

Purushottam Sir Costing Classes
CA Purushottam Sir provides costing classes for CA Inter, CMA Inter, CA Final & CMA Final

PRICING DECISION

Concept 1 – Best decision about Pricing of product for maximum profit

1. Best Quality Product with Best Price is key to maximise profit.
2. Best Price does not mean maximum price or minimum price
3. Pricing decision for selling in domestic & foreign market shall be different.
4. There are many methods to decide best price at which company shall maximise profit.

- ❖ We consider full cost (VC & FC) and desired profit While deciding pricing for regular sale in domestic market.
- ❖ We consider only relevant cost & desired profit While deciding pricing for offer units.

Note – Relevant cost = VC + avoidable FC + contribution to be lost (if any) in case spare capacity is not available.

Method – 1 Pricing Equation Method / Profit maximization model

- Economics Concept and Mathematical functions are used to calculate best price.

Terms of Economics

- Marginal Cost – Change in Total cost due to change in output by 1 unit. FC normally not change in output by 1 unit . Change in Variable cost means change in direct material cost, direct labour cost, direct expenses etc.

Example: VC p.u. = Rs. 1 and TFC = 20000

TC for 5000 units produced = 5000 units x Rs.1 + 20000 = 25000

TC for 5001 unit produced = 5001 units x Rs.1 + 20000 = 25001

MC = Rs.1 = VC p.u.

- Marginal Revenue – Change in Total Revenue due to change in quantity by 1 more unit. MR is also called derivative of TR
Total Revenue of 10 units = Rs.20 x 10 = Rs.200 and
Total Revenue of 11 units = Rs.20 x 11 units = Rs.220
Hence MR = 20

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- When we use derivative formulae to calculate best price that's why it is called "Mathematical model of pricing"
- Under this model, we use Price function, MR Function & MC Function to calculate best price which can help in maximizing profit

Price function / Demand function for Maximum Profit:

$P = a - bQ$, where

P = Price,

a = Highest price at which no one willing to buy or Demand is ZERO

b = Discount in selling price to sell one more unit (Reduction in SP to sell one more unit)

Q = Quantity demanded

MR Function

MR = It is derivative of TR

$TR = P \times Q$

$TR = (a - bQ) \times Q = aQ - bQ^2$

MR = derivative of TR = $a - 2bQ$

MC Function

MC = it is derivative of TC

$TC = VC \text{ p.u.} \times Q + TFC$

$MC = VC \text{ p.u.}$

Derivation of profit maximisation point (Thumb Rule to Maximise Profit)

MR means additional revenue (Normally equal to SP)

MC means additional cost (normally equal to VC)

Company shall reduce MR to increase sales but Maximum reduction in SP shall be upto VC

Hence $MR = MC$, profit will be maximum when $MR = MC$

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Question 6 – At a price of Rs. 200, A company can sell 1,000 units of its product in a month. If the selling price is increased to Rs.220 per unit then demand of product will fall to 950 units. Variable cost of product is Rs.140 per unit and Fixed cost is Rs.36,000 per month.

Required

- a) Write down demand function equation
- b) Write down marginal revenue function
- c) Write down marginal cost equation
- d) Find quantity to maximize profit
- e) Calculate optimum price

Answer – Price function = $a - bx$

$$b = \text{slope of demand curve} = \frac{\text{Change in Selling price per unit}}{\text{Change in qty sold}} = 20 / 50 \text{ units} = 0.40$$

To calculate a, if $P = 200$ then Quantity will be 1000

Hence $200 = a - 0.40 \times 1000$ hence $a = 600$

(a) Price function $P = a - bx$ i.e. $P = 600 - 0.40x$

(b) Total Revenue function (R) = $P \times Q$

$$= (600 - 0.40X) \times X$$

$$= (600x - 0.40x^2)$$

Now derivating the equation w.r.t. x

$$\frac{dR}{dx} = 600 - 2 \times 0.40x$$

$$MR = 600 - 0.80x$$

(c) $TC = VC \text{ p.u.} \times Q + FC$

$$TC = 140Q + 36000$$

Derivating both sides w.r.t. x

$$\frac{d(TC)}{dx} = 140$$

$$MC = 140$$

(d) For maximizing profit, $MR = MC$

$$140 = 600 - 0.80Q$$

$$Q = 575$$

(e) Calculation of optimum price

Put value of $Q = 575$ in price function

$$P = 600 - 0.40 \times 575$$

$$P = 370$$

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(f) Calculation for maximum profit

$$TR - TC$$

$$= (370-140) \times 575 - 36000 = 96250$$

Method 2 – Cost plus pricing model (Cost plus profit method)

- We apply this method to calculate price of product for regular sale in market (Not used to calculate price for offer units)

$$\text{Pricing under this method} = \frac{\text{Total cost} + \text{Mark up OR Profit}}{\text{units to be sold}}$$

Point to Remember

- 1) Total Cost = TVC + TFC (both avoidable and unavoidable FC)
- 2) Mark up means profit before tax

PBT – Tax = PAT

$$(\text{Sales} - \text{Total Cost}) - \text{PBT} \times \text{Tax rate} = \text{PAT}$$

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$$(\text{Sales} - \text{Total Cost}) (1 - \text{Tax rate}) = \text{PAT}$$

Question The cost of production and sales of 80,000 units per annum of product Q are:
Material Rs. 4,80,000 Labour Rs. 1,60,000 Variable Overhead Rs. 3,20,000 Fixed overhead Rs. 5,00,000. The fixed portion of capital employed is Rs.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 **Method 2 – Cost Plus Profit Method**

Return of 12% Net (after tax of 40%) on Capital Employed is equivalent to 20% (Gross) [12% , (1 – 0.4)] on Capital Employed.

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

Since Total Sales = Total Cost + Profit

$$80,000 K = 14,60,000 + 20\% (12,00,000 + 0.5 \times 80,000K)$$

$$\text{Or, } 80,000 K = 14,60,000 + 2,40,000 + 8,000K$$

$$\text{Or, } 72,000 K = 17,00,000$$

$$\text{Or, 'K' = Rs.23.61}$$

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

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Method 3 – Incremental cost method

- We use this method to calculate price for offer units
- Price for offer units = Relevant Cost + Desired profit

$$= VC + \text{Avoidable FC} + \text{contribution to be lost (If any)} + \text{Desired profit}$$

Note: If nothing given in question, FC shall be treated as unavoidable FC)

Question A small scale manufacturer produces an article at the operated capacity of 10,000 units while the normal capacity of his plant is 14,000 units. Working at a profit margin of 20% on sales realization, he has formulated his budget as under:

Particulars	Amount (Rs.)	Amount (Rs.)
	10,000 units	14,000 units
Sales Realisation	2,00,000	2,80,000
Variable overheads	50,000	70,000
Semi variable overheads	20,000	22,000
Fixed overheads	40,000	40,000

He gets an order for a quantity equivalent to 20% of the operated capacity and even on this additional production, profit margin is desired at the same percentage on sales realization as for production to operated capacity.

Assuming prime cost is constant per unit of production, what should be the minimum price to realise this objective?

Solution:-

Working Note 1:- Bifurcation of Semi variable OH into Variable OH and Fixed OH

Variable overhead = Rs. 5

Variable element in semi-variable overhead per unit = Change in cost / change in units = $\frac{22000 - 20000}{14000 - 10000}$ = Rs.0.50

Variable cost P.U. = Rs. 5 + Rs. 0.5 = Rs. 5.50

Fixed cost in SVC = $20,000 - 0.50 \times 10,000$ = Rs. 15000

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Total FC = 40000 + 15000 = 55000

W.Note-2 Calculation of Prime Cost

Statement of Prime Cost

Level	10,000 Rs.(PU)	Unit
Selling price		20
Profit		4
Total cost		16
- Variable overhead		5.5
- Fixed Overhead (55000 / 10000 units)		5.5
Prime cost		5

Calculation of incremental cost = 2000 units x (prime cost + variable overhead) = 2000 units x (Rs.5 + 5.50) = Rs. 21000

Calculation of SP

We know that Incremental sales – Incremental Cost (Relevant cost) = Incremental profit

Let us assume be the SP

2000 units x P – 21000 = 20% of Sales (2000P)

P = 13.125

Method No. 4 Concept of FOB & CIF (Free on Board & Cost Insurance Freight)

Case 1 When Ram purchases raw material from John and sells FG in India (Ram is Buyer)

Case 2 When Ram purchase raw material in India and Sells FG to John (Ram is Seller)

Sequence of Expenditure incurred in foreign Sale case

Seller --- Ex Factory Cost --- Transport charges --- Custom Duty & Clearance charges --- Loading charges in Ship --- Freight of Ship --- Insurance during transit ---- Custom Duty paid by Buyer (Import) ---- Transport charges in foreign ---- Goods in factory of Buyer

Seller shall always be responsible till goods reach port of his country.

Buyer shall always be responsible after goods reach port of buyer's country.

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Who will be responsible for goods while in transit in ship, gave birth to FOB & CIF.

- ❖ If terms are FOB it means Seller shall be responsible till goods reach port of seller's country. In case of loss during transit, seller shall not be responsible. Insurance and freight during shipment in ship shall be paid by buyer.
- ❖ If terms are CIF it means buyer shall be responsible till goods reach port of buyer's country. In case of any loss during transit, seller shall bear loss. Seller shall pay all exp. till port of buyer

FOB = Free on Board = EX Factory Cost + Transportation Cost + Custom Duty + Clearance Charges + Loading charges

CIF = Cost Insurance Freight = FOB + insurance + Freight

Landed Cost = CIF + Custom Duty (import)

Penetration pricing

1. Used for newly introduced product
2. Low pricing policy at initial stage to get huge market share e.g. Reliance Jio

Skimming Pricing

1. Used for newly introduced product.
2. High price at initial stage and price is reduced as competition comes e.g. mobile phone

Concept – Pareto Analysis

Pareto Analysis is a rule that recommends focus on the most important aspects of decision making, in order to simplify the process of decision-making.

It is based on the 80:20 phenomenon, first observed by **Pareto**, an Italian economist.

He noticed that 80% of the wealth was owned by 20% of its citizens. Hence a business organization should identify those products which contribute to approx 80% of total contribution.

Company should mainly focus only on those products for bigger profit.

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Question The following data of manufacture and sale is obtained from Veer Ltd for the 12 months ending 31st December.

Product	A	B	C	D	E	F	Total
Contribution (Rs.)	500	200	1,500	75	100	125	2,500

Prepare a Pareto Product Contribution Chart and Comment on the results. RTP

Answer –

First of all we will arrange products in descending order of contribution (Product with higher contribution shall be placed at first)

Product	Contribution (Rs.)	Cumulative Contribution (Rs.)	Cumulative Contribution (%)
C	1,500	1,500	60%
A	500	2,000	80%
B	200	2,200	88%
F	125	2,325	93%
E	100	2,425	97%
D	75	2,500	100%
Total	2,500		

Observation: Company should focus more on product C & A since these 2 products contribute to 80% of total contribution.

Perfect Competition Market

Pure / Perfect Competition is characterised by the following conditions -

- A large number of Buyers and Sellers.
- Homogenous product.
- Free entry or exit for Firms.
- Perfect knowledge of Purchasers and Sellers on prices & quantities.
- Absence of Market Segmentation.
- Absence of Transportation Cost.
- Perfect mobility of Factors of Production.

Monopoly - Monopoly is a market condition with the following features - (a) One Seller of a particular good or service, (b)

Absence of Competition, (c) Absence of Close Substitutes, and (d) Power to influence price.

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Question 6,000 Pen Drives of 2 GB are to be sold in a Perfectly Competitive Market to earn Rs. 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 Rs. 74,000. The Contribution per unit in the Monopoly Market is as high as three fourths its Variable Cost. Determine the Target Selling Price under each market condition?

Answer -

Particulars	Competition	Monopoly
1. Target Contribution=Fixed Cost + Profit = Rs. 74,000 + Rs. 1,06,000	Rs. 1,80,000	Rs. 1,80,000
2. Contribution per unit	$\frac{\text{Rs. } 1,80,000}{6,000 \text{ units}} = \text{Rs. } 30 \text{ p.u.}$	$\frac{\text{Rs. } 1,80,000}{1,200 \text{ units}} = \text{Rs. } 150 \text{ p.u.}$
3. Variable Cost per unit (See Note)	Rs. 200 p.u.	Rs. 200 p.u.
4. Target Selling Price per unit (2 + 3)	Rs. 230 p.u.	Rs. 350 p.u.

Note: Contribution in Monopoly Market = Rs. 150 p.u. = $\frac{3}{4}$ th of Variable Cost. So, Variable Cost = $\frac{\text{Rs. } 150}{\frac{3}{4}} = \text{Rs. } 200 \text{ p.u.}$

Value- Based Pricing Method

There is an increasing trend to price the product on the basis of customer's perception of its value. This method helps the firm in reducing the threat of price wars. Marketing research is important for this method. It is based on:

Objective Value or True Economic Value (TEV)

This is a measure of benefits that a product is intended to deliver to the consumers relative to the other products.

TEV = Cost of the Next Best Alternative + Value of Performance Differential

Cost of the next best alternative is the cost of a comparable product offered by some other company. Value of performance differential is the value of additional features provided by the seller of a product.

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Question A customer wants to buy a System for a single year (after which it will be scrapped) with plans to use it for 2,500 hrs. Cost Structure (similar products):

Particulars	System X	System Y
Operating Cost/ hour (Rs.)	5.00	7.50
Probability of System Crash	10%	0.5%
Price (Rs.)	37,500	??

Find the TEV for the System-Y if the cost of a System Crash to the buyer is 1,00,000

Solution TEV = Cost of Next best alternative + Value of performance Differential

$$= 37,500 + [2500 \text{ hours} \times (\text{Rs.}5.00 - \text{Rs.}7.50) + 100000 \times (10\% - 0.5\%)]$$

$$= \text{Rs.}40,750$$