MARGINAL COSTING AND DECISION MAKING

Managerial Problems in Application of Marginal Costing:

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1. Pricing Decisions
2. Profit Planning and Maintaining a Desired Level of Profit
3. Make or Buy Decisions
4. Problem of Key
5. Selection of a Suitable or Profitable Sales Mix
6. Effect of Changes in Sales Price
7. Alternative Methods of Production
8. Determination of Optimum Level of Activity
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Pricing under normal conditions

Fixing of selling prices is one of the most important functions of management.

Although prices are generally determined by market conditions and other economic factors yet marginal costing technique assists the management in the fixation of selling prices under various circumstances as:

(a) Pricing under normal conditions

(b) During stiff competition

(c) During trade depression

(d) For accepting special bulk orders

(e) For accepting additional orders utilising idle capacity.

(f) For accepting export orders and exploring new markets.

(a) Pricing under Normal Conditions:

Under normal circumstances, the prices are based upon total cost of sales so as to cover both fixed as well as variable cost and in addition to provide for certain desired margin of profit. But prices can also be fixed on the basis of marginal cost by adding a sufficiently high margin to marginal (variable) cost so as to cover the fixed cost and profits.

However, under other circumstances, products may have to be sold at a price below the total cost. For example, in the days of stiff competition or to meet the situation arising due to trade depression, for accepting special bulk or additional orders for utilising idle capacity ; for exporting and exploring new markets, etc.

The products may have to be sold at a price below the total cost based upon absorption costing. In such circumstances, the prices should be fixed on the basis of marginal cost (and total cost) in such a manner so as to cover the marginal cost and contribute something towards the fixed expenses. Sometimes it may become necessary to reduce the selling prices to the level of marginal cost or even below the marginal cost.

(b) Selling Price below the Marginal Cost:

The selling prices of products may be fixed even below the marginal cost in the following circumstances:

(i) To introduce a new product in the market.

(ii) To popularise a particular product.

(iii) To explore foreign markets.

(iv) To eliminate the competitor from the market.

(v) To help the sale of joint products.

(vi) To avoid the retrenchment of workers.

(vii) To dispose off the product of perishable nature.

(viii) To utilise idle capacity.

(ix) To keep plant and machinery in the running conditions.

(x) To retain old customers and prevent loss of future orders.

(xi) To avoid extra losses by closing down the business.

(xii) To dispose off surplus stocks.

(c) Pricing during Stiff Competition and Trade Depression:

During stiff competition, produces may have to be sold at a price below the total cost. In such circumstances, the price should be fixed on the basis of marginal cost in such a manner so as to cover the marginal (variable) cost and contribute something towards the fixed expenses. Sometimes, to eliminate the weaker competitors from the market, the price may be fixed even below the marginal cost.

During depression also products may be sold at a price below the total cost. There is a fall in the price as a result of depression. The prices can be safely reduced to an extent which covers the variable cost and contributes something towards the fixed cost.

This is so because fixed expenses will be incurred even if the product is discuntinued during depression for a short period. In case the product can be sold at something above the marginal

cost, the total loss on account of fixed expenses shall reduce as sales will recover some of the fixed expenses.

If there is a serious but temporary fall in the demand of the product, the minimum price that can be fixed is the marginal cost because selling below the marginal cost would mean more losses than the losses on closing down the business. Hence, if the product can be sold at a price equal to or more than the marginal cost, the business should be continued under such circumstances.

This has been made clear with the help of the following example:

Suppose, marginal cost of a product is Rs. 5/- per unit and fixed expenses amount to Rs. 1,00,000. Selling price per unit is Rs. 6/- and 50,000 units can be sold at this price.

	₹
Marginal cost of 50,000 units @ ₹ 5 per unit	2,50,000
Fixed Expenses	1,00,000
Total Cost	3,50,000

Cost per unit = 3,50,000/50,000 = Rs. 7

Selling price of Rs. 6/- per unit is below the total cost of Rs. 7/- per unit, yet it is advantageous to sell the products at Rs. 6/- per unit as it is more than the marginal costs.

	₹
Sales value of 50,000 units @ ₹ 6/- per unit	3,00,000
Less Total cost, calculated above	3,50,000
Loss	50,000
Loss due to fixed expenses, if product is discontinued	1,00,000
Loss reduced if the product is continued (1,00,000–50,000)	50,000

Accepting Special orders, Bulk orders, additional orders, export orders and exploring new markets:

Bulk orders, additional orders and orders from foreign or new markets, may be accepted at a price below the normal market price so as to utilise the idle capacity. Such orders are received usually asking for a price below the market price and hence a decision is to be taken to accept or reject the order.

The order may be accepted at any price above the marginal cost because the fixed costs have to be incurred even otherwise. Any contribution resulting from the additional-sales would mean an additional profit. But care must be taken to see that accepting an order below the market price does not affect the normal selling price adversely.

For example, an order from a local merchant should not be accepted at a price below the normal market price because it will affect the relationships with other customers buying at a normal price. But, if it is a foreign order, it may be accepted at a price below the normal price keeping in view the additional costs of exporting, if any and direct and indirect benefits of exporting such as, goodwill, subsidies, quotas, etc.

Illustration 1:

The Everest Snow Company manufactures and sells direct to consumer's 10,000 jars of 'Everest Snow' per month at Rs. 1.25 per jar. The company's normal production capacity is 20,000 jars of snow per month.

An analysis of cost for 10,000 jars is given below:

	₹
Direct Material	1,000
Direct Labour	2,475
Power	140
Jars	600
Misc. Supplies	430
Fixed Expenses of manufacturing, selling and administration	7,955
Total	₹ 12,600

The company has received an offer for the export under a different brand name of 1,20,000 jars of snow at 10,000 jars per month at 75 paise a jar.

Write a short report on the advisability or otherwise of accepting the offer.

Solution:

Marginal Cost Statement

	Per Unit	*Present capacity 50%*	*Proposed another 50% capacity @ 75 paise per unit*	*Total 100% capacity*
Sales (units)		10,000	10,000	20,000
	₹	₹	₹	₹
Sales (Value)	1.25	12,500	7,500	20,000
Less : Marginal Cost :				
Direct Material	0.1000	1,000	1,000	2,000
Direct Labour	0.2475	2,475	2,475	4,950
Power	0.0140	140	140	280
Misc. Supplies	0.0430	430	430	860
Jars	0.0600	600	600	1,200
	0.4645	4,645	4,645	9,290
Contribution	0.7845	7,855	2,855	10,710
Fixed Cost		7,955	—	7,955
Profit/Loss		(–)100	2,855	2,755

At the present level of activity, i.e., 10,000 units, there is a loss of Rs. 100 in spite of the fact that variable cost is only Re. 0.4645 against a selling price of Rs. 1.25 per unit. The reason is that the total cost per unit (including fixed costs) is Rs. 1.26 per unit.

But if additional 10,000 units are sold it converts the loss of Rs. 100 into a profit of Rs. 2,755 in spite of the fact that additional offer for 10,000 units is @ 75 paise per unit only.

This is so because of the fact that additional sales give a contribution of Rs. 2,855 i.e. (Rs. 0.75-0.4645 or say 0.2855 per unit). As additional sales give contribution and no additional fixed costs are involved, the offer should he accepted.

However, before taking a final decision the following further points should be studied:

(i) The cost of exporting, if any

(ii) Risk or re-import of the same goods into the home market and generating competition with itself.

(iii) Effect of lower export price on the home market.

(iv) Alternative uses of surplus capacity.

Application of Marginal Costing: Managerial Problem # 2.

Profit Planning and Maintaining a Desired Level of Profit:

Marginal costing techniques can be applied for profit planning as well. Profit planning involves the planning of future operations to achieve maximum profits or to maintain a desired level of profits. The change in the sales price, variable cost and product mix affect the profitability of a concern.

Absorption costing fails to bring out the effect of such changes on the profits of a concern due to the inclusion of fixed expenses in the total cost.

With the help of marginal costing, the required value of sales for maintaining or attaining a desired level of profit may be ascertained as follows:

Desired Sales = Fixed Cost + Desired Profit/P/V Ratio

Illustration 2:

The price structure of a cycle made by the Cycle Company Ltd. is as follows:

	Per Cycle ₹
Materials	60
Labour	20
Variable Overheads	20
	100
Fixed Overheads	50
Profit	50
Selling Price	200

This is based on the manufacture of one lakh cycles per annum.

The company expects that due to competition they will have to reduce selling prices, but they want to keep the total profits intact.

What level of production will have to be reached, i.e., how many cycles will have to be made to get the same amount of profit if:

(a) The selling price is reduced by 10%.

(b) The selling price is reduced by 20%.

Solution:

Fixed Overheads = ₹ 50 per cycle.
Present Profit = ₹ 50 per cycle.
Total No. of Cycles. = 1 lakh
Fixed Costs = 50 × 1 = ₹ 50 lakhs.
Total Present Profit = ₹ 50 lakhs

$$\text{Desired Sales} = \frac{\text{Fixed Cost + Profit}}{\text{P/V Ratio}} = \frac{\text{Fixed Cost + Profit}}{\text{Contribution per unit}}$$

(a) If the selling price is reduced by 10%

New Selling price = 200–10% = 200 – 20 = ₹ 180

Hence,

$$= \frac{50,00,000 + 50,00,000}{180 - 100}$$

$$= \frac{1,00,00,000}{80} = 1,25,000 \text{ cycles.}$$

(b) If the selling price is reduced by 20%

New Selling Price = 200 – 20% = 200 – 40 = ₹ 160

Desired Sales

$$= \frac{50,00,000 + 50,00,000}{160 - 100}$$

$$= \frac{1,00,00,000}{60} = 1,66,667 \text{ cycles.}$$

Application of Marginal Costing: Managerial Problem # 3.

Make or Buy Decisions:

Sometimes a concern has to decide whether a certain product or a component should be made in the factory itself (having unused production facilities) or bought from outside from a firm which specialises in it. In taking such a 'make or buy' decision, the technique of marginal costing is of immense help.

While deciding to 'make or buy' a distinction must be made between fixed cost and variable cost, and the variable cost of manufacturing it should be compared with the price at which this component or product can be bought from outside. It is advisable to make than to buy if the variable (marginal) cost of the product or component is lower than the purchase price.

But if the purchase price is lower than the marginal cost, it would be better to buy than to make itself. However, this decision is based upon the assumptions that fixed expenses do not increase and production facilities cannot be employed more profitably.

Further, the irregularity of supply from outside, disclosure of business secrets and non-availability of surplus capacity, etc. may force a concern to make rather than to buy.

Illustration 3:

A manufacturing company finds that while the cost of making a component No. 0.51 in its own workshop is Rs. 8.00 each, the same is available in market at Rs. 6.50 with an assurance of continuous supply. Give your suggestion whether to make or buy this component.

Give also your views in case the supplier reduces the price from Rs. 6.50 to Rs. 5.50. The cost data is as follows:

	₹
Materials	3.00
Direct labour	2.00
Other Variable Expenses	1.00
Depreciation and other Fixed Expenses	2.00
	8.00

Solution:

Since fixed costs are to be incurred whether we manufacture this component or not, the decision depends upon the marginal cost of making the component which is calculated as follows:

Marginal Cost of Component 0.51 (per unit)	₹
Materials	3.00
Direct Labour	2.00
Other Variable Expenses	1.00
	6.00

It is advisable to make the component itself if the marginal cost of making the component is lower than the purchase price because every component produced will give some contribution to the company. But in case the marginal cost is higher than the purchase price, it is better to buy the component from outside than to make it.

In the above example, if the purchase price is Rs. 6.50, it is not advisable to buy the component from outside. We should rather make the component of our own because every component manufactured will give a contribution of 50 paise. But the company should not manufacture the component if it is available at Rs. 5.50 from outside. In that case it is better to buy than to make.

Illustration 4:

LMN Ltd. purchases 20,000 bells per annum from an outside supplier at Rs. 5 each. The management feels that these be manufactured and not purchased. A machine costing Rs. 50,000 will be required to manufacture the item within the factory. The machine has an annual capacity of 30,000 units and life of 5 years.

The following additional information is available:

Material cost per bell	₹ 2.00
Labour cost per bell	₹ 1.00
Variable overheads	100% of labour cost

(a) The company should continue to purchase the bells from outside supplier or should make them in the factory, and

(b) The company should accept an order to supply 5000 bells to the market at a selling price of Rs. 4.50 per unit?

Solution:

Marginal cost of manufacture per bell	₹
Material	2.00
Labour	1.00
Variable Overheads (100% of Direct Labour)	1.00
	4.00

Additional Fixed cost of manufacture p.a.

Depreciation (50,000 × 1/5) = Rs. 10,000

Since the marginal cost of manufacturing the bell is less than the supplier's price of Rs. 5, there shall be a saving of Rs. (Rs. 5-4) or Re. 1 per bell if the bell is manufactured within the factory. Manufacturing will however result in an additional fixed cost of Rs. 10,000 p.a. Hence the total saving will have to be compared with this additional cost.

(*a*) Total savings (contribution) for 20,000 bells	= ₹ 20,000 × 1.00 = ₹ 20,000
Less : Additional fixed cost	= ₹ 10,000
Profit (Net Savings)	₹ 10,000

Thus, it is advisable to manufacture these bells within the factory.

(*b*) If the company accepts the order to supply 5000 bells at ₹ 4.50 per unit, it will result into an additional contribution (profit) of ₹ 2,500 as calculated below :

Selling price per unit	₹ 4.50
Marginal cost per unit	₹ 4.00
Contribution per unit	₹ 0.50
Total contribution on 5000 bells	₹ 5,000 × 0,50
	= ₹ 2,500
Total Net savings (*a* + *b*)	₹ 10,000 + 2,500 = ₹ 12,500

Hence, the company should manufacture the bells within the factory and accept the order to supply 5000 bells at Rs. 4.50 each.

Application of Marginal Costing: Managerial Problem # 4.

Problem of Key:

A limiting factor is a factor which limits or restricts production or sales and thus prevents a concern from making unlimited profits. Limiting factor is also known as key factor. The limiting factor may be any factor of production such as availability of raw material, labour, capital, plant capacity and even sales.

In case, a concern has two or more product lines, and there is a key or limiting factor, a problem may arise as to which product should be produced more so as to utilise the limiting factor in the best possible manner and to maximise the profits. When limiting factor is in operation.

Contribution per unit of limiting factor should be the criterion to assess the profitability of a product. The product which gives highest contribution per unit of limiting factor should be preferred to the one which gives lower contribution per unit of limiting factor. When two or more limiting factors are in operation, it is necessary to take all of them into consideration.

Illustration 5:

In a factory producing two different kinds of articles, the limiting factor is the availability of labour.

From the following information, show which product is more profitable:

		Product A Cost per unit ₹	*Product B Cost per unit* ₹
Materials		5.00	5.00
Labour :	6 Hours @ Re. 0.50	3.00	
	3 House @ Re. 0.50		1.50
Overheads :	Fixed—50% of labour	1.50	0.75
	Variable	1.50	1.50
	Total cost	11.00	8.75
	Selling price	14.00	11.00
	Profit	3.00	2.25
	Total Production for the month	500	600

Maximum capacity per month is 4800 hours. Give proof in support of your answer.

Solution:

	A	B	Product A (per unit) ₹	Product B (per unit) ₹
Selling price			14.00	11.00
Less : Variable Cost :	₹	₹		
Materials	5.00	5.00		
Labour	3.00	1.50		
Variable Overheads	1.50	1.50		
			9.50	8.00
Contribution per unit			4.50	3.00
Labour Hours required per unit			6 hours	3 hours
Contribution per hour			$= \frac{4.50}{6}$	$\frac{3.00}{3}$
			= 0.75	= 1.00
Hence, product B is more profitable (because of more contribution per hour).				

Proof

	Product A	Product B
Maximum Capacity per month	4800 hours	4800 hours
Labour hours required per unit	6 hours	3 hours
Maximum Capacity in units	$\frac{4800}{6} = 800$	$\frac{4800}{3} = 1600$
	₹	₹
Materials	4,000	8,000
Labour @ ₹ 0.50 per hour for 4800 hours	2,400	2,400
Overheads :		
Fixed—50% of labour	1,200	1,200
Variable @ ₹ 1.50 per unit	1,200	2,400
Total Cost	8,800	14,000
Sales	(800 × 14) 11,200	(1600 × 11) 17,600
Profit	2,400	3,600

Application of Marginal Costing: Managerial Problem # 5.

Selection of a Suitable or Profitable Sales Mix:

When a concern manufactures more than one product, a problem often arises as to the product mix or the sales mix which will yield the maximum profits. In determining the optimum or profitable sales mix, the products which give the maximum contribution are to be retained and their production should be increased.

The production of products which give comparatively lesser contribution should be reduced or dropped altogether. Finally, the optimum sales mix is that which gives the highest contribution. In case there is a limiting factor, the contribution per unit of limiting factor should be considered while judging the profitability of a product.

Illustration 6:

Present the following information to show clearly to management:

(a) The marginal product cost and the contribution per unit.

(b) The total contribution and profits resulting from each of the following mixtures.

Sales Mixtures:

(a) 100 units of product A and 200 of B.

(b) 150 units of product A and 150 of B.

(c) 200 units of product A 100 of B.

Solution:

	A (₹)	B (₹)	Product A (per unit) (₹)	Product B (per unit) (₹)
Selling price			14.00	11.00
Less : Variable Cost :				
Materials	5.00	5.00		
Labour	3.00	1.50		
Variable Overheads	1.50	1.50		
			9.50	8.00
Contribution per unit			4.50	3.00
Labour Hours required per unit			6 hours	3 hours
Contribution per hour			$= \frac{4.50}{6}$ = 0.75	$\frac{3.00}{3}$ = 1.00
Hence, product B is more profitable (because of more contribution per hour).				

Proof

	Product A	Product B
Maximum Capacity per month	4800 hours	4800 hours
Labour hours required per unit	6 hours	3 hours
Maximum Capacity in units	$\frac{4800}{6}$ = 800	$\frac{4800}{3}$ = 1600
	₹	₹
Materials	4,000	8,000
Labour @ ₹ 0.50 per hour for 4800 hours	2,400	2,400
Overheads :		
Fixed—50% of labour	1,200	1,200
Variable @ ₹ 1.50 per unit	1,200	2,400
Total Cost	8,800	14,000
Sales	(800 × 14) 11,200	(1600 × 11) 17,600
Profit	2,400	3,600

As sales mixture (c), i.e., 200 units of A and 100 units of B gives the maximum profit, it is more profitable.

Application of Marginal Costing: Managerial Problem # 6.

Effect of Changes in Sales Price:

Management is generally confronted with a problem of analysing the effect of changes in sales price upon the profitability of the concern. It may be required to reduce the prices on account of competition, depression, and expansion programme or government regulations.

The effect of changes in sales prices can be easily analysed with the help of contribution technique.

Illustration 7:

The following data are available from the records of a company:

	₹
Sales	60,000
Variable Cost	30,000
Fixed Cost	15,000

You are required to:

(a) Calculate the P/V Ratio, Break-Even Point and Margin of Safety at this level.

(b) Calculate the effect of 10% increase in sale price.

(c) Calculate the effect of 10% decrease in sale price.

Solution:

(a) P/V Ratio $= \frac{\text{Contribution}}{\text{Sales}} \times 100$

Contribution = Sales – Variable Cost

= ₹ 60,000–30,000 = ₹ 30,000

P/V Ratio $= \frac{30,000}{60,000} \times 100 = 50\%$

Break – Even Point $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$= \frac{15,000 \times 100}{50} = \text{Rs. } 30,000$

Margin of Safety = Present Sales–Sales at B.E.P.

= ₹ 60,000–30,000 = ₹ 30,000

(b) Effect of 10% increase in Sales Price :

Sales = ₹ 60,000 + 10% = ₹ 66,000

P/V Ratio $= \frac{\text{Contribution}}{\text{Sales}} \times 100$

$= \frac{66,000 - 30,000}{66,000} \times 100 = \frac{36,000}{66,000} \times 100 = 54.55\%$

Break–Even Point $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{\text{Fixed Cost}}{\text{Total Contribution}} \times \text{Total Sales}$

$= \frac{15,000}{36,000} \times 66,000 = \text{Rs. } 27,500$

Margin of Safety = Actual Sales – Sales at B.E.P.

= 66,000 – 27,500 = ₹ 38,500

(c) Effect of 10% decrease in Sales Price :

Sles = ₹ 60,000–10% = ₹ 54,000

P/V Ratio $= \frac{\text{Contribution}}{\text{Sales}} \times 100$

$= \frac{54,000 - 30,000}{54,000} \times 100 = \frac{24,000}{54,000} \times 100 = 44.44\%$

Break–Even Point $= \frac{\text{Fixed Cost}}{\text{Total Contribution}} \times \text{Sales}$

$= \frac{15,000}{24,000} \times 54,000 = \text{Rs. } 33,750$

Margin of Safety = Actual Sales–Sales at B.E.P.

= 54,000–33,750 = ₹ 20,250

Application of Marginal Costing: Managerial Problem # 7.

Alternative Methods of Production:

Sometimes the management has to choose from among alternative methods of production, e.g., machine work or hand work. The same product may be produced either by employing machine No. 1 or Machine No. 2, and the management may be confronted with the problem of choosing one among them.

In such circumstances, technique of marginal costing can be applied and the method which gives the highest contribution can be adopted keeping in view, of course, the limiting factor.

Illustration 8:

Product 'A' can be manufactured either by machine X or machine Y. Machine X can produce 50 units of 'A' per hour and machine Y, 100 units per hour. Total machine hours available are 2000 hours per annum.

Taking into account the following cost data, determine the profitable method of manufacture:

	Per Unit of Product 'A'	
	Machine X ₹	*Machine Y* ₹
Direct material	8	10
Direct Wages	12	12
Variable Overheads	4	4
Fixed Overhead	5	5
	29	31
Selling Price	30	30

Application of Marginal Costing: Managerial Problem # 8.

Determination of Optimum Level of Activity:

The technique of marginal costing also helps the management in determining the optimum level of activity. To make such a decision, contribution at different levels of activity can be found, and the level of activity which gives the highest contribution will be the optimum level. The level of production can be raised till the marginal cost does not exceed the selling price.

Illustration 9:

A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets per annum.

The present cost break-up for one bucket is as under:

	₹	
Material	10	
Labour Cost	3	
Overhead	5	(60% Fixed)

The Selling price is Rs. 20 per bucket.

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the prices of material.

You are required to calculated the profit at 50% and 90% capacities and also calculate break-even points for the capacity productions.

Solution:

Application of Marginal Costing: Managerial Problem # 9.

Evaluation of Performance:

Evaluation of performance efficiency of various departments, product lines or markets can also be made with the use of the technique of marginal costing. Sometimes, the management may have to decide to discontinue the production of non-profitable products or departments so as to maximise the profits.

In such cases, the contribution of different products, departments or sales divisions can be compared and the one which gives the lowest contribution in comparison to sales, i.e., the one with lowest P/V ratio should be discontinued. The following illustration explains how the technique of marginal costing can be applied to evaluate -the performance of different products or departments.

Illustration 10:

The management of a company considers that product B, one of its three main lines, is not as profitable as the other two with the result that no particular efforts are being made to push its sales.

The selling prices and costs of these products are as follows:

Product	*Selling Price*	*Direct Material*	*Direct Labour*		
			Dept. X	*Dept. Y*	*Dept. Z*
	₹	₹	₹	₹	₹
A	50	10	4	2	2
B	40	6	2	4	2
C	45	8	2	2	4

Overhead rates for each department per rupee of direct labour are as follows:

Product	*Selling Price*	*Direct Material*	*Direct Labour*		
			Dept. X	*Dept. Y*	*Dept. Z*
	₹	₹	₹	₹	₹
A	50	10	4	2	2
B	40	6	2	4	2
C	45	8	2	2	4

What advice would you give to the management about the profitability of Product B? Give reasons.

Solution:

Comparative Profitability Statement						
	Product A		*Product B*		*Product C*	
	₹	₹	₹	₹	₹	₹
Selling Price		50.00		40.00		45.00
Less : Marginal Cost						
Direct Material	10.00		6.00		8.00	
Direct Labour	8.00		8.00		8.00	
Variable Overhead:						
Dept. X	5.00		2.50		2.50	
Dept. Y	1.00		2.00		1.00	
Dept. Z	2.00		2.00		4.00	
		26.00		20.50		23.50
Contribution		24.00		19.50		21.50
P/V Ratio		48%		48.75%		47.77%
	$\frac{24.00}{50}\times 100$		$\frac{19.50}{40}\times 100$		$\frac{21.50}{44}\times 100$	

Conclusion:

As the P/V Ratio of Product B is the highest, it is the most profitable product line.

Illustration 11:

The following data relates to a company which manufactures three products A, B and C:

	A	*B*	*C*
Production (units)	2000	2400	3000
Cost per unit	₹	₹	₹
Material	5	8	12
Labour	2	4	3
Variable overhead	1	2	1
Fixed overhead	6	5	6
	14	19	22
Selling price per unit	20	25	30
Profit per unit	6	6	8

The production manager suggests that one production line should be discontinued-he undertakes to double the existing production in the remaining two lines. You are required to advise the management whether the suggestion is acceptable and, if so, which production line should be discontinued?

Solution:

Calculation of Fixed Cost

		₹
Product A :	2000 units @ ₹ 6 per unit	12,000
Product B :	2400 units @ ₹ 5 per unit	12,000
Product C :	3000 units @ ₹ 6 per unit	18,000
Total		42,000

Marginal Cost Statement

	Product A ₹	*B* ₹	*C* ₹
Selling Price (per unit)	20	25	30
Less : Marginal/Variable Cost			
Material	5	8	12
Labour	2	4	3
Variable Overhead	1	2	1
	8	14	16
Centribution (per unit)	12	11	14

Comparative Profitability Statement

(*a*) If product A is discontinued, the production of B and C will be double :

Production of B — 2400 × 2 = 4800 units
Production of C — 3000 × 2 = 6000 units

Contribution

		₹
Product B	4800 × 11 =	52,800
Product C	6000 × 14 =	84,000
Total Contribution		1,36,800
Less : Fixed Cost		42,000
Profit		94,800

(*b*) If product B is discontinued, the production of A and C will be double :

Production of A	2000 × 2 =	4000 units
Production of C	3000 × 2 =	6000 units

Contribution

		₹
Product A	4000 × 12 =	48,000
Product C	6000 × 14 =	84,000
Total Contribution		1,32,000
Less : Fixed Cost		42,000
Profit		90,000

(*c*) If product C is discontinued, the production of A and B will double :

Production of A = 2000 × 2 = 4000 units
Production of B = 2400 × 2 = 4800 units

Contribution

		₹
Product A	= 4000 × 12 =	48,000
Product B	= 4800 × 11 =	52,800
Total Contribution		1,00,800
Less : Fixed Cost		42,000
Profit		58,800

(*d*) If the existing production of three products is continued :

Contribution

		₹
Product A	= 2000 × 12 =	24,000
Product B	= 2400 × 11 =	26,400
Product C	= 3000 × 14 =	42,000
Total Contribution		92,400
Less : Fixed cost		42,000
Profit		50,400

From the above analysis, it is clear that profit is maximum when product A is discontinued, hence the management is advised to discontinue product A and double the production of B and C.

Application of Marginal Costing: Managerial Problem # 10.

Capital Investment Decisions:

The technique of marginal costing also helps the management in taking capital investment decisions. However, a simple example is given below to illustrate how marginal costing technique can be used while making such decisions.

Illustration 12:

A practising Chartered Accountant now spends Re. 0.90 per kilometre on taxi fares for his client's work. He is considering two other alternatives, the purchase of a new small car or an old bigger car.

The estimated cost figures are:

Items	*New Small Car* ₹	*Old Bigger Car* ₹
Purchase Price	35,000	20,000
Sale Price, after 5 years	19,000	12,000
Repairs & Servicing (per annum)	1,000	1,200
Taxes & Insurance, per annum	1,700	700
Petrol Consumption, per litre	10 km.	7 km.
Petrol price ₹ 3.50 per litre		

He estimates that he does 10,000 km. annually. Which of the three alternatives will be cheaper? If his practice expands and he has to do 19,000 km per annum, what should be the decision? At how many km per annum will the costs of the two cases break-even and why? Ignore interest and income-tax.

Solution:

Comparative Cost Statement

	New Small Car ₹	*Old Bigger Car* ₹	*Taxi* ₹
Purchase Price	35,000	20,000	
Less : Sale Price (after 5 yrs)	19,000	12,000	
Depreciation for 5 years	16,000	8,000	
Depreciation for one years	3,200	1,600	
Repair and Servicing	1,000	1,200	
Taxes & Insurance	1,700	700	
Fixed Cost, per annum	5,.900	3.500	
Variable Cost, per annum :			
(i) Petrol for 10,000 km.			
New Small Car @ ₹ 3.50 for 10 km.	3.500		
Old Big Car @₹ 3.50 for 7 km.		5,000	
(ii) Petrol for 19,000 km.	6.650	9.500	
Total Cost (Fixed + Variable)	9,400	8,500	9,000
for 10,000 km.			(10,000 × 0.90)
for 19,000 km.	12,550	13,000	17,100
			(19,000 × 0.90)

Conclusion:

For present practice requiring 10,000 km, an old bigger car is the cheapest as the annual cost is Rs. 8,500 which is the lowest of the three alternatives. But if his practice expands to 19,000 km, a new small car will be the cheapest with an annual cost of Rs. 12,550.

Calculation of Km at which the cost of the two cars will break-even:

Variable cost of new small car, for 10,000 km. Rs. 3,500

∴ Variable cost of new small car, per km. = (3,500/10,000) = Re. 0.35

Variable cost of old bigger car, for 10,000 km. = Rs. 5,000

∴ Variable cost of bigger car, per km. = 5,000/10,000 = Re. 0.50

Difference in the variable cost of two cars = 0.50 – 0.35 = Re. 0.15

Difference in the fixed cost of two cars = Rs. 5,900 – 3,500 = Rs. 2,400

Hence, Break – Even Point = Difference in fixed cost/Difference in variable cost per km.

= 2,400/15 × 100 = 16,000 km.

Proof:

At 16,000 km, the total cost of two cars is as:

		New Car ₹		*Old Car* ₹
Fixed Cost		5,900		3,500
Variable Cost	(16,00 × 0.35)	5,600	(16,000 × 0.50)	8,000
Total Cost		11,500		11,500