 Days) mallets of monthly production.
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#### Problem-4

A Japanese soft drink company is planning to establish a subsidiary company in India to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Indian subsidiary:

	Total Annual Costs (₹)	Percentage of Total Annual Cost which is Variable
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administrative Overheads	40,000	35%

The Indian production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Japanese office expenses is to be allocated to the Indian subsidiary.

#### Required

- (i) Compute the sale price per bottle to enable the management to realise an estimated 10% profit on sale proceeds in India.
- (ii) Calculate the break-even point in Rupee sales and also in number of bottles for the Indian subsidiary on the assumption that the sale price is ₹ 14 per bottle.



#### Solution

- (i) Computation of Sale Price *Per Bottle*

Output: 40,000 Bottles

	(₹)
Variable Cost:	
Material	2,10,000
Labour (₹1,50,000 × 80%)	1,20,000
Factory Overheads (₹92,000 × 60%)	55,200

Administrative Overheads (₹40,000 × 35%)	14,000
Commission (8% on ₹6,00,000) (W.N.-1)	48,000
Fixed Cost:	
Labour (₹1,50,000 × 20%)	30,000
Factory Overheads (₹92,000 × 40%)	36,800
Administrative Overheads (₹40,000 × 65%)	26,000
Total Cost	5,40,000
Profit (W.N.-1)	60,000
Sales Proceeds (W.N.-1)	6,00,000
Sales Price per bottle $\left( \frac{₹6,00,000}{40,000 \text{ Bottles}} \right)$	15

## (ii) Calculation of Break-even Point

$$\begin{aligned} \text{Sales Price per Bottle} &= ₹14 \\ \text{Variable Cost per Bottle} &= \frac{₹4,44,000 \text{ (W.N. - 2)}}{40,000 \text{ Bottles}} \end{aligned}$$

$$\begin{aligned} &= ₹11.10 \\ \text{Contribution per Bottle} &= ₹14 - ₹11.10 \\ &= ₹2.90 \end{aligned}$$

$$\begin{aligned} \text{Break -even Point} \\ \text{(in number of Bottles)} &= \frac{\text{Fixed Costs}}{\text{Contribution per Bottle}} \\ &= \frac{₹92,800}{₹2.90} = 32,000 \text{ Bottles} \end{aligned}$$

$$\begin{aligned} \text{Break- even Point} \\ \text{(in Sales Value)} &= 32,000 \text{ Bottles} \times ₹14 \\ &= ₹4,48,000 \end{aligned}$$

## Working Note

W.N.-1

Let the Sales Price be 'x'

$$\text{Commission} = \frac{8x}{100}$$

$$\text{Profit} = \frac{10x}{100}$$

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$$\begin{aligned}
 x &= 4,92,000 + \frac{8x}{100} + \frac{10x}{100} \\
 100x - 8x - 10x &= 4,92,00,000 \\
 82x &= 4,92,00,000 \\
 x &= 4,92,00,000 / 82 \\
 &= ₹6,00,000
 \end{aligned}$$

W.N.-2

Total Variable Cost

	(₹)
Material	2,10,000
Labour	1,20,000
Factory Overheads	55,200
Administrative Overheads	14,000
Commission [(40,000 Bottles × ₹14) × 8%]	44,800
Total	4,44,000

#### Problem-5

A manufacturing company has an installed capacity of 1,20,000 units per annum. The cost structure of the product manufactured is as under:

(i) Variable cost per unit-

Materials..... ₹ 8

Labour (subject to a minimum of ₹ 56,000 per month)..... ₹ 8

Overheads..... ₹ 3

(ii) Fixed overheads..... ₹ 1,68,750 per annum

(iii) Semi-variable overheads ₹ 48,000 per annum at 60% capacity, which increase by ₹ 6,000 per annum for increase of every 10% of the capacity utilisation or any part thereof for the year as a whole.

The capacity utilisation for the next year is estimated at 60% for two months, 75% for six months and 80% for remaining part of the year.

#### Required

If the company is planning to have a profit of 25% on the selling price, calculate the selling price per unit. Assume that there are no opening and closing stocks.

 Solution

## Statement Showing "Selling Price and Profit"

	(₹)
Material (89,000 units × ₹8) (W.N.-1)	7,12,000
Labour Cost (W.N.-2)	7,28,000
Variable Overhead (89,000 units × ₹3)	2,67,000
Semi Variable Overhead (W.N.-3)	60,000
Fixed Overheads	1,68,750
Total Cost	19,35,750
Add: Profit (25% of Selling Price or 33⅓ on Cost)	6,45,250
Total Sales Value	25,81,000
Selling Price <i>per unit</i> (₹25,81,000 / 89,000 units)	29

## Working Notes

## W.N.-1

Computation of Capacity Utilisation (for the next year):	(units)
60% of Capacity for first two months (2 months × 6,000 units)	12,000
75% of Capacity for next six months (6 months × 7,500 units)	45,000
80% of Capacity for the remaining four months (4 months × 8,000 units)	<u>32,000</u>
Total Capacity Utilization	89,000

## W.N.-2

Computation of Labour Cost (Subject to a minimum of ₹ 56,000 p.m.):

	(₹)
Labour Cost of first two months (12,000 units × ₹8)	96,000
However Minimum is (₹56,000 × 2)	1,12,000
Labour Cost of next six months (45,000 units × ₹8)	3,60,000
Labour Cost of last four months (32,000 units × ₹8)	<u>2,56,000</u>
Total Labour Cost	7,28,000

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W.N.-3

Computation of Semi-Variable Overheads *per annum*:

	(₹)
Semi-Variable Overheads (at 60% Capacity)	48,000
Semi-Variable Overheads for Additional 14.16% (74.16% – 60.00%) Capacity are the same as that for 20% of the Capacity Utilisation for the entire year	<u>12,000</u>
	60,000

---

### Return on Investment Pricing

Problem-6

The cost of production and sales of 80,000 units per annum of product Q are:

Material	₹ 4,80,000	Labour	₹ 1,60,000
Variable Overhead	₹ 3,20,000	Fixed overhead	₹ 5,00,000

The fixed portion of capital employed is ₹12 lacs and the varying portion is 50% of sales turnover.

**Required:**

Determine the selling price per unit to earn a return of 12% net on capital employed (net of Tax @ 40%).

 **Solution**

Return of 12% Net (after tax of 40%) on Capital Employed is equivalent to 20% (Gross)  $[12\% \div (1 - 0.4)]$  on Capital Employed.

Let Selling Price *per unit* to be 'K'

$$\begin{aligned} \text{Since Total Sales} &= \text{Total Cost} + \text{Profit} \\ 80,000 K &= 14,60,000 + 20\% (12,00,000 + 0.5 \times 80,000K) \\ \text{Or, } 80,000 K &= 14,60,000 + 2,40,000 + 8,000K \\ \text{Or, } 72,000 K &= 17,00,000 \\ \text{Or, 'K'} &= \frac{17,00,000}{72,000} \\ &= ₹23.61 \end{aligned}$$

Hence Selling Price *per unit* will be ₹23.61.

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**Problem-7**

A company produces a single product 'Impex'.

For an annual sales of 40,000 units of Impex, fixed overhead is ₹ 5,50,000. The variable cost per unit is ₹ 60. Capital employed in fixed assets is ₹ 8,00,000 and in current assets is 50% of net sales (i.e. sales less discount). The company sells goods at 20% discount on the maximum retail price (M.R.P.), which is ₹ X per unit. The company wants to earn a return of 25% before tax on capital employed in fixed and current assets.

**Required**

Calculate the value of X.

 **Solution**

Maximum Retail Price is ₹ X per unit.

Selling Price Net of Discount (i.e. 20%) = ₹ 0.80X

**Statement Showing "Total Cost, Return on Capital Employed and Sales"**

	Amount (₹)
Variable Cost (₹60 × 40,000 units)	24,00,000
Add: Fixed Overhead	5,50,000
Total Cost ... (i)	29,50,000
Fixed Assets (25% of ₹8,00,000)	2,00,000
Current Assets {25% of (0.5 × 40,000 units × 0.80X)}	4,000 X
Return on Capital Employed ... (ii)	2,00,000 + 4,000 X
Total Sales Net of Discount (₹0.8X × 40,000 units) ... (iii)	32,000 X

Hence, Total Sales = Total Cost + Return on Capital Employed

$$\Rightarrow 32,000 X = 29,50,000 + 2,00,000 + 4,000 X \quad [\text{From (i), (ii) and (iii)}]$$

$$\Rightarrow 32,000 X - 4,000 X = 31,50,000$$

$$\Rightarrow 28,000 X = 31,50,000$$

$$\Rightarrow X = \frac{₹ 31,50,000}{28,000}$$

$$\Rightarrow = ₹ 112.50$$

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#### Problem-8

Excel Ltd. specialises 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	Year 2	Year 3	Year 4
Advertisement (₹)	50,000	50,000	30,000	15,000
Other expenses (₹)	25,000	25,000	45,000	60,000

Variable costs of producing and 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's profit goals call for a discounted rate of return of 15% after taxes on investments 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.

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

#### Required

Work out an initial selling price per unit of the product that may be fixed for obtaining the desired rate of return on investment.

#### Solution

#### Determination of Initial Selling Price

Let the Selling Price be ₹K

Sales Value: ₹4,000K

Annual Cash Cost	(₹)
Variable Cost (4,000 units × ₹125)	5,00,000
Advertisement and Other Expenses	75,000
Additional Fixed Costs	37,500
Total Cash Cost	6,12,500

$$\text{Depreciation per annum (₹12,50,000 / 4)} = ₹3,12,500$$

$$\text{Profit for Taxation} = 4,000 \times ₹K - (₹6,12,500 + ₹3,12,500)$$

	=	₹4,000K - ₹9,25,000
Tax at 30% on Profit	=	30% of {₹4,000K - ₹9,25,000}
	=	₹1,200K - ₹2,77,500
Total Annual Cash Outflow	=	₹6,12,500 + (₹1,200K - ₹2,77,500)
	=	₹1,200K + ₹3,35,000
Net Annual Cash Inflow	=	₹4,000K - (₹1,200K + ₹3,35,000)
	=	₹2,800K - ₹3,35,000
Now, Present Value of Initial Cash Outflow	=	Present Value of Cash Inflow
Or,	₹12,50,000	= (₹2,800K - ₹3,35,000) × 2.854
Or,	K	= ₹276.06

Hence Selling Price should be ₹276.06 per unit.

## Pricing of New Product / Services

### Problem-9

*Hind Metals Manufactures an alloy product 'Incop' by using Iron and Copper. The metals pass through two plants, X and Y. The company gives you the following details for the manufacture of one unit of Incop:*

Materials.....	Iron: 10 kgs @ ₹ 5 per kg.
	Copper: 5 kg @ ₹ 8 per kg.
Wages.....	3 hours @ ₹ 15 per hour in Plant X
	5 hours @ ₹ 12 per hour in Plant Y
Overhead recovery.....	On the basis of direct labour hours
Fixed overhead.....	₹ 8 per hour in Plant X
	₹ 5 per hour in Plant Y
Variable overhead.....	₹ 8 per hour in Plant X
	₹ 5 per hour in Plant Y
Selling overhead (fully variable).....	₹ 20 per unit

### Required

- (i) Find out the minimum selling price to be fixed for the alloy, when the alloy is new to the market. Briefly explain this pricing strategy.

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- (ii) After the alloy is well established in the market. What should be the minimum selling price? Why?



Solution

Workings

#### Statement Showing "Total Cost"

(₹ per unit of alloy)

Materials		
Iron (10kg @ ₹5/-)	50	
Copper (5kg @ ₹8/-)	40	90
Wages		
X (3 hrs @ 15 ₹/hr.)	45	
Y (5 hrs @ 12 ₹/hr.)	60	105
Variable Overheads (Production)		
X (₹8 × 3 hrs)	24	
Y (₹5 × 5 hrs)	25	49
Variable Overhead – Selling		20
Total Variable Cost		264
Fixed Overhead		
X (₹8 × 3 hrs)	24	
Y (₹5 × 5 hrs)	25	49
Total Cost		313

- (i) If pricing strategy is to penetrate the market, the *minimum price* for a new product should be the variable cost i.e. ₹264/-. In some circumstances, it can also be sold below the variable cost, if it is expected to quickly penetrate the market and later absorb a price increase. Total variable cost is the penetration price.
- (ii) When the alloy is well established, the minimum selling price will be the total cost – including the fixed cost i.e. ₹ 313 per unit. Long run costs should cover at least the total cost.

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#### Problem-10

R.T. Ltd, want to fix proper selling prices for their products 'A' and 'B' which they are newly introducing in the market. Both these products will be manufactured in Department D which is considered as a Profit Centre.

The estimated data are as under:

	A	B
Annual Production (Units)	1,00,000	2,00,000
Direct Materials per unit	₹ 15.00	₹ 14.00
Direct Labour per unit (Direct Labour Hour Rate ₹ 3)	₹ 9.00	₹ 6.00

The proportion of Overheads other than interest, chargeable to the two products are as under:

Factory Overheads (50% Fixed) 100% of Direct Wages, Administration Overheads (100% Fixed) 10% of Factory Cost, Selling and Distribution Overheads (50% Variable) ₹ 3 and ₹ 4 respectively per unit of products A and B.

The fixed capital investment in the Department is ₹ 50 Lakhs. The working capital requirement is equivalent to 6 months stocks of cost of sales of both the products. For this project a term loan amounting to ₹ 40 lakhs has been obtained from Financial Institutions at an interest rate of 14% per annum. 50% of the working capital needs are met by Bank Borrowing carrying interest at 18% per annum. The Department is expected to give a return of 20% on its capital employed.

#### Required

- Fix the selling prices of products A and B such that the contribution per direct labour hour is the same for both the products;
- Prepare a statement showing in detail the over-all profit that would be made by the Department.

#### Solution

- Statement Showing "Fixation of the Selling Price of Products A and B"

	Products		
	A	B	Total
Sales (units) ... (A)	1,00,000	2,00,000	
	(₹)	(₹)	(₹)
Contribution (W.N.-5) ... (B)	19,26,429	25,68,571	44,95,000
Variable Cost (W.N.-2) ... (C)	30,00,000	50,00,000	80,00,000
Sales Value ... (D) = (B) + (C)	49,26,429	75,68,571	1,24,95,000
Selling Price per unit ... (D) / (A)	49.26	37.84	
Direct Labour Hours (W.N.-6) ... (E)	3,00,000 hrs.	4,00,000 hrs.	
Contribution per Labour Hr. ... (B) / (E)	6.42	6.42	

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(b) Statement Showing "Overall Profit"

	Products		
	A	B	Total
Contribution (W.N.-5)	19,26,429	25,68,571	44,95,000
Less: Fixed Costs			
Factory Overheads	4,50,000	6,00,000	10,50,000
Administration Overheads	3,30,000	5,20,000	8,50,000
Selling & Dist. Overheads	1,50,000	4,00,000	5,50,000
Interest on Term Loan (₹40,00,000 × 14%)			5,60,000
Interest on Working Capital (₹52,25,000 × 0.5 × 18%)			4,70,250
Profit			10,14,750

Working Notes

1. Statement of Variable Cost and Total Cost *per unit* for each Product

Particulars	A		B	
	Total Cost	Variable Cost	Total Cost	Variable Cost
Direct Materials	15.00	15.00	14.00	14.00
Direct Labour	9.00	9.00	6.00	6.00
Factory Overheads	9.00	4.50	6.00	3.00
Total Factory Cost	33.00	28.50	26.00	23.00
Adm. Overheads	3.30	---	2.60	---
Selling & Distribution Overheads	3.00	1.50	4.00	2.00
Total	39.30	30.00	32.60	25.00

2. Statement of Total Variable Costs and Total Costs

	Variable Costs (₹)	Total Cost (₹)
Product A - 1,00,000 units	30,00,000	39,30,000
Product B - 2,00,000 units	50,00,000	65,20,000
Total	80,00,000	1,04,50,000

## 3. Computation of Capital Employed

	(₹)
Fixed Capital	50,00,000
Working Capital (6 months Cost of Sales, i.e. ½ of ₹1,04,50,000 as per W.N.-2 above)	52,25,000
<b>Total Capital Employed</b>	<b>1,02,25,000</b>

## 4. Expected Return on Capital Employed at 20%

$$\frac{₹1,02,25,000 \times 20}{100} = ₹20,45,000$$

## 5. Computation of Sales Value and Contribution

	(₹)
Total Cost (W.N.-2)	1,04,50,000
Add: Expected Returned	20,45,000
<b>Sales Value</b>	<b>1,24,95,000</b>
Less: Variable Costs (W.N.-2)	80,00,000
<b>Contribution</b>	<b>44,95,000</b>

$$\begin{aligned} \text{Contribution for Product A} &= \text{Total Contribution} \times \frac{\text{Direct Labour Hrs. for Product A}}{\text{Total Direct Labour Hrs.}} \\ &= ₹44,95,000 \times \frac{3,00,000 \text{ hrs}}{7,00,000 \text{ hrs}} \\ &= ₹19,26,429 \end{aligned}$$

$$\begin{aligned} \text{Contribution for Product B} &= \text{Total Contribution} \times \frac{\text{Direct Labour Hrs. for Product B}}{\text{Total Direct Labour Hrs.}} \\ &= ₹44,95,000 \times \frac{4,00,000 \text{ hrs}}{7,00,000 \text{ hrs}} \\ &= ₹25,68,571 \end{aligned}$$

## 6. Total Labour Hours

Product A (1,00,000 units × 3 hrs)	3,00,000
Product B (2,00,000 units × 2 hrs)	4,00,000
<b>Total Direct Labour Hours</b>	<b>7,00,000</b>

### 3.29 Advanced Management Accounting

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#### Problem-11

*Sunny Ltd. has developed a new product which is about to be launched into the market. The variable cost of selling the product is ₹ 17 per unit. The marketing department has estimated that at a sale price of ₹ 25, annual demand would be 10,000 units. However, if the sale price is set above ₹ 25, sales demand would fall by 500 units for each ₹ 0.50 increase above ₹ 25. Similarly, if the price is below ₹ 25, demand would increase by 500 units for each ₹ 0.50 stepped reduction in price below ₹ 25.*

#### **Required**

*Determine the price which would maximise Sunny Ltd.'s profit in the next year.*



#### Solution

#### Statement of Total Contribution

Sales Price p.u. (₹)	Variable Cost p.u. (₹)	Contribution p.u. (₹)	Sales Volume (units) (₹)	Total Contribution (₹)
(1)	(2)	(3) = (1) - (2)	(4)	(5) = (3) × (4)
25.00	17.00	8.00	10,000	80,000
24.50	17.00	7.50	10,500	78,750
24.00	17.00	7.00	11,000	77,000
25.50	17.00	8.50	9,500	80,750
26.00	17.00	9.00	9,000	81,000
27.00	17.00	10.00	8,000	80,000
27.50	17.00	10.50	7,500	78,750

From the above statement it is quite apparent that the contribution would be maximum at a sale price of ₹26 per unit and sales demand of 9,000 units.

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#### Problem-12

*Genie Carpets Associates have just developed a new carpet design with the brand name 'Arabian Nights'. Sales demand is very difficult to predict but it very much depends upon the selling price. At a price of ₹ 30 per square metre it is estimated that the annual sales demand would be between 50,000 and 90,000 sq. Metres per annum. At a price of ₹ 40 per sq. metre, sales demand would be between 34,000 and 44,000 sq. metres per annum. As regards cost, at production volumes of 45,000 sq. metres or less per annum, attributable fixed costs would be ₹ 2,12,000 per annum and variable costs would be ₹ 32 per sq. metre. At higher*

production volumes, attributable fixed costs would increase to ₹ 3,08,000 but variable costs per sq. metre would be only ₹ 24.

'Arabian Nights' has been developed at a cost of ₹ 80,000.

When the product is marketed, an amount of ₹ 70,000 per annum will be charged to the operation towards Head Office Expenses.

The production of the new carpet will have to be supervised by a foreman. In order to find time for supervision he has to give up work in another department, for which he is paid a salary of ₹ 1,000 per month.

The production of 'Arabian Nights' would be undertaken, of course, in a division of the factory which is at present rented out to M/s S&R Ltd., Umbrella – makers for an amount of ₹ 10,000 per quarter.

### Required

Calculate the margin of safety, as a percentage of expected sales volume at both the maximum and minimum sales volume for the two price levels and decide on the selling price per sq. metre.

### Solution

#### Working Notes

##### (i) Relevant Total Fixed Costs

	At a Price of ₹ 30 per sq. mt. (₹)	At a Price of ₹ 40 per sq. mt. (₹)
Attributed Fixed Costs	3,08,000	2,12,000
Foreman's Salary	12,000	12,000
Rent Foregone (Opportunity Cost)	40,000	40,000
Total Fixed Cost	3,60,000	2,64,000

(ii) Contribution per sq. metre ₹6 ₹8

##### (iii) Profit or Loss at Minimum Sales Volume

Minimum Sales Volume (Sq. Metres)	50,000	34,000
Total Contribution at above volume (₹)	3,00,000	2,72,000
Less: Total Fixed Costs (₹)	3,60,000	2,64,000
Profit / (Loss)	(60,000)	8,000

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#### (iv) Profit or Loss at Maximum Sales Volume

Maximum Sales Volume (Sq. Metres)	90,000	44,000
Total Contribution (₹)	5,40,000	3,52,000
Less: Total Fixed Costs (₹)	3,60,000	2,64,000
Profit	1,80,000	88,000

(v) Break-even Sq. Metres	$\frac{₹3,60,000}{₹6}$	$\frac{₹2,64,000}{₹8}$
	60,000 Sq. mts.	33,000 Sq. mts.

#### Margin of Safety

At Minimum Sales Volume	Nil (Loss)	2.94% $\left( \frac{34,000 \text{ Sq.Mtr.} - 33,000 \text{ Sq.Mtr.}}{34,000 \text{ Sq.Mtr.}} \times 100 \right)$
At Maximum Sales Volume	33.33% $\left( \frac{90,000 \text{ Sq.Mtr.} - 60,000 \text{ Sq.Mtr.}}{90,000 \text{ Sq.Mtr.}} \times 100 \right)$	25.00% $\left( \frac{44,000 \text{ Sq.Mtr.} - 33,000 \text{ Sq.Mtr.}}{44,000 \text{ Sq.Mtr.}} \times 100 \right)$

#### Selling Price

At a price of ₹40 per sq. metre, there is possibility of earnings profit at both the minimum and maximum level of sales. Hence, this price should be adopted. However at the maximum and intermediate volumes (beyond 74,667 sq. mts.) profits will be higher at a price of ₹30 per sq. mt. Therefore, the price of ₹30 per sq. mt. should be preferred, assuming that at this price sales would be above 74,667 sq. mts. when the profit at ₹30 will be equal to the profit from maximum sales volume at ₹40 per sq. mt.

## Pricing – Different Scenario

### Problem-13

6,000 pen drives of 2 GB to be sold in a perfectly competitive market to earn ₹ 1,06,000 profit, whereas in a monopoly market only 1,200 units are required to be sold to earn the same profit. The fixed costs for the period are ₹ 74,000. The contribution per unit in the monopoly market is as high as three fourths its variable cost.

#### Required

Determine the targets selling price per unit under each market condition.

 Solution

	Perfect Competition	Monopoly
Units	6,000	1,200
Contribution (₹1,06,000 + ₹74,000)	1,80,000	1,80,000
Contribution per unit	30	150
Variable Cost per unit $\left( ₹150 \times \frac{4}{3} \right)$	---	200
Variable Cost per unit	200	---
Selling Price per unit	230	350

## Problem-14

An organisation manufactures a product, particulars of which are detailed below:

Annual Production (Units)	20,000
Cost per annum (₹)	
Material	50,000
Other variable cost	60,000
Fixed cost	40,000
Apportioned Investment (₹)	1,50,000

**Required**

Determine the unit selling price under two strategies mentioned below. Assume that the organisation's Tax rate is 40%—

- 20% return on investment.
- 6% profit on list sales, when trade discount is 40%.

 Solution

## (a) Selling Price to Yield 20% Return on Investment

Investment (₹)	1,50,000
After Tax Required ROI 20% (₹)	30,000
Tax Rate	40%
After Tax Profit	60%

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Pre Tax Profit - Return [(30,000 ÷ 60) × 100] (₹)	50,000
Sales (₹1,50,000 + ₹50,000) (₹)	2,00,000
Number of units Produced	20,000
Selling Price per unit (₹2,00,000 ÷ 20,000 units)	₹10

(b) Selling Price to Yield 6% Profit on List Price

Let 'K' be the List Sales

$$\begin{aligned} \{ \text{List Sales (1 - Trade Discount)} - \text{Cost} \} (1 - \text{Tax Rate}) &= 0.06K \\ \{ K (1 - 0.40) - 1,50,000 \} (1 - 0.40) &= 0.06K \\ \{ 0.60 K - 1,50,000 \} 0.6 &= 0.06K \\ 0.30 K &= 90,000 \\ K &= ₹3,00,000 \end{aligned}$$

List Sales Price per unit is ₹15  $\left( \frac{₹3,00,000}{20,000 \text{ units}} \right)$ .

Net Selling Price per unit is ₹9 (₹15 – 40% of 15).

#### Problem-15

LMV Limited manufactures product Z in departments A and B which also manufacture other products using same plant and machinery. The information of product Z is as follows:

Items	Department A (₹)	Department B (₹)
Direct Material per unit	30	25
Direct Labour per unit (₹ 10 per hour)	30	40
Overhead Rates:		
Fixed	8 per hour	4 per hour
Variable	6 per hour	3 per hour
Value of Plant and Machinery	25 lakhs	15 lakhs

Overheads are recovered on the basis of direct labour hours. Variable selling and distribution overheads relating to product Z are amounting to ₹ 30, 000 per month. The product requires a working capital of ₹ 4, 00,000 at the target volume of 1,500 units per month occupying 30 per cent of practical capacity.

#### Required

- (i) To calculate the price of product Z to yield a contribution to cover 21 percent rate of return on investment.

- (ii) Set the minimum selling price of the product if (1) the product is well established in the market; (2) the product is first time launched in the market.

 Solution

- (i) Statement Showing "Computation of Variable Cost"

		(₹)	(₹)
Direct Material	Deptt. A---	30	
	Deptt. B---	25	55
Direct Labour	Deptt. A---	30	
	Deptt. B---	40	70
Variable Overhead	Deptt. A (3 hrs × ₹6)---	18	
	Deptt B (4 hrs × ₹3)---	12	30
Variable Selling and Distribution Overhead	(₹30,000 / 1,500 units)		20
Total Variable Cost per unit			175

Total Hours Required for a Target of 1,500 units of Product Z:

Deptt. A (1,500 units × 3hrs)	4,500 hrs
Deptt. B (1,500 units × 4hrs)	<u>6,000 hrs</u>
	<u>10,500 hrs</u>

10,500 hrs represent 30% Capacity

So Total Capacity per month (10,500 hrs. / 0.30)	= 35,000 hrs
Yearly Capacity (35,000 hrs. × 12 months)	= 4,20,000 hrs
Fixed Capital Employed in both departments (25 Lakhs + 15 Lakhs)	= ₹40.00 Lakhs
Expected Return (0.21 × ₹40,00,000)	= ₹8,40,000
Contribution per hour (₹8,40,000 / 4,20,000 hrs)	= ₹2.00 per hour
Return on Working Capital (0.21 × ₹4,00,000)	= ₹84,000
Contribution per unit (₹84,000 / 18,000 units)	= ₹4.67 per unit

Total Contribution Required

To Cover Fixed Cost (3 hrs of A and 4 hrs of B @ 2 per hr)	= ₹14.00
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To Working Capital = ₹ 4.67  
₹18.67

Fixed Charges Recovery is based on usage. Full Capacity is not being used by Product Z and Departments are also producing other Products using same Plant and Machinery.

Price of Product is ₹193.67 per unit [Variable Cost (₹175) + Contribution Required (₹18.67)].

(ii) Price of Product when product is *well established in market*:

Variable Cost	₹175
Fixed Cost (₹24 + ₹16)	<u>₹40</u>
Total price	<u>₹215</u>

The Product is *first time launched in the market*, and then Variable Cost ₹175 should form the basis for Price Fixation.

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#### Problem-16

A shoe manufacturer has a net profit of ₹ 25 per pair on a selling price of ₹143. He is producing 6,000 pairs per annum which is 60% of the potential capacity. The cost per pair is as under:

	₹
Direct Materials	35.00
Direct Wages	12.50
Works Overheads (50% fixed)	62.50
Administrative Overheads (75% fixed)	6.00

During the current year the manufacturer also estimates demand of 6,000 pairs but anticipates that the fixed charges to go up by 10% while the rate of direct labour and direct materials will increase by 8% and 6% respectively. But he has no option of increasing the selling price. Under this situation he obtains an offer to utilise further 20% of capacity. What minimum price will you recommend to ensure an overall profit of ₹1,67,300?

 Solution

## Computation of Profitability at 6,000 Pairs Activity

	Existing Price Level Amount (₹)	Revised Price Level Amount (₹)
Selling Price <i>per pair</i>	143.00	143.00
Variable Costs:		
Direct Materials	35.00	37.10 (₹35 × 1.06)
Direct Wages	12.50	13.50 (₹12.5 × 1.08)
Works Overhead (50% of ₹62.50)	31.25	31.25
Administration Overhead (25% of ₹6)	1.50	1.50
Total Variable Cost <i>per pair</i>	80.25	83.35
Contribution <i>per pair</i>	62.75	59.65
Total Contribution ... (A)	3,76,500	3,57,900
Fixed Costs		
Works Overhead (6,000 pairs × ₹31.25)	1,87,500	2,06,250 (₹1,87,500 × 1.1)
Administration Overhead (6,000 pairs × ₹4.50)	27,000	29,700 (₹27,000 × 1.1)
Other Fixed Overheads *	12,000	13,200 (₹12,000 × 1.1)
Total Fixed Costs ... (B)	2,26,500	2,49,150
Profit ... (A) – (B)	1,50,000	1,08,750
Desired Profit	---	1,67,300
Additional Profit (₹1,67,300 – ₹1,08,750)	---	58,550
Additional Offer $\left( \frac{6,000}{60\%} \times 20\% \right)$		2,000 Pairs
Profit <i>per pair</i>		29.275

### 3.37 Advanced Management Accounting

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(\*)

$$\begin{aligned}\text{Other Fixed Overhead} &= \text{Contribution} - \text{Profit} - (\text{Fixed Works Overheads} + \text{Fixed Administrative Overheads}) \\ \text{Selling Price per pair} &= \text{Variable Cost per pair} + \text{Profit per pair} \\ &= ₹83.35 + ₹29.275 \\ &= ₹112.625 \text{ or } ₹112.63\end{aligned}$$

Therefore, minimum selling price per pair for the additional offer shall be ₹112.63



Selling price is ₹143 per pair and net profit is ₹25 per pair, hence, total cost per pair at the existing level should be ₹118 (₹143 – ₹25). However, the total cost per pair given is ₹116. It is assumed that balance ₹2 per pair (₹118 – ₹116) is Other Fixed Overheads. This problem can also be solved by assuming difference of ₹2 as Other Variable Costs with an anticipation that it will not change in the revised situation.

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#### Problem-17

The Board of Directors XY Company Limited are considering a new type of handy sewing machine which their R & D Department has developed. The expenditure so far on research has been ₹ 95,000 and a consultant's report has been prepared at a cost of ₹ 22,500. The report provides the following information:

Cost of production per unit:

	₹
Material.....	45.00
Labour.....	75.00
Fixed overheads (Based on Company's normal allocation rates).....	20.00

Anticipated additional fixed costs:

	₹
Rent for additional space .....	₹ 1,25,000 per annum
Other additional fixed costs .....	₹ 70,000 per annum

A new machine will be built with the available facilities with a cost of ₹ 1,10,000 (material ₹90,000 and labour ₹ 20,000). The materials are readily available in stores which are regularly used. However, these are to be replenished immediately. The price of these materials have since been increased by 50%. Scrap value of the machine at the end of the 10<sup>th</sup> year is estimated at ₹ 20,000. The product scraps generated can be disposed off at the end of year 10 for a price of ₹ 1,43,000.

Years 1-5		Years 6-10	
Demand (Unit)	Probability	Demand	Probability
40,000	0.15	24,000	0.30
20,000	0.60	16,000	0.50
12,000	0.25	4,000	0.20

It is estimated that the commercial life of the machine will be no longer than 10 years and the after tax cost of capital is 10%. The full cost of the machine will be depreciated on straight line basis, which is allowed for computing the taxable income, over a period of 10 years. Tax rate is 30%.

DCF factors at 10%:	
1 - 5 years (cumulative)	3.79
6 - 10 years (cumulative)	2.355
10th year	0.386

### Required

Compute minimum selling price for the handy sewing machine.

### Solution

#### (i) Expected Sales Volume

Years 1-5:  $(40,000 \times 0.15 + 20,000 \times 0.60 + 12,000 \times 0.25) = 21,000$  units

Years 6-10:  $(24,000 \times 0.30 + 16,000 \times 0.50 + 4,000 \times 0.20) = 16,000$  units

#### (ii) Capital Cost

	₹
Materials (₹ 90,000 x 1.50)	1,35,000
Labour (Replacement cost)	20,000
Overheads (Not Relevant)	---
	<u>1,55,000</u>

#### (iii) Production Variable Cost

	₹
Materials	45
Labour	75
Overheads (Not relevant)	---
Total	<u>120</u>

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#### (iv) Profitability

Details	Years 1-5	Years 6-10
Sales Units	21,000	16,000
Selling Price (₹)	X	X
Sales Value (₹) ... [A]	21,000X	16,000X
Material and Labour Cost @ ₹120	25,20,000	19,20,000
Incremental Fixed Cost (₹)	1,95,000	1,95,000
Depreciation (1,55,000/10)	15,500	15,500
Total Cost (₹) ... [B]	27,30,500	21,30,500
Profit (₹) ... [A-B]	21,000X – 27,30,500	16,000X – 21,30,500
Less: Tax @ 30%	6,300X – 8,19,150	4,800X – 6,39,150
Profit After Tax	14,700X – 19,11,350	11,200X – 14,91,350
Add: Depreciation	15,500	15,500
Cash Inflow	14,700X – 18,95,850	11,200X – 14,75,850

#### (v) Cash Inflow in the Terminal Year (year 10)

	₹
Sale Value of the Machine	20,000
Scrap Realization	143,000
Total	163,000
Tax @ 30%	(48,900)
After Tax Cash Inflow	114,100

#### (vi) Present Value of Cash Flows

Details	Year 0	Year 1-5	Year 6-10	Year 10
Capital Cost	1,55,000	–	–	–
Cash Flow from Operation	–	14,700X – 18,95,850	11,200X – 14,75,850	–
Cash Flow Terminal Year	–	–	–	1,14,100
Discount Factor	1	3.79	2.355	0.386
Present Value of Cash Flows	-1,55,000	55,713X – 71,85,271.50	26,376X – 34,75,626.70	44,042.6

## (vii) Net Cash Inflows

$$= (-1,55,000) + (55,713X - 71,85,271.50) + (26,376X - 34,75,626.70) + (44,042.60)$$

$$= 82,089X - 1,07,71,855.60$$

## (viii) Computation of Minimum Selling Price

For determining Minimum Selling Price, Net Cash Inflows should be equal to zero:

$$82,089X - 1,07,71,855.60 = 0$$

$$\text{Or } X = 131.22$$

Minimum selling price is ₹131.22

## Note

- (a) R&D expenses of ₹ 95,000 is not relevant.  
 (b) Fee for consultant's report of ₹ 22,500 is not relevant.  
 (c) Tax element on irrelevant costs not considered, since the benefit will arise even without this product.

## Problem-18

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:

<b>Selling price (₹ per unit)</b>	44	48	50	56	60
<b>Annual Demand (units)</b>	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*

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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 <i>per unit</i> $\left( \frac{₹ 1,00,00,000}{2,00,000 \text{ units}} \right)$	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

- (i) 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.

## Pareto Analysis

### Problem-19

Generation 2050 Technologies Ltd. develops cutting-edge innovations that are powering the next revolution in mobility and has nine tablet smart phone models currently in the market whose previous year financial data is given below:

Model	Sales (₹'000)	Profit-Volume (PV) Ratio
Tab - A001	5,100	3.53%
Tab - B002	3,000	23.00%
Tab - C003	2,100	14.29%
Tab - D004	1,800	14.17%
Tab - E005	1,050	41.43%
Tab - F006	750	26.00%
Tab - G007	450	26.67%
Tab - H008	225	6.67%
Tab - I009	75	60.00%

### Required

- Using the financial data, carry out a Pareto analysis (80/20 rule) of Sales and Contribution.
- Discuss your findings with appropriate recommendations.



### Solution

#### Statement Showing "Pareto Analysis"

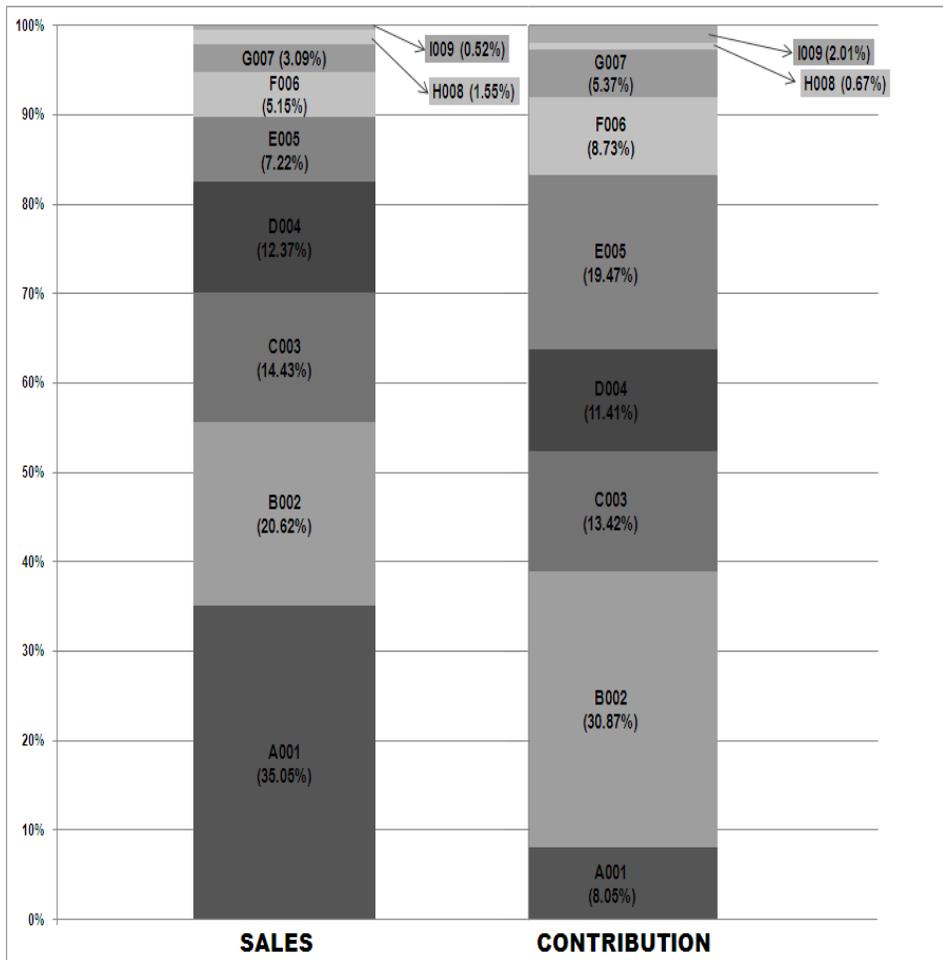
Model	Sales (₹'000)	% of Total Sales	Cumulative Total	Model	Cont. (₹'000)	% of Total Cont.	Cumulative Total %
Pareto Analysis Sales				Pareto Analysis Contribution			
A001	5,100	35.05%	35.05%	B002	690	30.87%	30.87%
B002	3,000	20.62%	55.67%	E005	435	19.47%*	50.34%
C003	2,100	14.43%	70.10%	C003	300	13.42%	63.76%
D004	1,800	12.37%	82.47%	D004	255	11.41%	75.17%
E005	1,050	7.22%	89.69%	F006	195	8.73%*	83.90%
F006	750	5.15%	94.84%	A001	180	8.05%	91.95%

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G007	450	3.09%	97.93%	G007	120	5.37%	97.32%
H008	225	1.55%	99.48%	I009	45	2.01%	99.33%
I009	75	0.52%	100.00%	H008	15	0.67%	100.00%
	14,550	100.00%			2,235	100.00%	

(\*) Rounding - off difference adjusted.

Diagram Showing "Sales and Contribution"



This Diagram is shown for better understanding of the concept.

### Recommendations

Pareto Analysis is a rule that recommends focus on most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the product or area where best returns can be achieved by taking appropriate actions.

Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule; in general business sense it means that a few of the products, goods or customers may make up most of the value for the firm.

In present case, five models namely A001, B002, C003, D004 account for 80% of total sales where as 80% of the company's contribution is derived from models B002, E005, C003, D004 and F006.

Models B002 and E005 together account for 50.34% of total contribution but having only 27.84% share in total sales. So, these two models are the key models and should be the top priority of management. Boths C003 and D004 are among the models giving 80% of total contribution as well as 80% of total sales so; they can also be clubbed with B002 and E005 as key models. Management of the company should allocate maximum resources to these four models.

Model F006 features among the models giving 80%of total contribution with relatively lower share in total sales. Management should focus on its promotional activities.

Model A001 accounts for 35.05% of total sales with only 8.05% share in total contribution. Company should review its pricing structure to enhance its contribution.

Models G007, H008 and I009 have lower share in both total sales as well as contribution. Company can delegate the pricing decision of these models to the lower levels of management, thus freeing themselves to focus on the pricing decisions for key models.

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## SECTION - C

### Pricing Policy/ Strategy

#### Problem-1

*Rapid Heal Tech Ltd. (RHTL) 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. RHTL 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**

- (i) *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 suggest necessary strategies at this stage.*



#### **Solution**

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. RHTL 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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#### Problem-2

*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.

**Problem-3**

State the most appropriate pricing policy to be adopted in the following independent situations:

- (i) Modern patented drug entering the market.
- (ii) The latest version of a mobile phone is being launched by an established, financially strong company.
- (iii) An established company has recently entered the stationery market segment and launched good quality paper for printing at home and office.
- (iv) A car manufacturer is launching an innovative, technologically advanced car in the highly priced segment.

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 Solution

Situation		Appropriate Pricing Policy
(i)	Modern patented drug entering the market.	Skimming Pricing
(ii)	The latest version of a mobile phone is being launched by an established, financially strong company.	Penetration Pricing
(iii)	An established company has recently entered the stationery market segment and launched good quality paper for printing at home and office.	Market Price
(iv)	A car manufacturer is launching an innovative, technologically advanced car in the highly priced segment.	Skimming Pricing