COST AND MANAGEMENT ACCOUNTING-II

JOINT PRODUCT & BY PRODUCT

SEMESTER-IV

ANNU OJHA (A.O.)

JOINT PRODUCTS AND BY-PRODUCTS

INTRODUCTION

Joint products are defined by CIMA(Chartered Institute Of Management Accountants) as "**two or more products produced by the same process and separated in processing, each having a sufficiently high saleable value to merit recognition as a main product".**

By-products is defined by CIMA as **"output of some value produced incidentally in manufacturing something else (main product)".**

It should be noted that by-products are differentiated from joint products only by **degree of economic importance**. What is a by-product today may be a main product, a joint product, or scrap tomorrow, depending completely on the economic importance of the product.

Examples of joint products and by-products-

Sl.	Industry	Joint products	By-products
1	Dairy	Skim milk, cream, butter, cheese	Whey and other products
2	Petroleum refinery	ATF, Kerosene and Naphtha, etc.	Paraffin, tar, oil cakes, etc.
3	Flour milling	Patent flour, clear flour	Bran, wheat germs
4	Rice milling	Patent rice	Rice husk, rice oil, etc.
5	Soap manufacturing	Soap of different varieties	Glycerine

ACCOUNTING FOR JOINT PRODUCTS

BASIS FOR ALLOCATION OF JOINT COSTS

- Physical unit method

$$= \frac{\text{Physical units of each joint product}}{\text{Total physical units}} \times 100$$

- Sales value at split-off method

$$= \frac{\text{Sale value of each joint product}}{\text{Total sales}} \times 100$$

- Net realizable value method

$$= \frac{\text{NRV of each joint product}}{\text{Total NRV}} \times 100$$

- Net value method

Sales value	***
Less: estimated profit	***
	***
Less: further processing cost	***
	***
Less : selling and distribution cost	***
Net value	***

All other things are similar to that of NPV method.

PHYSICAL UNITS METHODS

Example-1

One tonne of raw material put, into a common process yields four joint products P,Q,R and S their weights being 63 kgs, 117 kgs,180 kgs, and 540 kgs. Respectively. The balance in weight is considered as normal wastage.

Based on the total processing cost of Rs.20,000 per tonne of raw material input, you are required to apportion the joint cost to the products P,Q,R and S.

Solution:

Statement showing apportionment of joint cost among the joint cost among the joint product P,Q,R and S for the period…..

Products	Output (kgs.)	Basis Of Apportionment	Share Of Joint Cost
P	63	63/900x20,000	1400
Q	117	117/900x20,000	2,600
R	180	180/900x20,000	4,000
S	540	540/900x20,000	12,000
total output	900		20,000
Normal wastage	100		NIL
Total input	**1,000**		**20,000**

Working notes: (a) here wastage of 100 kgs. Is purely a normal loss. Its cost is charged over the goods units produced as joint products.

(b) the basis of apportionment of common cost for a joint products.

Joint products= $\frac{\text{Particulars output}}{\text{Total output}}$ X total joint product

SURVEY METHOD

Example-2

Sunlight manufacturing company produce four products jointly – K,L,M and N. the common cost incurred upto split-off point for the 3rd quarter of year 2018-19 includes: direct material-Rs.60,000, direct wages-Rs.40,000, overhead charges Rs.50,000.

The quantities of output for the joint product for the same period are-

K-5,000 units; L-2,000 units; M-7,500 units; N-1,500 units. Through technical survey the points assigned for the output of four joint product are 3,5,8 and 10 respectively.

Show your allocation of common costs among the joint products.

Step-1 total common cost incurred upto split-off point for joint product for the quarter ended 31st dec 2019.

Direct material	=60,000
Direct wages	= 40,000
Prime cost	**=1,00,000**
Overhead charges	=50,000
Total cost	**=1,50,000**

Here, pre-separation common cost per equivalent unit

$$= \frac{\text{Total pre-separation common cost}}{\text{Total no. of equivalent units}}$$

$$= \frac{1,50,000}{1,00,000} = 1.50$$

Calculation of joint cost under survey method

Product	Output	Point assigned	Equivalent units	Cost per equivalent	Cost apportioned	Cost per unit
(1)	(2) Units	(3)	(4)=(2)x(3)	(5) Rs.	(6)=(4)x(5)	(7)=(3)x(5)
K	5000	3	15,000	1.50	22,500	4.50
L	2000	5	10,000	1.50	15,000	7.50
M	7500	8	60,000	1.50	90,000	12.00
N	1500	10	15,000	1.50	22,500	15.00

CONTRIBUTION MARGIN METHOD

Contribution= sales – variable cost

Margin = profit = contribution – fixed cost

Example -3

Star co. produces three joint products P,Q and R. The total common cost incurred for the month of july, 2019 for the joint product upto split-off point are as follows:

Direct material-30,000, direct labour-35,000, variable overhead-25,000; fixed overhead-54,000. the particulars relating to the joint products are as follows:

Product	**P**	**Q**	**R**
Variable cost after split-off point (Rs.)	**8**	**5**	**4**
Selling price per unit(Rs.)	**24**	**16**	**14**
Output produced (units)	**4,000**	**6,000**	**5,000**

you are required to apportion the joint costs by contribution margin method and to compute the profit per unit of the joint products.

Solution: statement showing calculation of variable cost per unit for pre-separation period

Particulars		**amount**
Direct materials		30,000
Direct labour		35,000
Prime cost		**65,000**
Variable overhead		25,000
Total variable cost or marginal cost		**90,000**
Total output of joint products(units)	**[4,000+6,000+5,000]**	**15,000**
Variable cost per units		**6.00**

Statement showing contribution margin method, allocation of fixed cost and profit earned by the joint product for the month of july,2019

products	Output Produced	Pre-separation variable cost p.u.	Post separation variable cost p.u.	Total variable cost	Selling price per unit	Contribution per unit	Total contribution	Total fixed cost allocated	Total profit
1	2	3	4	5= (3+4)	6	7= (6-5)	8= (2X7)	9	10= (8-9)
P	4,000	6.00	8.00	14	24	10	40,000	24,000	16,000
Q	6,000	6.00	5.00	11	16	5	30,000	18,000	12,000
R	5,000	6.00	4.00	10	14	4	20,000	12,000	8,000

Here, contribution margin ratio of the three joint product P,Q and R=40,000:30,000:20,000=4:3:2
So, share of total fixed cost allocation for the joint product P on the basis of contribution margin

$$= \frac{\text{Contribution of P}}{\text{Total contribution}} \times \text{total fixed overhead}$$

Share of fixed cost
P=4/9x54,000=24,000
Q=3/9x54,000=18,000
R=2/9x54,000=12,000

MARKET VALUE METHOD:

(a) Market value at separation point;

(b) Market value after further processing;

(c) Net realisable value, or reverse cost method.

Example-4 In a concern engaged in process industry, four products emerge from a particular process of operation. The total cost of input for the period ended 30th sept 2019 is Rs.253500. the detail of output, additional cost after split off point and sales value of products are appended below:

Products	output	Additional processing cost after split off point	Sales value
A	8,000	60,000	1,68,000
B	5,000	10,000	1,10,000
C	3,000	-	60,000
D	4,000	20,000	90,000

If the products are sold at the split off point without further processing, the sales value would have been

A-1,15,000

B-90,000

C-55,000

D-80,000

You are required to prepare a statement of profitability based on the product being sold (I) after further processing and (II) at the split off point.

SOLUTION:

(i) Allocation of total common cost among the joint products on the basis of the products sold after further processing.

Here, equivalent sales value at split-off point= after processing sales values – additional processing cost after split-off point.

This basis is used for the apportionment of common pre separation cost by using the following formula:-

Share of common cost for a product

$$= \frac{\text{Equivalent sales value for the product}}{\text{Total equivalent sales value}} \text{X total common cost}$$

Statement showing apportionment of pre-split-off common cost and profitability of the joint products if sold after further processing for the period ended on 30th sept 2019:-

Joint product	Output(units)	After processing sales value	Additional processing cost after split-off	Equivalent sales value at split off point	Share of joint cost	Profit earned
A	8,000	1,68,000	60,000	1,08,000	81,000	27,000
B	5,000	1,10,000	10,000	1,00,000	75,000	25,000,
C	3,000	60,000	-	60,000	45,000	15,000
D	4,000	90,000	20,000	70,000	52,500	17,500
TOTAL	20,000	4,28,000	90,000	3,38,000	2,53,500	84,500

(ii) Allocation of total common cost among the joint products on the basis of the products sold at the split off point:
Here, the sales value of the joint products, if sold at the split-off point is given in the question. This basis is used for apportionment of the common pre separation cost by using the following formula:
Share of common cost for a product

$$= \frac{\text{Split-off point sales value for the product}}{\text{Total sales value at split-off point}} \times \text{total common cost}$$

Statement showing apportionment of pre-split common cost and profitability of the joint products if sold at the split off point for the period ended on 30th sept 2019:-

Joint product	Output	Sales value at split-off point	Share of joint cost	Profit earned
A	8,000	1,15,000	85,743	29,257
B	5,000	90,000	67,103	22,897
C	3,000	55,000	41,007	13,993
D	4,000	80,000	59,647	20,353
TOTAL	**20,000**	**3,40,000**	**2,53,500**	**86,500**

ACCOUNTING FOR BY-PRODUCT

B ltd. Manufacturing product A which yields two by- product B and C. The actual joint expenses of manufacturing for a period were Rs.8,000. it was estimated that the profits on each product as a percentage of sales, would be 30%,25% and 15% respectively. Subsequent expenses were:-

Particulars	A(Rs.)	B(Rs.)	C(Rs.)
Materials	100	75	25
Direct wages	200	125	50
Overhead	150	125	75
	450	325	150
Sales	6,000	4,000	2,500

Prepare a statement showing the apportionment of the joint expenses of manufacture over the different products.

Solution :

Working notes:-

Here, total costs of the products= 4,200+3,000+2,125=9,325. but total production costs = costs of pre-separation/common cost+ subsequent total expenses=8,000+(450+325+150)=8,925. so, extra expenses = 9,325 - 8,925 =400 may be assumed as selling expenses. It is apportioned in the ratio of sales.

Statement showing the apportionment of the joint expenses of manufacture over the main product and the by products for the period…….

Particulars	Main product A	By product		Total
		B	C	
Sales	6,000	4,000	2,500	12,500
Less: profit	30% on sales = 1,800	25% on sales = 1,000	15% on sales = 375	3,175
Total cost/ cost of sales	**4,200**	**3,000**	**2,125**	**9,325**
Less: selling expenses(WN)	192	128	80	400
Production cost	**4,008**	**2,872**	**2,045**	**8,925**
Less: subsequent expenses (i.e., cost of further processing)	450	325	150	925
Share of joint/ common costs	**3,558**	**2,547**	**1,895**	**8,000**