

Decision Making – Marginal & ETC

1. The sales, cost, selling price and processing time of three different herbal drinks produced by a company for year just concluded are given below:

	Strong	Product Normal	Mild
Annual sales (no. of packs 250 gm)	6,000	5,000	1,000
Selling price (`/pack)	50	40	30
Unit cost (`./pack)	42	36	21
Processing time/ per pack (hrs)	1.5	1	2

The total processing hours available to the company is fully utilized for this sale. Fixed manufacturing overheads are fully absorbed in unit cost at rate of 200% of variable cost. For the coming year the demand for the three products has been estimated as under:

Strong- 6,000 packs
Normal- 6,000 packs
Mild – 2,000 packs

Considering that the selling prices are fixed and the processing time can be switched from one product line to another, calculate the best production programme for next operating year indicating the increase in net profit that will result.

2. Apple Ltd. produces three products - A, B and C, from the same manufacturing facilities. The cost and other details of the three products are as follows.

	A	B	C
Selling price/unit (`)	200	160	100
Variable cost/unit (`)	120	120	40
Maximum production per month (units)	5,000	8,000	6,000
Maximum demand per month (units)	2,000	4,000	2,400

Total hours available for the month 200 hours. Fixed expenses/month `2,76,000. The processing hours cannot be increased beyond 200 hours per month.

You are required to

- compute the most profitable product-mix :
- compute the overall break-even sales of the co. for the month based on the mix calculated in (a)
- if total hours available is 260 , what the maximum profit?
- if a minimum production of 2,000 units are to be made for each product , what will be the maximum profit?
- calculate best product mix: Given, Purchase price – A – 114 , B – 122 and C – 45 and Hours Available – 160 hours ?
- in (e) above, If purchase price of C – ` 41 in above question. Find best product mix.

3. The following is the quarterly budget of a company engaged in the manufacture of a range of products:

Products	A	B	C	D
Sales Units	3600	5600	5200	3000
Selling Price/Unit (₹)	1000	1200	2300	2000
D. Materials/Unit (₹)	425	555	1275	1045
D. Labour/Unit (₹)	180	180	280	265
Variable overheads/Unit (₹)	240	240	480	400

Fixed overheads per quarter ₹ 30,70,000. Variable overheads rate is ₹ 8 per hour.

In order to stimulate demand, the company proposes to launch an advertisement campaign at a cost of ₹ 2 lakhs. It is expected that the proposed advertisement campaign will increase the sales as under:

Products	A	B	C	D
Increase in Sales Units to	4000	6200	5700	3300

The production capacity is limited to 7,53,000 hour in the quarter. Products A and C can be bought and sold. The purchase prices of the products A and C respectively are ₹ 890 and ₹ 2,200.

Determine whether the investment in advertisement campaign should be made or not;
 Compute the profit or arising from the implementation of the advertisement program.

4. A company manufactures three products from an intermediate produced in its own plant . The downstream units at full capacity operations require one lakh kilos of intermediate . However , in view of certain constraints , this output would be affected by 25% . Intermediate is charged to user divisions at ₹ 10 per kilo inclusive of its variable cost of ₹ 8 per kg.
 Following particulars are furnished :

<u>Downstream</u> Units	A	B	C
Capacity (kgs.)	60,000	40,000	20,000
Intermediate required (kgs.)	66,000	20,000	14,000
Variable cost (₹/kg.)	14	8	9
Fixed cost (")	3	5	3
Profit (")	3	2	4
Total Price (")	20	15	16

It is further given that :

Constraints would prevail throughout the year and no other arrangement is possible to meet shortage ;

Company had an opening stock of 7,500 kgs. and minimum stock of 3,500 kgs. has to be maintained in any case ; and for economic operations plants have to be operated at a minimum of 70% capacity .

Required :

- To suggest the most profitable mix ;
- To compute the loss of profit suffered as a result of main plant operating at 75% capacity ; and
- To re-fix the price of the products so as to retain the same profit .

5. A company manufactures two products, A and B using imported raw materials. The selling price of these products are: A ₹ 144, B ₹ 216. The standard cost data are as under:

		Product A	Product B
Raw Materials	P	15	20
	Q	5	20
Direct Wages @ ₹ 4/- per hour			
Department	1.	24	36
	2.	12	24
	3.	36	—
	4.	—	48
Variable Overheads		16	14
Fixed Overheads per annum		₹ 2,50,000	

The Company operates a 8-hour shift for 300 days in a year and the number of workers engaged in each department is given below

Department	No. of workers
1	45
2	24
3	27
4	36

Required :-

- (i) How many units of each product should be manufactured and what is the resultant maximum profit if the number of employees cannot be increased or transferred from one department to another.
 - (ii) If only one product is to be manufactured by the company.
 - (a) Which of the products should be manufactured to yield optimum profit and
 - (b) What is the amount of such profit if the availability of both the imported raw materials in total is limited to ₹ 1,80,000.
6. S. M Ltd. is engaged in the manufacture of Plastic bottles of standard size. The factory has eight machines of identical size each, capable of producing 50 bottles per hour. The variable cost per bottle is ₹ 0.40 and the selling price is ₹ 1.00 each.

The company has received an offer from another firm for manufacture of 50,000 units of a plastic moulded toy. The price per toy is ₹ 6.00 and the variable cost is ₹ 4.80 each. In the case the company takes up the job, it has to meet the expenses of making a special mould required for the manufacture of the toy. The cost of the mould is ₹ 20,000. The company's time study analysis shows that the machines can produce only 20 toys per hours. The company has a total capacity of 10,000 machine hours during the period in which the toy is required to be manufactured. The fixed costs excluding the cost of construction of the mould during the period will be ₹ 21,000.

The company has an order for the supply of 3,75,000 bottles during the period.

Required :

- (I) Do you advice the company to take up the order for manufacturing plastic moulded toys during the time it has an order in its books for the supply of 3,75,000 bottles.

- (II) If the orders for the supply of bottles increase to 5,00,000 bottles, will you advise the company to accept the order for the supply of plastic moulded toys? State the reason
- (III) As associate company of S M Ltd. has idle capacity and is willing to take up the whole or part of the manufacturing of the plastic moulded toys on subcontracting basis. The subcontract price inclusive of the cost of construction of mould is ₹ 5.60 per toy. Determine the minimum expected excess machines hour capacity needed to justify producing any portion of the toy order by the company itself rather than subcontracting.
- (IV) The company expected that it would be left with an excess capacity of 1,600 machine hours during the period. Consequently, it accepted the toy order and subcontracted the balance requirements of the toys to meet the order. Later, the demand for bottles increased to 4,50,000 units for the period. Since the company had accepted the toy order to fill 1,600 machines hours, it could meet the demand for bottles only to the extent of 8,400 machines hours. Work out the loss which the company suffered is not being able to predict the demand for bottles accurately.

7. A Company is able to obtain 200, 000 kgs. of A and 4,00,000 kgs. of B from the input of 6,00,000 kgs of a raw-material 'F'. The selling prices of these outputs one A = ₹ 6 per kg. B = ₹ 4.50 per kg. The processing Costs are .

Raw Materials:	6,00,000 x 2	12,00,000
Variable processing costs		6,00,000
Fixed processing costs		<u>2,00,000</u>
Total		<u>20,00,000</u>

The company has three proposals for consideration :-

- a) Product A can be further processed by mixing it with other purchased materials. The entire quantity of the resultant product 'P' can be sold at ₹ 13 per kg. Each kg. of 'P' requires one kg. of A and the processing costs amount to ₹ 16,00,000.
- b) There is an offer to purchase an additional quantity of 40,000 kgs. of Product 'B' at a price of ₹ 3.50 per kg. The existing market for 'B' will not be affected by this proposal. All the production of Product A can be sold at a uniform price.
- c) A new raw material has just become available. The processing costs will remain the same but the process will now yield 2 kgs. of A for every 3 kgs. of Product B. The total quantity of the new raw material available is limited to 6,00,000 kgs.

Required :-

- i) Find the original profit on sale of A and B.
- ii) Evaluate the proposal for further processing of 'A' into 'P'.
- iii) In the case of proposal b) the increased quantum of 'A' will reduce its selling price. Find the minimum average price of 'A' that will sustain the increased quantum of sales.
- iv) Evaluate proposal c) and find the maximum price the company can afford to pay for the new raw material by retaining the existing profit.
8. Vaccum tubes Ltd. is producing 5,000 T.V. tubes per annum. Each T.V. tube is sold at ₹1,600 per unit and has variable cost of ₹1,550. Annual fixed cost burden of the Company is ₹3 lacs. Present capacity is used up to 60%.

The unit has received an offer from a foreign buyer for 2,500 T.V. tubes. The management wants your advise regarding the minimum price that can be quoted to the foreign buyer so that capacity utilisation is increased and loss is avoided.

Following additional information has been supplied to you by the management.

The export business will fetch following additional benefits which have to be considered in calculating the quotation of F.O.B. price.

10% cash assistance on F.O.B. price realisation as an incentive from Govt.

The excise duty content in the inputs will be refunded by way of duty drawback by Govt. This will be 5% of F.O.B. price.

Govt. will issue an import license up to 10% of F.O.B. realisation. The import Licence can be sold in market at a premium of 100%. The license can also be used for importing Printed Circuit boards which can be sold at 20% profit on cost price.

Please advise the bare minimum F.O.B. price for the T.V. Tube to break even if :-

- (a) the import license is sold in market.
- (b) The import license is used for importing Printed Circuit Boards.

9. A company manufacturing a highly successful line of cosmetics intends to diversify the product line to achieve fuller utilisation of its plant capacity. As a result of considerable research made the company has been able to develop a new product called "EMO".

EMO is packed in tubes of 50 gram capacity and is sold to the wholesalers in cartons of 24 tubes at ` 240 per carton. Since the company uses its spare capacity for the manufacture of EMO, no additional fixed expenses will be incurred.

Share of fixed allocated overhead 4,50,000 per month. The company estimates the production on sale of EMO at 3,00,000 tubes per month and on the basis the following cost estimates have been developed:

	` per carton
Direct Materials	108
Direct wages	72
Overheads	54
Total costs	234

After a detailed market survey the company is confident that the production and sales of EMO can be increased to 3,50,000 tubes per month and ultimately to 4,50,000 tubes per month.

The company at present has a capacity for the manufacture of 3,00,000 empty tubes and the cost of the empty tubes if purchased from outside will result in a saving of 20% in material and 10% in direct wages and variable overhead costs of EMO. The price at which the outside firm is willing to supply the empty tubes is ` 1.35 per empty tube. If the company desires to manufacture empty tubes in excess of 3,00,000 tubes, a new machine involving an additional fixed overheads of ` 30,000 per month will have to be installed.

Required:

- (i) State by showing your workings whether the company should make or buy the empty tubes at each of the three volumes of production of EMO namely, 3,00,000; 3,50,000 and 4,50,000 tubes.
- (ii) At which volume of sales will it be economical for the company to install the additional equipment for the manufacture of empty tubes?
- (iii) Evaluate the profitability on the sale of EMO at each of the aforesaid three levels of output based on your decision and showing the cost of empty tubes as a separate element of cost.

10. C Ltd. an Indian company, has entered into an agreement of strategic alliance with Z Inc. of United States of America for the manufacture of personal computers in India. Broadly, the terms of agreement are :

(a) Z will provide C with Kits in a dismantled condition. These will be used in the manufacture of the personal computer in India. On a value basis, the supply, in terms of the FOB price will be 50% thereof.

(b) C will procure the balance of materials in India.

(c) Z will provide to C with designs and drawings in regard to the materials and supplies to be procured in India. For this, C will pay Z a technology fee of ` 3 crores.

(d) Z will also be entitled to a 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 Z.

(e) C will furnish to Z detailed quarterly returns.

Other information available :

- (i) FOB price of computer agreed \$ 510. Exchange rate to be adopted \$1 = ` 40 [Note : In making calculations, the final sum maybe rounded to the next rupee].
- (ii) Insurance and freight -- ` 500 per imported kit ;
- (iii) Customs duty leviable is 150% of the CIF prices ; but as a concession, the actual rate livable has been fixed at 30% of CIF ;
- (iv) The technology agreement expires with the production of 2,00,000 computers ;
- (iv) The quoted price on kits includes a 20% margin of profits on cost to Z ;
- (v) The estimated cost of materials and supplies to be obtained in India will be 140% of the cost of supplies made by Z.
- (vi) 48% of the value in rupees of the locally procured goods represent cost of the standard items.
- (vii) Cost of assembly and other overheads in India will be ` 2,000 per personal computer.

Required : Calculated the selling price of a personal computer in India bearing in mind that C has targeted a profit of 20% to itself on the selling price.

11. Elec. Ltd. is engaged in the manufacture of four products in its factory. The production and sales volume is much lower than the normal volume and so there is a substantial unfavourable variance in the recovery of overheads. The sales and cost data for a year are as under :—

		Products (` in lakhs)				
		A	B	C	D	Total
Sales	(A)	400	500	200	100	1200
Direct Materials		64	70	32	7	173
Direct Wages		88	105	60	18	271
Factory Overheads		128	172	120	24	444
Selling & Admn. Overheads		80	100	40	20	240
Total Costs	(B)	360	447	252	69	1128
Profit / Loss	(C = A – B)	40	53	-52	31	72
Unabsorbed Overhead(D)						48
Net Profit	(E = C – D)					24

50% of the factory overheads is variable at normal operating volume and the variable selling and administration overheads account for 5% of sales.

Of the total sales of product 'C' half of the volume is used in the market for applications in which product 'D' can be substituted. Thus if product 'C' is not available the sales of product 'D' can be increased by ` 100 lakhs without any change in the fixed selling expenses.

Of the total sales of product 'C' about 25% is sold in conjunction with product 'A'. The customers will not be able to substitute product 'D' and so the sales of product 'A' will be reduced by 12.5% of the present level if product 'C' is withdrawn.

In the event of total discontinuance of product 'C', the fixed factory and selling and administration overheads will be reduced by ` 20 lakhs. Alternatively if the production and sales of product 'C' is maintained to the extent of 25% of the present level as service to product 'A', there will be a reduction in the fixed costs to the extent of ` 10 lakhs.

You are required to :—

a) Prepare statements to show the financial implications of:

- continuation of Product 'C'
- Total discontinuance of product 'C'
- Continuance of product 'C' only as service to customers using product 'A' whose business will otherwise be lost.

b) Make your recommendations on the course of action to be taken by the company with such comments as you may like to offer.

