

# 11

## CHAPTER

# Joint and By-Product

<b>Joint Products</b>	<ul style="list-style-type: none"><li>• It represents two or more products of almost equal importance which are produced in natural proportions simultaneously from the same material in the same process.</li><li>• These products may be saleable without further processing or after further processing.</li><li>• For example, in refining crude petroleum, gasoline, oil, fuel, lubricants, paraffin, etc. produced are all joint products.</li></ul>
<b>Co-Products</b>	<ul style="list-style-type: none"><li>• It represents two or more products which are contemporary but are not necessarily produced in natural proportions from the same material in the same process.</li><li>• For example, either chair or table can be produced from same wood.</li></ul>
<b>By-Product</b>	<ul style="list-style-type: none"><li>• It refers to incidental waste, arising during the course of manufacture, which has a commercial name and value.</li><li>• In other words, it refers to secondary or subsidiary product incidentally arising during the manufacturing process.</li><li>• It may be further processed to increase their realizable value.</li><li>• For example, molasses arising in the manufacture of sugar, husk arising in the rice mill while production of rice.</li></ul>
<b>Split of Point</b>	<ul style="list-style-type: none"><li>• It is a point in a production process where joint products emerging from the process gets separately identifiable.</li><li>• Cost incurred upto split of point is known as joint costs and such costs needs to be borne jointly by the products emerging from the common process.</li><li>• Any cost incurred after split of point is a product specific cost and to be borne by the product concerned.</li></ul>
<b>Point of distinction between Joint Products and By-Products</b>	<ul style="list-style-type: none"><li>• Joint product are the products of equal economic importance, while the by-product are of lesser importance</li><li>• Joint product are produced in the same process, whereas by-products are produced from the scrap or the discarded materials of the main product</li><li>• Joint products are not produced incidentally, but by-products emerge incidentally also.</li></ul>

<b>Accounting Treatment of By-Product</b>	<ul style="list-style-type: none"> <li>● <b>When they are of small total value</b> <ul style="list-style-type: none"> <li>➤ The sale value of the by-product may be credited to the P&amp;L Account as miscellaneous income and no credit be given in the cost accounts.</li> <li>➤ The sale proceeds of the by-product may be treated as deduction from the total costs.</li> </ul> </li> <li>● <b>When they are of considerable total value</b> <ul style="list-style-type: none"> <li>➤ In this case by-products may be regarded as joint products.</li> <li>➤ The costs incurred upto the point of separation should be apportioned over by-products and joint products by using a logical basis.</li> </ul> </li> <li>● <b>When they require further processing</b> <ul style="list-style-type: none"> <li>➤ In this case, the net realizable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realizable value of by-products.</li> <li>➤ If the total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed under (i) above.</li> <li>➤ If the amount realized from the sale of by-products is considerable, it may be treated as discussed under (ii) above.</li> </ul> </li> </ul>
<b>Methods of Apportionment of Joint Cost to Joint Products</b>	<ul style="list-style-type: none"> <li>● Physical Unit Method</li> <li>● Net Realisable Value</li> <li>● Using Technical Estimates</li> <li>● Market Value at Point of Separation</li> <li>● Market Value after Further Processing</li> <li>● Average Unit Cost Method</li> <li>● Contribution Margin Method</li> <li>● Reverse Cost Method</li> </ul>
<b>Physical unit Method</b>	<ul style="list-style-type: none"> <li>● Under this method, joint costs are apportioned on the basis of physical volume of the joint products at the split-off point.</li> <li>● Any processing loss is also apportioned over the products on the same basis.</li> <li>● This method is suitable where the physical units of joint products are same.</li> </ul>
<b>Net Realizable Value Method (NRV)</b>	<ul style="list-style-type: none"> <li>● Under this method, joint costs are apportioned in the ratio of net realizable values of the joint products at the separation point.</li> <li>● <math>NRV = \text{Estimated final sales value of output} - \text{S\&amp;D expenses} - \text{Further Processing Cost}</math></li> <li>● This method is suitable where all the joint products are subject to further processing, further processing costs after separation point are incurred disproportionately and market value of all the joint products at separation point are not available.</li> </ul>
<b>Technical Estimates</b>	<ul style="list-style-type: none"> <li>● This method uses technical estimates to apportion the joint costs over the joint products.</li> <li>● It is used when the result obtained from other methods does not match with the resources consumed by joint products or the realizable value for the joint products are not readily available.</li> </ul>

<b>Market Value at Separation Point Method</b>	<ul style="list-style-type: none"> <li>• Under this method, joint costs are apportioned in the ratio of market value of the joint products at the separation point.</li> <li>• This method is suitable where further processing costs after separation point are incurred disproportionately or where joint products are not subject to further processing.</li> <li>• This method is not applicable where the market values of the joint products at separation point are not available.</li> </ul>
<b>Market Value After Further Processing</b>	<ul style="list-style-type: none"> <li>• Under this method, joint costs are apportioned in the ratio of market value of the joint product after further processing.</li> <li>• This method is suitable where all the joint products are subject to further processing and further processing costs after separation point are incurred proportionately.</li> </ul>
<b>Average Unit Cost Method</b>	<ul style="list-style-type: none"> <li>• Under this method, joint costs are apportioned on the basis of average cost per unit which is obtained by dividing total joint costs by total number of units of joint products produced.</li> <li>• The effect of application of this method is that all joint products will have uniform cost per unit and customers of high quality items are benefited because they have to pay less price on their purchase.</li> </ul>
<b>Contribution Margin Method</b>	<ul style="list-style-type: none"> <li>• Under this method, joint costs are segregated into two parts viz. variable and fixed.</li> <li>• The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities.</li> <li>• If the products are further processed, then all variable cost incurred to be added to the variable cost determined earlier.</li> <li>• Then contribution is calculated by deducting variable cost from their respective sales values.</li> <li>• The fixed costs are then apportioned over the joint products on the basis of contribution ratios.</li> </ul>
<b>Reverse Cost Method</b>	<ul style="list-style-type: none"> <li>• Under this method, joint costs are apportioned in the ratio of joint cost values of the joint products at the separation point.</li> <li>• Joint Cost of each product = Estimated Sale Value – Estimate Profit – Estimated S&amp;D expenses – Further processing cost</li> </ul>
<b>Methods of Apportionment of Joint Cost to by-Products</b>	<ul style="list-style-type: none"> <li>• Net Realisable Value Method</li> <li>• Standard Cost in Technical Estimates</li> <li>• Comparative Price</li> <li>• Re-use Basis</li> </ul>

## PRACTICAL QUESTIONS

1. Calculate the estimated cost of production of by-products X and Y at the point of separation from the main product:

	By-product X	By-product Y
	₹	₹
Selling price per unit	12	24
Cost per unit after separation from main product	3	5
Units produced	500	200

Selling expenses amount to 25% of Total Works Cost – i.e. including both pre-separation and post-separation works cost. Selling prices are arrived at by adding 20% to Total Cost – i.e., the sum of works cost and selling expenses.

**Ans.** ₹2,500; ₹2,200

2. A factory is engaged in the production of a chemical X and in the course of its manufacture a by-product Y is produced, which after a separate process has a commercial value. For the month of March, the following are summarized cost data:

	Joint Expenses	Separate Expenses	
	₹	X(₹)	Y(₹)
Materials	19,200	7,360	780
Labour	11,700	7,680	2,642
Overheads	3,450	1,500	544

The output of the month was 142 tonnes of X and 49 tonnes of Y. The selling price of Y averaged ₹280 per tonne. Assuming the profit on Y is estimated at 50% of selling price, calculate the cost of X per tonne.

**Ans.** ₹47,996

3. Two products P and Q are obtained in a crude form and require further processing at a cost of ₹5 for P and ₹4 for Q per unit before sale. Assuming a net margin of 25 per cent on cost, their sale prices are fixed at ₹13.75 and ₹8.75 per unit respectively. During the period, the joint cost was ₹88,000 and the output were:

P 8,000 units

Q 6,000 units

Ascertain the joint cost per unit.

**Ans.** ₹8; ₹4

4. A factory producing article P also produces a by-product Q which is further processed into finished product. The joint costs of manufacture are given below: [RTP Nov 2023]

	₹
Material	5,000
Labour	3,000
Overheads	2,000
	10,000

Subsequent costs are given below:

	P	Q
Material	₹3,000	₹1,500
Labour	1,400	1,000
Overheads	600	500
	5,000	3,000

Selling prices are: P – ₹16,000 and Q – ₹8,000

Estimated profits margin on selling prices are 25% for P and 20% for Q.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of P and Q. Also prepare Production Accounts.

**Ans.** ₹6,733; ₹3,267

5. The SK Oil company purchase crude vegetable oil. It does refining of the same. The refining process results in four products at the split off point: M, N, O & P.

Product O is fully processed at the split off point. Product M, N, & P can be individually further refined into 'Super M', 'Super N' and 'Super P'. In the most recent month (October), the output at split off point was:

Product M	3,00,000 gallons
Product N	1,00,000 gallons
Product O	50,000 gallons
Product P	50,000 gallons

The joint cost of the purchasing the crude vegetable oil and Processing it were ₹40,00,000. SK had no beginning or ending inventories. Sales of Product O in October were ₹20,00,000. Total output of products M, N and P was further refined and then sold. Data related to October are as follows:

Product	Further processing cost to make super products	Sales
Super M	₹80,00,000	₹1,20,00,000
Super N	₹32,00,000	₹40,00,000
Super P	₹36,00,000	₹48,00,000

SK had the option of selling products M, N and P at the split off point. This alternative would have yielded the following sales for the October, production:

Product M	₹20,00,000
Product N	₹12,00,000
Product P	₹28,00,000

You are required to answer:

- (a) How the joint cost of ₹40,00,000 would be allocated between each product under the following methods
- Sales value at split off point
  - Physical output (gallon)
  - Estimated net realizable value
- (b) Could SK have increased its October operating profits by making different decisions about the further refining of product M, N or P? Show the effect of any change you recommend on operating profits.

**Ans.** (a) ₹in lakhs (i) ₹10; ₹6; ₹10; ₹14; (ii) ₹24; ₹8; ₹4; ₹4; (iii) ₹20; ₹4; 10; ₹6;

6. Find out the cost of Joint products A, B and C using average unit cost method from the following data: [SM]

(a) Pre-separation joint cost ₹60,000

(b) Production data:

Products	Units produced
A	500
B	200
C	<u>300</u>
	<u>1,000</u>

**Ans.** ₹30,000; ₹12,000; ₹18,000

7. A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are: [Nov 2019]

Direct material	₹30,000
Direct labour	₹9,600
Variable Overheads	₹12,000
Fixed Overheads	₹32,000

Sales: A – 100 units @ ₹600 per unit; B – 120 units @ ₹200 per unit.

Apportion joint costs on the basis of:

- Physical Quantity of each product.
- Contribution Margin method, and
- Determine Profit or Loss under both the methods.

**Ans.** (i) ₹38,000; ₹45,600; (ii) ₹55,455; ₹28,145

8. From a single raw material, a chemical company produces three products A, B and C. Product A is considered to be a by-product and products B and C are treated as major joint products. In

process I, by-product A is obtained and the remaining output passes to process II where products B and C are obtained.

During January, the cost of materials consumed was ₹3,600 and operating costs were:

Process I: ₹6,000 and Process II: ₹7,500

Work-in-progress was negligible at both the beginning and end of the month. Production and sales data for the month is given below:

Product	Production	Sales
A	6,000 litres	3,000 litres at 5 paise per litre
B	9,000 kgs	7,500 kgs at ₹2 per kg
C	2,500 kgs	1,500 kgs at ₹4.80 per kg

Stocks as on 1<sup>st</sup> Jan were:

Product	Quantity	Rate
A	600 litres	5 paise per litre
B	750 kgs	₹1.5 per kg
C	50 kgs	₹3.75 per kg

You are required to prepare statement showing: (a) the value of the stock of each product as on 31<sup>st</sup> January, employing market price for A and apportioning the remaining cost between B and C according to the sales value of the output and (b) gross profit for January.

**Ans.** (a) ₹180; ₹2,520; ₹2,822.40; (b) ₹6,315; ₹3,114.90

9. A Company produces two joint products P and Q in 70:30 ratio from basic raw materials in department A. The input output ratio of department A is 100:85. Product P can be sold at the split off stage or can be processed further at department B and sold as product AR. The input output ratio is 100:90 of department B. The department B is created to process product P only and to make it product AR.

The selling prices per kg are as under:

Product P	₹85
Product Q	₹290
Product AR	₹115

The production will be taken up in the next month.

Raw materials 8,00,000 kgs

Purchase price ₹80 per kg

	Deptt. A (₹Lacs)	Deptt. B (₹Lacs)
Direct materials	35.00	5.00
Direct labour	30.00	9.00
Variable overhead	45.00	18.00
Fixed overheads	40.00	32.00
Total	150.00	64.00
Selling Expenses	₹in lacs	
Product P	24.60	
Product Q	21.60	
Product AR	16.80	

**Required:**

- Prepare a statement showing the apportionment of joint costs if Joint Costs are apportioned in the proportion of NRV at Split-off point.
- State whether it is advisable to produce product AR or not.

**Ans.** (i) ₹316 lakh; ₹474 lakh; (ii) Yes recommended

**10.** SK Ltd. produces three joint products. In the period just ended costs of production totalled ₹5,09,640. Output from the process during the period was:

Product W	2,76,000 Kilos
Product X	3,34,000 Kilos
Product Y	1,34,000 Kilos

There was no opening stock of the three products. Products W and X are sold in this stage. Product Y is subjected to further processing. Sales of products W and X during the period were:

Product W	2,55,000 Kilos at ₹0.945 per kilo
Product X	3,12,000 Kilos at ₹0.890 per kilo

1,28,000 kilos of product Y were further processed during the period. The balance of the period production of the three products W, X and Z remained in stock at the end of the period. The value of closing stock of individual products is calculated by apportioning costs according to weight of output.

The additional costs in the period of further processing product Y, which is converted into product Z, were:

Direct Labour	₹10,850
Production overhead	₹7,070

96,000 Kilos of product Z were produced from the 1,28,000 kilos of product Y. A by-product BP is also produced which can be sold for ₹0.12 per kilo. 8,000 kilos of BP were produced and sold in the period.

Sales of product Z during the period were 94,000 kilos, with total revenue of ₹1,00,110. Opening stock of product Z was 8,000 Kilos @ ₹1.08 per kg. The FIFO method is used for pricing transfers of product Z to cost of sales. Selling and distribution costs are charged to all main products when sold, at 10% revenue.

**Required:**

- (a) Prepare a profit and loss statement for the period, identifying separately the profitability of each of the three main products.
- (b) SK Ltd. has now received an offer from another company to purchase the total output of product Y (i.e. before further processing) for ₹0.62 per Kilo. Calculate the viability of this alternative. Consider selling & distribution overheads as fixed expenses for making your evaluation.

**Ans.** (a) ₹42,202; ₹36,192; -₹12,281; (b) Don't accept the proposal.

## PRACTICE QUESTIONS

- 11.** SK Ltd. produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the month, company incurred joint production costs of ₹10,00,000. The main products are not marketable at the split off point and thus have to be processed further. [SM]

Particulars	Product A	Product B	Product C
Monthly output in kg	60,000	1,20,000	50,000
Selling price per kg	₹50	₹30	₹5
Process costs	₹2,00,000	₹3,00,000	

Find out the amount of joint cost that SK Ltd. would allocate to the product-B by using the physical volume method to allocate joint production costs?

**Ans.** ₹5,00,000

- 12.** A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarized cost data: [May 2019]

	Joint Expenses	Separate Expenses	
	₹	Bomex (₹)	Cromex (₹)
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling price per unit		100	40
Estimated profit per unit			5

	Units	Units
No. of units produced	2,000	2,000

The factory uses net realizable value method for apportionment of joint cost to by-products. You are required to prepare statements showing:

- the joint cost allocable to Cromex
- the product-wise and overall profitability of the factory for April 2019.

**Ans.** (i) ₹42,000; (ii) ₹26,000; ₹10,000.

- 13.** ASR Limited produces Product 'L' and gets a by-Product 'M' out of a joint process. The net realizable value for the by-product is used to reduce the joint production costs before the joint costs are allocated to the main product. During the month of October 2022, company incurred joint production costs of ₹4,00,000. The main product 'L' is not marketable at the split off point. Thus, it has to be processed further. Details of company's operation are as under: **[Nov 2022]**

Particulars	Product L	By-Product M
Production (units)	10,000	200
Selling price per kg	₹45	₹5
Further processing cost	₹1,01,000	-

You are required to find out:

- Profit earned from Product 'L'
- Selling price per kg of product 'L', if the company wishes to earn a profit of ₹1,00,000 from the above production.

**Ans.** (i) – ₹50,000; (ii) ₹60.

- 14.** A coke manufacturing company produces the following products by using 5,000 tons of coal @ ₹1,100 per ton into a common process. **[SM]**

Coke	3,500 tons
Tar	1,200 tons
Sulphate of ammonia	52 tons
Benzol	48 tons

Prepare a statement apportioning the joint cost amongst the products on the basis of the physical unit method.

**Ans.** ₹40,10,600; ₹13,75,000; ₹59,400; ₹55,000.

- 15.** Find out the cost of joint products A and B using contribution margin method from the following data: **[SM]**

Sales:	A: 100 kg @ ₹60 per kg
	B: 120 kg @ ₹30 per kg
Joint costs	Marginal costs ₹4,400
	Fixed costs ₹3,900

**Ans.** ₹5,000; ₹3,300.

16. OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the split-off point – S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹40,000. Other details are as follows: [SM, July 2021]

Product	Further Processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

Ans. ₹20,000; -₹4,000; -₹16,000.

17. In Oil Mill four products emerges from a refining process. The total cost of input during the quarter ending March 2018 is ₹1,48,000. The output, sales and additional processing costs are as under:

[RTP Nov 2019]

Product	Output in Litres	Additional processing Cost after split off point (₹)	Sales Vale (₹)
ACH	8,000	43,000	172,500
BCH	4,000	9,000	15,000
CSH	2,000	-	6,000
DSH	4,000	1,500	45,000

In case these products were disposed of at split off point that is before further processing, the selling prices would have been:

ACH	BCH	CSH	DSH
₹15.00	₹6.00	₹3.00	₹7.50

Prepare a statement of profitability assuming that joint costs are allocated in ratio of sales value at split off point in the following cases:

- If the products are sold after further processing is carries out in the mills
- If they are sold at the split off point

Ans. (a) Total profit = ₹37,000; (b) Total profit = ₹32,000.

18. SK Ltd. produces 2,00,000, 30,000, 25,000, 20,000 and 75,000 units of its five products A, B, C, D and E respectively in a manufacturing process and sells them at ₹17, ₹13, ₹8, ₹10 and ₹14 per unit. Except product D remaining products can be further processed and then can be sold at ₹25, ₹17, ₹12 and ₹20 per unit in case of A, B, C and E respectively. [SM, RTP May 2023]

Raw material costs ₹35,90,000 and other manufacturing expenses cost ₹5,47,000 in the manufacturing process which are absorbed on the products on the basis of their 'Net Realisable Value'. The further processing costs of A, B, C and E are ₹12,50,000, ₹1,50,000, ₹50,000 and ₹1,50,000 respectively. Fixed costs are ₹4,73,000.

You are required to prepare the following in respect of the coming year:

- Statement showing income forecast of the company assuming that none of its products are to be further processed
- Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.
- Can you suggest any other production plan whereby the company can maximize the profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.

**Ans.** (a) Profit ₹6,30,000; (b) Profit ₹13,00,000; (c) Profit ₹13,30,000.

- 19.** A company produces two joint product X and Y, from the same basic materials. The processing is completed in three departments. **[RTP Dec 2021]**

Materials are mixed in department I. At the end of this process X and Y get separated. After separation X is completed in the department II and Y is finished in department III. During a period 2,00,000 kgs of raw material were processed in department I, at a total cost of ₹8,75,000 and the resultant 60% becomes X and 30% becomes Y and 10% normally lost in processing.

In department II 1/6 of the quantity received from department I is lost in processing. X is further processed in department II at a cost of ₹1,80,000.

In department III further new material added to the material received from department I and weight mixture is doubled, there is no quantity loss in the department and further processing cost (with material cost) is ₹1,50,000.

The details of sales during the year:

	Product X	Product Y
Quantity sold (kgs)	90,000	1,15,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split-off-point, the selling price of X and Y would be ₹8 and ₹4 per kg respectively.

**Required:**

- Prepare a statement showing the apportionment of joint cost to X and Y in proportion of sales value at split off point.
- Prepare a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.
- Prepare a statement showing the product wise profit for the year
- On the basis of profits before and after further processing of product X and Y, give your comment that products should be further processed or not.

**Ans.** (a) ₹7,00,000; ₹1,75,000; (b) ₹8.80; ₹2.708; (c) ₹1,08,000; ₹1,48,540.

20. SK Ltd. is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of May, 2021, SK Ltd. purchased 50 kilolitre processed cream @ ₹100 per 1,000 ml. Conversion cost of ₹1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee. [SM]

The May, 2021 production and sales information is as follows:

Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per litre/kg (₹)
Buttermilk	28	28	30
Butter	20	-	-
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in May, 2021.

Required:

- Show how joint cost would be apportioned between Buttermilk and Butter under estimated net realizable value method.
- MP Ltd. offers to purchase 20 tonne of butter in June at ₹360 per kg. In case SK Ltd. accepts this offer, no Ghee would be produced in June. Suggest whether SK Ltd. shall accept the offer affecting its operating income or further process butter to make Ghee itself?

**Ans.** (i) ₹5,10,000; ₹45,90,000; (ii) Not to accept offer.

21. RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for the month of April, 2022. [SM, May 2022]

Cost incurred up to separation point: ₹10,000

	Product X	Product Y	Product Z
Output (in Litre)	100	70	80
	₹	₹	₹
Cost incurred after separation point	2,000	1,200	800
<b>Selling price per litre:</b>			
After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

- (i) Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.
- (ii) Advise the management whether, on purely financial consideration, the three products are to be processed further or not.

**Ans.** (i) -₹1,000; ₹1,600; ₹800.

- 22.** SK manufacturing company uses joint production process that produces three products at the split off point. Joint production costs during September were ₹8,40,000. Product information for September was as follows: **[SM, RTP Nov 2022]**

Particulars	Product A	Product B	Product C
Units produced	1,500	3,000	4,500
Units sold	2,000	6,000	7,500
Sales Prices:			
At the split-off	₹100		
After further processing	₹150	₹175	₹50
Costs to process after split-off	₹1,50,000	₹1,50,000	₹1,50,000

Assume that product C is treated as a by-product and the company accounts for the by-product at net realizable value as a reduction of Joint cost. Assume also that product B & C must be processed further before they can be sold. Find out the total cost of Product A in September if joint cost allocation is based on net realizable values?

- 23.** A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'. The process yield is as under: **[Nov 2020]**

Product M	80%
Product N	12%
Process loss	8%

The cost of raw material is ₹80 per unit.

Processing cost is ₹2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.

Prepare a comprehensive cost statement for each product showing:

- (i) Apportionment of joint cost among products 'M' and 'N' and
- (ii) Total cost of the products 'M' and 'N'.

**Ans.** (i) ₹6,18,587; ₹1,46,413; (ii) ₹6,18,587; ₹1,46,413.

24. A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹1,80,000 and ₹1,50,000 respectively. **[Similar RTP May 2019 & May 2018]**

X was further processed in Department 3 at a cost of ₹1,08,000. There is no waste in further processing. The details of sales effected during the period were as under:

	A	B	X
Quantity Sold (Kgs)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹50, ₹40 and ₹10 per kg respectively.

**Required:**

- Prepare a statement showing the apportionment of joint costs to A, B and X.
- Present a statement showing the cost per kg of each product indicating joint cost, further processing cost and total cost separately.
- Prepare a statement showing the product wise and total profit for the period
- State with supporting calculations as to whether any or all the products should be further processed or not.

**Ans.** (a) ₹6,30,000; ₹2,80,000; ₹3,78,000; (b) ₹45; ₹43; ₹9; (c) ₹8,90,000.

25. Three products X, Y and Z alongwith a byproduct B are obtained again in a crude state which require further processing at a cost of ₹5 for X; ₹4 for Y; and ₹2.50 for Z per unit before sale. The byproduct is however saleable as such to a nearby factory. The selling prices for the three main products and byproduct, assuming they should yield a net margin of 25% of cost, are fixed at ₹13.75, ₹8.75 and ₹7.50 and ₹1.00 respectively – all per unit quantity sold. **[MTP Nov 2018]**

During a period, the joint input cost including the material cost was ₹90,800 and the respective outputs were:

X	8,000 units
Y	6,000 units
Z	4,000 units
B	1,000 units

By-product should be credited to joint cost and only the net joint costs are to be allocated to the main products. Calculate the joint cost per unit of each product and the margin available as a percentage on cost.

**Ans.** 17.02%; 18.56%; 16.46%.

26. A company manufactures one main product (M1) and two by-products B1 and B2 for the month of January 2013, following details are available. Total Cost upto Separation Point ₹2,12,400.

[MTP Nov 2018]

	M1	B1	B2
Cost after separation	-	₹35,000	₹24,000
No. Of units produced	4,000	1,800	3,000
Selling price per unit	₹100	₹40	₹30
Estimated net profit as percentage to sales value	-	20%	30%
Estimated selling expenses as percentage to sales value	20%	15%	15%

There are no beginning or closing inventories.

Prepare statement showing:

- Allocation of joint costs; and
- Product wise and overall profitability of the company for January 2013.

Ans. (a) ₹11,800; ₹25,500; (b) ₹1,86,300.

27. Mayura Chemicals Ltd. buys a particular raw material at ₹8 per litre. At the end of the processing in Department-1, this raw material splits-off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold. Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20: [Jan 2021]

Particulars	Department		
	1	2	3
Cost of Raw Material	₹4,80,000	-	-
Direct Labour	₹70,000	₹4,50,000	₹6,50,000
Manufacturing Overhead	₹48,000	₹2,10,000	₹4,50,000
	Products		
	X	Y	Z
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	-	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net-realizable value method of allocating joint costs.

You are required to prepare:

- Schedule showing the allocation of joint costs
- Calculate the cost of goods sold of each product and the cost of each item in Inventory
- A comparative statement of Gross Profit

Ans. (i) ₹2,34,000; ₹1,56,000; ₹2,08,000; (ii) ₹1,56,000; ₹8,16,000; ₹9,81,000; (iii) ₹4,32,000.

28. SK Chemicals purchases salt and processes it into more refined products such as Caustic Soda, Chlorine and PVC. In the month of July, Inorganic Chemicals purchased salt for ₹40,000. Conversion costs of ₹60,000 were incurred upto the split off point, at which time two saleable products were produced. Chlorine can be further processed into PVC. The July production and sales information is as follows: [SM]

	Production (tonnes)	Sales Quantity (tonnes)	Selling Price (per tonne)
Caustic soda	1,200	1,200	₹50
Chlorine	800	-	-
PVC	500	500	₹200

All 800 tonnes of Chlorine were further processed, at an incremental cost of ₹20,000 to yield 500 tonnes of PVC. There were no beginning or ending inventories of Caustic soda, Chlorine or PVC. There is active market for Chlorine. Inorganic Chemicals could have sold all its July production of Chlorine at ₹75 per tonne.

**Required:**

- (a) To calculate how joint cost of ₹1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods:
  - (i) Sales value at split off,
  - (ii) physical measure (method) and
  - (iii) Estimated net realizable value
- (b) MP Products offers to purchase 800 tonnes of Chlorine in august at ₹75 per tonne. This sale of chlorine would mean that no PVC would be produced in August. How the acceptance of this offer for the month of August would affect operating income?

**Ans.** (a) (i) ₹50,00; ₹50,000; (ii) ₹60,000; ₹40,000; (iii) ₹42,857; ₹57,143; (b) loss ₹20,000.

## SOLUTION OF PRACTICE QUESTIONS

11. Net joint cost to be allocated = Joint cost – Realisable value of by-product  
 = 10,00,000 – (50,000 × 5) = ₹7,50,000

Share of joint cost of Product B on basis of physical unit method

$$= \frac{\text{Physical quantity of B}}{\text{Total quantity}} \times \text{Net Joint cost} = \frac{1,20,000}{1,80,000} \times 7,50,000 = ₹5,00,000$$

12.

(i) Statement showing Joint Cost Allocation to 'Cromex'

Particulars	Cromex (₹)
Sales (₹40 × 2,000 units)	80,000
Less: Post split off costs (4,000 + 18,000 + 6,000)	(28,000)
Less: Estimated profit (₹5 × 2,000)	(10,000)
<b>Joint Cost Allocable</b>	<b>42,000</b>

(ii) Statement showing product wise and Overall Profitability

Particulars	Bomex (₹)	Cromex (₹)	Total (₹)
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	(1,38,000)*	(42,000)	(1,80,000)
Less: Post split off costs	(36,000)	(28,000)	(64,000)
<b>Profit</b>	<b>26,000</b>	<b>10,000</b>	<b>36,000</b>

\*This is a balancing figure i.e. 1,80,000 – 42,000 = 1,38,000

13.

(i) Calculation of profit on product 'L'

Particulars	₹
Sales value	4,50,000
Less: Further processing cost	(1,01,000)
	3,49,000
Less: Joint production cost [4,00,000 – (200 × 5)]	(3,99,000)
Loss	(50,000)

(ii) Desired selling price =  $\frac{\text{Total cost} + \text{Desired profit}}{\text{Units}} = \frac{3,99,000 + 1,01,000 + 1,00,000}{10,000}$   
 = ₹60 per kg

14. Wastage = Input – Output = 5,000 – (3,500 + 1,200 + 52 + 48) = 200

\*Wastage will be distributed over four products in ratio of output and will be added with output to get input units.

Particulars	Coke	Tar	Sulphate of Amonia	Benzole
Output	3,500	1,200	52	48
Wastage*	146	50	2	2
Input	3,646	1,250	54	50
Share of Joint Cost @1,100 per ton	40,10,600	13,75,000	59,400	55,000

15.

**Statement of Joint Cost**

Particulars	Product A	Product B
Marginal Cost (4,400 in 100:20 i.e. quantity ratio)	2,000	2,400
Fixed Cost (w.n. – 1)	3,000	900
<b>Share of Joint Cost</b>	5,000	3,300

Working Note-1

**Statement of Distribution of Fixed Cost**

Particulars	Product A	Product B
Sales	100×60 = 6,000	120×30 = 3,600
(-) Variable Cost	2,000	2,400
Contribution	4,000	1,200
<b>Share of Fixed Cost</b> (3,900 in 40:12)	3,000	900

16.

**Statement of Incremental Profit/(Loss)**

Particulars	Product S	Product P	Product N
Sale after further processing	1,20,000	40,000	48,000
Less: Sale at split-off point	20,000	12,000	28,000
Incremental sale	1,00,000	28,000	20,000
Less: further processing cost	80,000	32,000	36,000
Incremental profit/(loss)	20,000	(4,000)	(16,000)

Thus, it is recommended to further process Product S and Product P, N and A should be sold at split off point.

17.

**Statement of Cost**

Particulars	Product ACH	Product BCH	Product CSH	Product DSH
Sale value at split off	8,000×15=1,20,000	4,000×6=24,000	2,000×3=6,000	4,000×7.50=30,000
Share of Joint Cost	98,667	19,733	4,933	24,667
(1,48,000 in 120:24:6:30)				

**(a) Statement of Profit**

Particulars	Product ACH	Product BCH	Product CSH	Product DSH	Total
Sale value after split off	1,72,500	15,000	6,000	45,000	2,38,500
Less: Further Processing Cost	43,000	9,000	-	1,500	53,500
Less: Share of Joint Cost	98,667	19,733	4,933	24,667	1,48,000
Profit	30,833	(13,733)	1,067	18,833	37,000

**(b) Statement of Profit**

Particulars	Product ACH	Product BCH	Product CSH	Product DSH	Total
Sale value at split off	1,20,000	24,000	6,000	30,000	1,80,000
Less: Share of Joint Cost	98,667	19,733	4,933	24,667	1,48,000
Profit	21,333	4,267	1,067	5,333	32,000

18.

**(a) Apportionment of Joint Cost**

Joint Products	A	B	C	D	E
Output (Units)	2,00,000	30,000	25,000	20,000	75,000
Final S.P. P.U.	₹25	₹17	₹12	₹10	₹20
Final Sales Value of Output (₹)	50,00,000	5,10,000	3,00,000	2,00,000	15,00,000
(-) Further Processing Costs	(12,50,000)	(1,50,000)	(50,000)	—	(1,50,000)
N.R.V.	37,50,000	3,60,000	2,50,000	2,00,000	13,50,000
Share in J.C.	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000

Income Forecast (When none of the products are further processed)

Particulars	A	B	C	D	E	Total
Sales Value at Split off point	34,00,000	3,90,000	2,00,000	2,00,000	10,50,000	52,40,000
(2 lakh×17)		(30,000×13)	(25,000×8)	(20,000×10)	(75,000×14)	
(-) Share in JC	(26,25,000)	(2,52,000)	(1,75,000)	(1,40,000)	(9,45,000)	(41,37,000)
Profit Before	7,75,000	1,38,000	25,000	60,000	1,05,000	11,03,000
(-) Fixed Costs						(4,73,000)
Net Profit						6,30,000

**(b) Income Forecast (When A, B, C & E are further processed)**

Particulars	A	B	C	D	E	Total
Sales Value	50,00,000	5,10,000	3,00,000	2,00,000	15,00,000	75,10,000
(-) Further Processing Cost	(12,50,000)	(1,50,000)	(50,000)	—	(1,50,000)	(16,00,000)
(-) Share in J.C.	(26,25,000)	(2,52,000)	(1,75,000)	(1,40,000)	(9,45,000)	(41,37,000)
Profit Before F. C.	11,25,000	1,08,000	75,000	60,000	4,05,000	17,73,000
(-) Fixed Costs						(4,73,000)
Net Profit						13,00,000

**(c)**

Jain Products	Profit if none of Products are further processed	Profits if A, B, C & E are further processed	Decision to Further process
A	7,75,000	11,25,000	Yes
B	1,38,000	1,08,000	No
C	25,000	75,000	Yes
E	1,05,000	4,05,000	Yes
Total Profit Before Fixed Cost			18,03,000
A B C D E (11,25,000 + 1,38,000 + 75,000 + 60,000 + 4,05,000)			
(-) Fixed Cost			(4,73,000)
Net Profit			13,30,000

19.

**Calculation of quantity produced**

	Dept I	Dept II	Dept III
Input (Kg)	2,00,000	1,20,000	60,000
Weight lost or added	(20,000)	(20,000)	60,000
Total weight	1,80,000	1,00,000	1,20,000
Production of X	1,20,000	1,00,000	-
Production of Y	60,000	-	1,20,000

**(a) Statement of apportionment of Joint Cost (₹8,75,000)**

	Product X	Product Y
Output (kg)	1,20,000	60,000
Selling price per kg (₹)	8	4
Sales value (₹)	9,60,000	2,40,000
<b>Share in Joint Cost (4:1)</b>	<b>7,00,000</b>	<b>1,75,000</b>

**(b) Statement of cost per kg**

	Product X	Product Y
Share in Joint cost (₹)	7,00,000	1,75,000
Output (Kg)	1,00,000	1,20,000
Cost per kg (Joint cost)	7.00	1.458
Further processing cost per kg	1.80	1.250
<b>Total cost per kg (₹)</b>	<b>8.80</b>	<b>2.708</b>

**(c) Statement of profit**

	Product X	Product Y
Output (kg)	1,00,000	1,20,000
Sales (kg)	90,000	1,15,000
Closing Stock (Kg)	10,000	5,000
	₹	₹
Sales @ ₹10/ ₹4	9,00,000	4,60,000
Add: Closing stock (at full cost)	88,000	13,540
Value of production	9,88,000	4,73,540
Less: share in joint cost	7,00,000	1,75,000
Less: Further processing	1,80,000	1,50,000
<b>Profit</b>	<b>1,08,000</b>	<b>1,48,540</b>

**(d) Profitability statement, before and after processing**

	Product X Before (₹)	Product X After (₹)	Product Y Before (₹)	Product Y After (₹)
Sales Value	9,60,000		2,40,000	
Share in Joint Cost	7,00,000		1,75,000	
<b>Profit</b>	<b>2,60,000</b>	<b>1,08,000</b>	<b>65,000</b>	<b>1,48,540</b>

Product X should be sold at split off point and product Y after processing because of higher profitability.

20.

- (i) Total Joint Cost = Processed cream cost + conversion cost  
 $= (50 \times 1,000 \times 100) + 1,00,000 = ₹51,00,000$

### Statement of Joint Cost

Particulars	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	$30 \times 28 \times 1,000 = 8,40,000$	$16 \times 1,000 \times 480 = 76,80,000$
Less: Post split-off cost	-	(1,20,000)
Net Realizable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹51,00,000 in ratio of 1:9	5,10,000	45,90,000

#### (ii) Statement of Incremental Profit or Loss

Particulars	(₹)
Revenue from Ghee	$16 \times 1,000 \times 480 = 76,80,000$
(-) Revenue from Butter	$20 \times 1,000 \times 360 = 72,00,000$
Incremental Revenue	4,80,000
(-) Further processing cost	1,20,000
Incremental Profit	3,60,000

The operating income of SK Ltd. will be reduced by ₹3,60,000 in June if it sells 20 tonne of Butter to MP Ltd., instead of further processing of Butter into Ghee for sale. Thus, SK Ltd. is advised not to accept the offer and further process butter to make Ghee itself.

21.

#### (i) Statement of profit/(loss)

Particulars	Product X	Product Y	Product Z
Sale value (A)	$100 \times 50 = 5,000$	$70 \times 80 = 5,600$	$80 \times 60 = 4,800$
Share of joint cost (10,000 in 100:70:80)	4,000	2,800	3,200
Further processing cost	2,000	1,200	800
Total cost (B)	6,000	4,000	4,000
Profit/(loss) (A - B)	(1,000)	1,600	800

#### (ii) Statement of Evaluation of Decision

Particulars	Product X	Product Y	Product Z
Sale value after FPC	$100 \times 50 = 5,000$	$70 \times 80 = 5,600$	$80 \times 60 = 4,800$
(-) Sale value at split off	$100 \times 25 = 2,500$	$70 \times 70 = 4,900$	$80 \times 45 = 3,600$
Incremental sales	2,500	700	1,200
(-) Further processing cost	2,000	1,200	800
Incremental Profit/(loss)	500	(500)	400

There is incremental loss in product Y and incremental profit in case of Product X and Z. Thus, it is recommended to further process product X and Z whereas Product Y should be sold without further processing i.e. at split off point.

22. Product A can be sold at the split-off point, because the question says that “Products B and C must be processed further before they can be sold”. Since product A is not included in that, we know that Product a can be sold at the split off point. Furthermore, the cost to process Product a can be sold at the split off point is ₹1,50,000 whereas the additional revenue to be earned by processing it further is only ₹75,000 (₹50 increase in selling price per unit multiplied by the 1,500 units produced during September). Therefore, Product A will not be processed further and we use the sales value at split off for A for allocating the joint costs. The sales value at the split off for A is ₹100 × 1,500 units = ₹1,50,000.

Since Product B must be processed further, we use its net realizable value for the joint cost allocation. The net realizable value of Product b is ₹3,75,000 [(₹175 selling price after further processing × 3,000 units produced) - ₹1,50,000 in further processing cost].

Product C, the byproduct, must also be processed further to be sold; The net realizable value of Product C is ₹75,000 [(₹50 sales price after further processing × 4,500 units produced) - ₹1,50,000 in further processing].

Joint production costs total ₹8,40,000. Since the by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated are ₹7,65,000 (₹8,40,000 minus the ₹75,000 NRV of Product C), to be allocated between Product A (sale value of ₹1,50,000) and Product B (net realizable value ₹3,75,000). So, the total on which the allocation of the joint costs is based is ₹1,50,000 + ₹3,75,000 = ₹5,25,000. Product represents 28.571% of the total value.

Since Product A has no further processing costs, the total cost of product A is equal to its allocated joint costs which are 28.571% of the net joint costs of ₹7,65,000 or ₹2,18,568.

23. Total joint cost = Raw material cost + Processing cost = (6,750 × 80) + 2,25,000 = ₹7,65,000

Total labour cost = 2,25,000 × 66% = ₹1,48,500

Joint cost other than labour cost = 7,65,000 - 1,48,500 = ₹6,16,500

#### Statement of Joint Cost Apportionment

Particulars	Product M	Product N
Labour Cost (1,48,500 in 100:80)	82,500	66,000
Cost other than labour cost (6,16,500 in 80:12)	5,36,087	80,413
Share of Joint Cost	6,18,587	1,46,413

#### Statement of Total Cost

Particulars	Product M	Product N
Raw material cost (5,40,000 in 80:12)	4,69,565	70,435
Labour Cost (1,48,500 in 100:80)	82,500	66,000
Other Processing Cost (76,500 in 80:12)	66,522	9,978
Share of Joint Cost	6,18,587	1,46,413

24.

**(i) Statement of Apportionment of Joint Cost:**

Particulars		Total (₹)	Joint Products (₹)		
			A	B	X
A.	Production (in Kgs.)	—	18,000	10,000	54,000
B.	Sale Price/Kg. at Split-off	—	50	40	10
C.	Sale Value of Production at Split-off [A × B]	18,40,000	9,00,000	4,00,000	5,40,000
D.	Share of Joint Cost in Ratio of Sale Value at Split-off Point i.e., 9:4:5:4	12,88,000	6,30,000	2,80,000	3,78,000

**(ii) Statement Showing Cost**

Particulars	A		B		X	
	Per Unit	Total	Per Unit	Total	Per Unit	Total
Production (In Kgs.)		18,000	--	10,000	--	54,000
Joint Cost (₹)	35	6,30,000	28	2,80,000	7	3,78,000
Further Processing Cost	10	1,80,000	15	1,50,000	2	1,08,000
Total Cost	45	8,10,000	43	4,30,000	9	4,86,000

**(iii) Profitability Statement for the Period**

A	Joint Products (₹)			Total (₹)
	B	X		
A. Sale Units (Kg.)	17,000	5,000	44,000	-----
B. Total Cost/Kg. (₹)	45	43	9	
C. Sale Value (₹)	12,24,000	2,50,000	7,92,000	22,66,000
Less: Total Cost (A × B)	(7,65,000)	(2,15,000)	(3,96,000)	(13,76,000)
Profit	4,59,000	35,000	3,96,000	8,90,000

**(iv) Statement of Profit (Had the Products Been Sold at Split-off Point)**

Particulars	Joint Products (₹)			Total (₹)
	A	B	X	
A. Sale Units (Kg.)	17,000	5,000	44,000	-----
B. Sale Price/Kg. at Split off Point (₹)	50	40	10	-----
C. Sale Value of Units Sold at Split off Point (A × B)	8,50,000	2,00,000	4,40,000	14,90,000
Less: Share of Joint Cost @ ₹35, ₹28 & ₹7 per Unit Respectively	(5,95,000)	(1,40,000)	(3,08,000)	(10,43,000)
Profit	2,55,000	60,000	1,32,000	4,47,000

Comparing the profit as per above statement & the profit as per statement prepared in point no. (ii) above we can say the profit can be maximized if:

Product 'A' is sold after processing, thus profit	= ₹4,59,000
Product 'B' is sold at split-off point, thus profit	= ₹60,000
Product 'X' is sold after processing, thus profit	= ₹3,96,000
Total Profit	= <u>₹9,15,00</u>

	Alternatively,	A	B	X
A.	Sale value after further processing			
	$\frac{12,24,000}{17,000}, \frac{2,50,000}{5,000}, \frac{7,92,000}{44,000}$	72	50	18
B.	Sale value at split-off	50	40	10
C.	Cost at Split-off	35	28	7
D.	Cost after further processing	45	43	9
E.	Increase in sale price after further processing [A - B]	22	10	8
F.	Increase in cost on further processing [D - C]	10	15	2
G.	Net profit/(loss) on further processing [E - F]	12	(5)	6
H.	Advisable sale points	After Processing	At split off	After Processing

## 25. Computation of share of joint costs

Particulars	X (₹)	Y (₹)	Z (₹)
Selling price	13.75	8.75	7.50
Less: Profit @ 25% on cost or 20% on sales	2.75	1.75	1.50
Cost of sales	11.00	7.00	6.00
Less: Post split off cost	5.00	4.00	2.50
Joint cost per unit	6.00	3.00	3.50
Output (units)	8,000	6,000	4,000
Total cost	48,000	18,000	14,000
Actual share of net joint cost (A) (90,000 in 48:18:14)	54,000	20,250	15,750
Output (units) (B)	8,000	6,000	4,000
Joint cost per unit (A ÷ B)	6.75	3.38	3.94

### Statement of Profit

Particulars	X	Y	Z
Joint cost per unit	6.75	3.38	3.94
Post split off cost	5.00	4.00	2.50
Total cost	11.75	7.38	6.44
Selling price	13.75	8.75	7.50
Margin	2.00	1.37	1.06
Margin % on cost	17.02%	18.56%	16.46%

#### Working Note:

(1) Joint input cost including material cost	90,800
Less: Realization from by-product	
Sale value (1,000 × 1)	1,000
Less: Profit (1,000 × 20%)	<u>200</u> <u>800</u>
Net Joint costs to be allocated	<u>90,000</u>

26.

### Statement of apportionment of joint cost

	Products	
	B1 (₹)	B2 (₹)
Sales	72,000	90,000
Less: Estimated Profit 20% and 30% Respectively	14,400	27,000
Cost of Sales	57,600	63,000
Less: Selling expenses 15% of sales	10,800	13,500
Work cost	46,800	49,500
Less: Post split off cost	35,000	24,000
Share of joint cost	11,800	25,500

Thus, Share of Joint cost of M1 = ₹2,12,400 – ₹11,800 – ₹25,500 = ₹1,75,100

### Statement of Profitability

	M1	B1	B2	Total
Sales	4,00,000	72,000	90,000	5,62,000
Less: Selling expenses	80,000	10,800	13,500	1,04,300
Cost of sales	3,20,000	61,200	76,500	4,57,700
Less: share of Joint cost	1,75,100	11,800	25,500	2,12,400
Less: Post separation cost	-	35,000	24,000	59,000
Profit	1,44,900	14,400	27,000	1,86,300

27.

**(i) Statement of allocation of joint cost**

Particulars	Product X	Product Y	Product Z	Total
Units sold	10,000	15,000	22,500	
Add: Closing stock (A)	5,000	-	7,500	
Units Produced (B)	15,000	15,000	30,000	
Selling price per unit (C)	30	64	50	
Sale value of Prod. (B × C)	4,50,000	9,60,000	15,00,000	29,10,000
Less: Additional cost	-	6,60,000	11,00,000	17,60,000
Net realizable value	4,50,000	3,00,000	4,00,000	11,50,000
Share of joint cost (D) (5,98,000 in NRV ratio)	2,34,000	1,56,000	2,08,000	5,98,000

**(ii) Statement of calculation of cost of goods sold and inventory**

Particulars	Product X	Product Y	Product Z	Total
Share of joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	-	6,60,000	11,00,000	17,60,000
Less: Cost of inventories	$\frac{2,34,000 \times 5,000}{15,000}$ = (78,000)	-	$\frac{13,08,000 \times 7,500}{30,000}$ = (3,27,000)	(4,05,000)
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

**(iii) Statement of calculation of gross profit**

Particulars	Product X	Product Y	Product Z	Total
Units sold	10,000	15,000	22,500	
Selling price per unit	30	64	50	
Sales	3,00,000	9,60,000	11,25,000	23,85,000
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Profit / (loss)	1,44,000	1,44,000	1,44,000	4,32,000

28.

**(a) Statement showing apportionment of joint cost (sales value at split - off method)**

Joint Products	Production (Tonnes)	S.P. per unit at Split-off Point	Sales Value of Production	Share in Joint Cost
Caustic Soda	1,200	50	60,000	50,000
Chlorine	800	75	60,000	50,000

**(b) Statement showing apportionment of joint cost (Physical Measure Method)**

Joint Products	Production (Tonnes)	Share in Joint Costs
Caustic Soda	1,200	60,000
Chlorine	800	40,000

**(c) Statement showing apportionment of joint cost (Net Realizable Value Method)**

Joint Products	Sales Value After Further Processing	Further Processing Cost	Estimated Net Realizable Value	Share in Joint Cost
Caustic Soda	60,000	—	60,000	42,857
Chlorine	1,00,000	20,000	80,000	57,143

**2. Statement showing evaluation of proposal of MP products**

Particulars	Amount
<b>Incremental Gains:</b>	
Saving of Further Processing Costs (A)	20,000
	20,000
<b>Incremental Costs</b>	
Loss of Additional Sales Value (i.e. ₹1,00,000 - ₹60,000) (B)	40,000
Net Incremental Gain/(Loss) (A) – (B)	40,000
	(20,000)

