

	No entry	Stock Ledger Control A/c To Work-in-progress Ledger Control A/c	Dr.	Stock Ledger Control A/c To Work-in-progress Ledger Control A/c	Dr.
8. Jobs completed	No entry				
9. Interest paid	Interest A/c To Cash	Dr.		Interest A/c To Cash	Dr.
10. Rent of own premises	No entry		Works Overhead A/c To General Ledger Adjustment A/c	Works Overheads A/c To Rent (notional) A/c	Dr.
11. Abnormal idle time	No entry		Costing P&L A/c To Wages A/c (or alternatively the balance may be carried forward)	Profit & Loss A/c To Wages A/c	Dr.
12. Sales (credit)	Sales Ledger Control (or Debtors) A/c To Sales A/c	Dr.	General Ledger Adjustment A/c To Cost of Sales A/c	Sales Ledger Control (Debtors) A/c To Sales A/c	Dr.

Example 14.1

Give journal entries for the following transactions under Integrated Accounting:

- (i) Materials purchased on credit;
- (ii) Payment to creditors;
- (iii) Issue of direct material for production;
- (iv) Payment of wages; and
- (v) Charging wages for production.

(B.Com. (Hons), Delhi, 2003)

Solution:**Journal Entries under Integrated Accounting**

- | | |
|-------------------------------------------------|-----|
| (i) Material purchased on credit: | |
| Stores Ledger Control A/c | Dr. |
| To Creditors A/c | |
| (For material purchased on credit) | |
| (ii) Payment to creditors: | |
| Sundry Creditors A/c | Dr. |
| To Bank A/c | |
| (Amount paid to creditors) | |
| (iii) Issue of direct materials for production: | |
| Work-in-progress Control A/c | Dr. |
| To Stores Control A/c | |
| (Direct material issued to production) | |
| (iv) Payment of wages: | |
| Wages Control A/c | Dr. |
| To Cash Account | |
| (For wages paid) | |
| (v) Charging wages for production: | |
| Work-in-progress Control A/c | Dr. |
| To Wages Control A/c | |
| (For Wages charged to production) | |

Example 14.2

The following transactions are extracted from the books of XYZ Ltd. You are required to pass journal entries under Integrated Accounts System:

	Rs.
(i) Purchase of raw materials on credit	4,00,000
(ii) Carriage inward	3,000
(iii) Paid to creditors	3,00,000
(iv) Stores issued	2,50,000
(v) Productive waged paid	2,00,000
(vi) Unproductive wages paid	70,000
(vii) Works overheads incurred	3,60,000
(viii) Materials issued for repairs	2,000
(ix) Selling expenses paid	10,000
(x) Office expenses paid	4,000
(xi) Works overhead absorbed	4,10,000
(xii) Cost of completed jobs	8,60,000

(B.Com. (Hons) Delhi, 2007)

Solution:

(i)	Stores Ledger Control A/c To creditors A/c (Being Raw Material Purchased on credit)	Dr	4,00,000	4,00,000
(ii)	Stores Ledger Control A/c To cash A/c (Being carriage inward paid)	Dr	3,000	3,000
(iii)	Creditors A/c To cash A/c (Being cash paid to creditors)		3,00,000	3,00,000
(iv)	Work-in-Progress Control A/c To stores Ledger Control A/c (Being material issued to Production)	Dr	2,50,000	2,50,000
(v)	Wages Control A/c To Cash A/c (Being direct wages paid)	Dr	2,00,000	2,00,000
(vi)	Works Overhead Control A/c To Cash (Being unproductive wages paid)	Dr	70,000	70,000
(vii)	Works Overhead Control A/c To cash (Being work expenses incurred)	Dr	3,60,000	3,60,000
(viii)	Works overhead Control A/c To Stores Ledger Control A/c (Being material issued for repair)	Dr	2,000	2,000
(ix)	Selling and Distribution overhead control A/c To Cash (Being selling Exp. paid)	Dr	10,000	10,000
(x)	Office overhead control A/c To cash (Being office expenses)	Dr	4,000	4,000
(xi)	Work in Progress Control A/c To work overhead control A/c (Being works overhead absorbed)	Dr	4,10,000	4,10,000
(xii)	Finished stock Control A/c To WIP Control A/c (Being cost of completion transfer to finished stock)	Dr	8,60,000	8,60,000

Example 14.3

Journalise the following transactions in the integrated books of accounts:

(a) Credit purchase	Rs 12,00,000
(b) Production wages paid	7,00,000
(c) Stocks issued to production orders	8,00,000
(d) Work expenses charged to production	4,50,000
(e) Finished goods transferred from production orders	18,00,000

(f) Administration expenses charged to production	1,50,000
(g) Work expenses outstanding	1,20,000
(h) Work expenses paid	4,60,000

(ICWA Inter Dec. 1996)

Solution:**Journal Entries Under Integral System of Accounting**

	<i>Particulars</i>		<i>Dr. (Rs.)</i>	<i>Cr. (Rs.)</i>
(a)	Stores Ledger Control Account Dr. To Sundry Creditors Account (Being purchases of goods on credit)		12,00,000	12,00,000
(b)	Wages Control Account Dr. To Cash/Bank Account (Being wages paid in cash/cheque)		7,00,000	7,00,000
(c)	Work-in-progress Control Account Dr. To Stores Ledger Control Account (Being stores issued against production order)		8,00,000	8,00,000
(d)	Work-in-progress Control Account Dr. To Production Overhead Control A/c (Being the Work Expenses allocated to Production/Jobs)		4,50,000	4,50,000
(e)	Finished Goods Ledger Control A/c Dr. To Work-in-progress Ledger Control A/c (Being goods finished during the year transferred)		1,80,000	1,80,000
(f)	Work-in-progress Control Account Dr. To Administration Overhead Control A/c (Being administration expenses charged to production)		1,50,000	1,50,000
(g)	Production Overhead Control A/c Dr. To Outstanding Works Overhead Account (Being works expenses incurred during the period but still unpaid)		1,20,000	1,20,000
(h)	Overhead Control Account Dr. To Cash/Bank Account (Being works expenses paid in Cash/Bank during the period)		4,60,000	4,60,000

Example 14.4

Record the following transactions in the ledger under the integral system and prepare the trial balance. Trial balance at the beginning of the period is as follows:

	Dr.	Cr.
Bank Balance	Rs 1,500	
Stock:		
Finished goods	2,000	
Work-in-progress	3,250	
Raw materials	3,000	

Creditors		1,000
Debtors	500	
Fixed assets	51,000	
Depreciation provision		1,250
Capital account		55,000
Profit and loss account		4,000
	<u>61,250</u>	<u>61,250</u>
Transactions during the year were:		
	Rs.	Rs.
Materials purchased on credit		5,000
Materials issued to production:		
Direct	3,500	
Indirect	<u>500</u>	4,000
Payment to creditors		3,000
Wages paid:		
Direct	5,000	
Indirect	<u>1,000</u>	6,000
Finished goods produced		15,000
Cost of finished goods sold		16,000
Sales value		20,000
Receipt from debtors		17,500
Overhead incurred:		
Factory	3,000	
Office	500	
Selling and distribution	<u>500</u>	4,000
Depreciation (in addition to overheads)		250

Solution:

Bank Account

	Rs.		Rs.
To Balance b/d	1,500	By Purchases ledger control A/c	3,000
To Sales ledger control A/c	17,500	By Wages control A/c	6,000
		By Factory overheads	3,000
		By Office overheads	500
		By Selling and distribution overheads	500
		By Balance c/d	<u>6,000</u>
	<u>19,000</u>		<u>19,000</u>

Finished Goods Ledger Control Account

	Rs.		Rs.
To Balance b/d	2,000	By Cost of sales A/c	16,000
To Work-in-progress A/c	15,000	By Balance	<u>1,500</u>
To Office overheads A/c	<u>500</u>		
	<u>17,500</u>		<u>17,500</u>

Work-in-progress Ledger Control Account

	Rs.		Rs.
To Balance b/d	3,250	By Finished goods ledger control A/c	15,000
To Stores ledger A/c	3,500	By Balance c/d	1,500
To Wages control A/c	5,000		
To Factory overheads A/c	4,750		
	<u>16,500</u>		<u>16,500</u>

Stores Ledger Control Account

	Rs.		Rs.
To Balance b/d	3,000	By W.I.P. Ledger control A/c	3,500
To Purchases ledger Control A/c	5,000	By Factory overheads A/c	500
	<u>8,000</u>	By Balance c/d	4,000
			<u>8,000</u>

**Purchases Ledger Control Account
(Creditors account)**

	Rs.		Rs.
To Bank	3,000	By Balance b/d	1,000
To Balance b/d	3,000	By Stores ledger control A/c	5,000
	<u>6,000</u>		<u>6,000</u>

**Sales Ledger Control Account
(Debtors A/c)**

	Rs.		Rs.
To Balance b/d	500	By Bank	17,500
To Cost of sales A/c	20,000	By Balance c/d	3,000
	<u>20,500</u>		<u>20,500</u>

Factory Overheads Account

	Rs.		Rs.
To Stores ledger control A/c	500	By W.I.P. Ledger A/c	4,750
To Wages control A/c	1,000		
To Bank	3,000		
To Depreciation provision	250		
	<u>4,750</u>		<u>4,750</u>

Wages Control Account

	Rs.		Rs.
To Bank	6,000	By Work-in-Progress A/c	5,000
	<u>6,000</u>	By Factory overheads	1,000
			<u>6,000</u>

Cost of Sales Account

	Rs.		Rs.
To Finished goods ledger control A/c	16,000	By Sales ledger control A/c	20,000
To Profit and Loss A/c	<u>4,000</u>		
	20,000		<u>20,000</u>

Office Overheads Account

To Bank	Rs. 500	By Finished goods ledger control A/c	Rs. 500
---------	---------	--------------------------------------	---------

Selling and Distribution Overhead Account

To Bank	Rs. 500	By Profit and loss A/c	Rs. 500
---------	---------	------------------------	---------

Provision for Depreciation Account

To Balance c/d	Rs. 1,500	By Balance b/d	Rs. 1,250
	<u>1,500</u>	By Factory overheads	250
			<u>1,500</u>

Profit and Loss Account

To Selling and distribution overhead A/c	Rs. 500	By Cost of sales A/c	4,000
To Net profit	<u>3,500</u>		
	4,000		<u>4,000</u>

Profit and Loss Appropriation Account

To Balance c/d	Rs. 7,500	By Balance b/d	Rs. 4,000
	<u>7,500</u>	By Profit and Loss A/c (profit for the year)	3,500
			<u>7,500</u>

Share Capital Account

To Balance c/d	Rs. 55,000	By Balance b/d	Rs. 55,000
----------------	------------	----------------	------------

Fixed Assets Account

To Balance b/d	Rs. 51,000	By Balance c/d	Rs. 51,000
----------------	------------	----------------	------------

Trial Balance

	Dr.	Cr.
Purchase ledger control A/c		3,000
Sales ledger control A/c	3,000	
Provision for depreciation		1,500
Bank	6,000	
Finished goods ledger control A/c	1,500	
Work-in-progress ledger control A/c	1,500	
Stores ledger control A/c	4,000	
Profit and loss A/c		7,500

586 Cost Accounting

Share capital		55,000
Fixed assets	51,000	
	<u>67,000</u>	<u>67,000</u>

Example 14.5

BPR Limited keeps books on integrated accounting system. The following balance appear in the books as on April 1, 2006.

	Dr. (Rs.)	Cr. (Rs.)
Stores Control A/c	40,950	—
Work-in-Progress A/c	38,675	—
Finished Goods A/c	52,325	—
Bank A/c	22,750	—
Creditors A/c	—	18,200
Fixed Assets A/c	1,47,875	—
Debtors A/c	27,300	—
Share Capital A/c	—	1,82,000
Provision for Depreciation A/c	—	11,375
Provision for Doubtful Debts A/c	—	3,725
Factory Overheads Outstanding A/c	—	6,250
Pre-Paid Administration Overheads A/c	9,975	—
Profit and Loss A/c	—	72,800
	<u>3,17,100</u>	<u>3,17,100</u>

The transactions for the year ended March 31, 2003, were as given below:

	Rs.	Rs.
Direct Wages	1,97,925	—
Indirect Wages	<u>11,375</u>	2,09,300
Purchase of materials (on credit)		2,27,500
Materials issued to production		2,50,250
Material issued for repairs		4,550
Goods finished during the year (at cost)		4,89,125
Credit Sales		6,82,500
Cost of Goods sold		5,00,500
Production overheads absorbed		1,09,200
Production overheads paid during the year		91,000
Production overheads outstanding at the end of year		7,775
		Rs.
Administration overheads paid during the year		27,300
Selling overheads incurred		31,850
Payment to Creditors		2,29,775
Payment received from Debtors		6,59,750
Depreciation of Machinery		14,789
Administration overheads outstanding at the end of year		2,225
Provision for doubtful debts at the end of the year		4,590

Required:

Write up accounts in the integrated ledger of *BPR* Limited and prepare a Trial balance.

(CA, PE, Exam II, Group II, Nov. 2003)

Solution:

Stores Control A/c

Dr.	Rs.		Cr.
To Balance b/d	40,950	By WIP A/c	2,50,250
To Creditors A/c	2,27,500	By Production overheads A/c	4,550
		By Balance c/d	13,650
	2,68,450		2,68,450

Wages Control A/c

Dr.	Rs.		Cr.
To Bank	1,97,925	By Work-in-Progress A/c	1,97,925
To Bank	11,375	By Production overheads A/c	11,375
	2,09,300		2,09,300

Work-in-Progress A/c

Dr.	Rs.		Cr.
To Balance b/d	38,675	By Finish goods A/c	4,89,125
To Wages control A/c	1,97,925	By Balance c/d	1,06,925
To Stores control A/c	2,50,250		
To Production overheads A/c	1,09,200		
	5,96,050		5,96,050

Production Overheads A/c

Dr.	Rs.		Cr.
To Wages control A/c	11,375	By WIP A/c	1,09,200
To Stores control A/c	4,550	By Profit and Loss A/c	14,039
To Bank	84,750	(Under-absorbed overheads Written off)	
(91,000-6,250)			Rs.
To Production overheads outstanding	7,775		
To Provision for depreciation	14,789		
	1,23,239		1,23,239

Finished Goods A/c

Dr.	Rs.		Cr.
To Balance b/d	52,325	By Cost of sales A/c	5,00,500
To Work-in-progress A/c	4,89,125	By Balance c/d	80,450
To Admn. Overheads A/c	39,500		
	5,80,950		5,80,950

Administration Overheads A/c

Dr.	Rs.		Cr.
			Rs.
To Pre-paid admn. Overheads A/c	9,975	By Finished goods A/c	39,500
To Bank	27,300		
To Admn. Overheads outstanding	2,225		
	<u>39,500</u>		<u>39,500</u>

Cost of Sales A/c

Dr.	Rs.		Cr.
			Rs.
To Finished goods A/c	5,00,500	To Sales A/c	5,32,350
To Selling overheads	31,850		
	<u>5,32,350</u>		<u>5,32,350</u>

Sales A/c

Dr.	Rs.		Cr.
			Rs.
To Cost of sales A/c	5,32,350	By Debtors A/c	6,82,500
To Profit and Loss A/c	1,50,150		
	<u>6,82,500</u>		<u>6,82,500</u>

Factory overheads / Production Overheads Outstanding A/c

Dr.	Rs.		Cr.
			Rs.
To Bank	6,250	By Balance b/d	6,250
To Balance c/d	7,775	By Production overheads	7,775
	<u>14,025</u>		<u>14,025</u>

Prepaid Administration Overheads A/c

Dr.	Rs.		Cr.
			Rs.
To Balance b/d	9,975	By Admn. Overheads A/c	9,975
	<u>9,975</u>		<u>9,975</u>

Provision for Depreciation A/c

Dr.	Rs.		Cr.
			Rs.
To Balance c/d	26,164	By Balance b/d	11,375
	<u>26,164</u>	By Production overheads A/c	14,789
			<u>26,164</u>

Provision for Doubtful Debts A/c

Dr.	Rs.		Cr. Rs.
To Balance c/d	4,590	By Balance b/d	3,725
		By Profit and Loss A/c	865
	<u>4,590</u>		<u>4,590</u>

Profit and Loss A/c

Dr.	Rs.		Cr. Rs.
To Provision for doubtful debts	865	By Balance b/d	72,800
To Production overheads	14,039	By Sales A/c	1,50,150
To Balance c/d	2,08,046		
	<u>2,22,950</u>		<u>2,22,950</u>

Debtors A/c

Dr.	Rs.		Cr. Rs.
To Balance b/d	27,300	By Bank A/c	6,59,750
To Sales A/c	6,82,500	By Balance c/d	50,050
	<u>7,09,800</u>		<u>7,09,800</u>

Creditors A/c

Dr.	Rs.		Cr. Rs.
To Bank	2,29,775	By Balance b/d	18,200
To Balance c/d	15,925	By Stores control A/c	2,27,500
	<u>2,45,700</u>		<u>2,45,700</u>

Fixed Assets A/c

Dr.	Rs.		Cr. Rs.
To Balance b/d	1,47,875	By balance c/d	1,47,875

Bank A/c

Dr.	Rs.		Cr. Rs.
To Debtors	6,59,750	By Balance b/d	22,750
		By Direct wages	1,97,925
		By Indirect wages	11,375
		By Production overheads (Rs. 84,750 + Rs. 6,250)	91,000
		By Admn. Overheads A/c	27,300
		By Selling overheads A/c	31,850
		By Creditors A/c	2,29,775
		By Balance c/d	47,775
	<u>6,59,750</u>		<u>6,59,750</u>

Trial Balance
As on March 31, 2007

	Dr. Rs.	Cr. Rs.
Stores control A/c	13,650	
Work in Progress A/c	1,06,925	
Finished goods A/c	80,450	
Bank A/c	47,775	
Creditors A/c		15,925
Fixed Assets A/c	1,47,875	
Debtors A/c	50,050	
Share capital A/c		1,82,000
Provision for depreciation A/c		26,164
Profit and Loss A/c		2,08,046
Production overheads outstanding A/c		7,775
Outstanding administrative overheads A/c		2,225
Provision for doubtful debt		4,590
	4,46,725	4,46,725

THEORY QUESTIONS

1. What do you understand by “integrated accounts”, and what are the principles involved? State the advantages of “Integrated accounts.” *(B. Com. (Hons), Delhi)*
2. What is an integrated accounting? State its advantages. *(CA, PE, Exam II, Group II, May 2007, (ICWA Inter)*
3. What do you understand by the integrated accounting system? State its advantages and prerequisites. *(CA Inter)*
4. Distinguish between Interlocking and Integration System of cost and financial accounts?
5. Explain the accounts kept in Integrated Accounting System.
6. State the advantages of integrated cost and financial accounts. *(B. Com. (Hons), Delhi, 2004)*
7. Explain the basic requirements of an Integrated System of Accounting. *(B. Com. (Hons), Delhi)*
8. What is integrated accounting? Briefly describe the merits of integration. *(B. Com. (Hons), Delhi)*
9. Define integrated accounting system. Distinguish it with non-integrated accounting system. *(B. Com. (Hons), Delhi, 2006)*

PROBLEMS

1. Journalise the following transactions assuming cost and financial accounts are integrated:

	(Rs.)
Raw materials purchases	40,000
Direct materials issued to production	30,000
Wages paid (30% indirect)	24,000
Direct wages charged to production	16,800
Manufacturing expenses incurred	19,000
Manufacturing overhead charged to production	18,400
Selling and distribution costs	4,000
Finished products (at cost)	40,000

Sales	58,000
Closing stock	NIL
Receipt from debtors	13,800
Payment to creditors	22,000
	<i>(C.A. Inter)</i>

2. From the following particulars pass the journal entries in an integral accounting system:

- (a) Issued materials Rs. 3,00,000/- of which Rs. 2,80,000 (standard Rs 2,40,000) is direct material.
- (b) Net wages paid Rs. 70,000/-, Deductions being Rs. 12,000/- (standard Rs. 75,000/-)
- (c) Gross salaries payable for the period is Rs. 26,000/- (standard Rs. 25,000/-), Deductions Rs. 2,000/-
- (d) Sales (Credit) Rs. 8,00,000/-
- (e) Discount allowed Rs. 5,000/-
- (f) Salaries and wages allocation: Rs. 60,000/- direct (standard Rs. 62,000/-) and out of the balance, 50% production, 30% admn. and 20% selling and distribution overheads. *(ICWA Inter)*

3. In the absence of the Chief Accountant, you have been asked to prepare a month's cost accounts for a company which operate a batch costing system fully integrated with the financial accounts. The following relevant information is provided to you:

	Rs.
Balances at the beginning of the month:	
Stores Ledger Control Account	25,000
Work-in-Progress Control Account	20,000
Finished Goods Control Account	35,000
Prepaid production Overheads brought forward from previous month	3,000
Transactions during the month:	
Materials purchased	75,000
Materials issued:	
To production	30,000
To Factory maintenance	4,000
Materials transferred between batches	5,000
Total wages paid:	
To Direct workers	25,000
To Indirect workers	5,000
Direct wages charged to batches	20,000
Recorded non-productive time of direct worker	5,000
Selling and distribution overheads incurred	6,000
Other production overheads incurred	12,000
Sales	1,00,000
Cost of finished goods sold	80,000
Cost of goods completed and transferred into	
Finished goods during the month	65,000
Physical value of work-in-progress at the end of the month	40,000
The production overhead absorption rate is 150% of direct wages charged to work-in-progress.	

Required:

Prepare the following accounts for the month:

- (a) Stores Ledger Control Account
- (b) Work-in-Progress Control Account
- (c) Finished Goods Control Account
- (d) Production Overhead Control Account
- (e) Profit and Loss Account

(CA Inter)

592 Cost Accounting

4. Dutta Enterprises operates an integral system of accounting. You are required to pass the Journal Entries for the following transactions that took place for the year ended 30.6.2007.
(Narrations are not required)

	Rs.
Raw materials purchased (50% on Credit)	6,00,000
Materials issued to production	4,00,000
Wages paid (50% direct)	2,00,000
Wages charged to production	1,00,000
Factory overheads incurred	80,000
Factory overheads charged to production	1,00,000
Selling and distribution overheads incurred	40,000
Finished goods at cost	50,00,000
Sales (50% Credit)	7,50,000
Closing stock	Nil
Receipts from debtors	2,00,000
Payments to creditors	2,00,000

(B. Com. (Hons), Delhi 1998, 2002)

RECONCILIATION OF COST AND FINANCIAL ACCOUNTS

Learning Objectives

After reading this chapter, you should be able to:

1. describe the need for reconciliation;
2. explain the reasons for differences in profit and
3. discuss the reconciliation procedure.

NEED FOR RECONCILIATION

When a manufacturing firm uses an integrated accounting system, i.e., no separate cost and financial accounts, the question of reconciliation does not arise. But in many manufacturing concerns, cost and financial accounts are maintained separately and independently of each other. In such a case, profit disclosed by one accounting system tends to differ from that of the other accounting system. This creates problems and the need arises of reconciling the two accounting systems to arrive at one profit figure.

REASONS FOR DIFFERENCES IN PROFIT

Differences in the profits presented in cost and financial books may be due to the following reasons:

Items Appropriated or Charged to Profit but Not Found in Cost Accounts

1. Company tax.
2. Transfer to general reserve or any other fund to accumulated profits, for example, dividend equalisation reserve.
3. Dividend paid on the share capital.
4. Additional provisions for depreciation on plant, etc. and for bad debts.
5. Amounts written off as goodwill, preliminary expenses, underwriting commissions, debenture discount, capital issue expenses.
6. Appropriation for the purpose of repayment of loans or debentures.

Purely Financial Matters Not Found in Cost Accounts

1. Interest received on bank deposits.
2. Interest, dividends, etc. received on investments.
3. Rents received.
4. Losses on the sale of investments, machinery, buildings, etc.
5. Profits on the sale of fixed assets.
6. Transfer fees received.
7. Interest on bank loans, mortgages, debentures and other borrowed money.
8. Interest on proprietor's capital.
9. Damages payable.
10. Penalties payable.

Treatment of Items in Cost Books and Financial Books

In cost accounts overheads are recovered on the basis of a predetermined rate. In this way recovered overhead may not agree with the actual overhead incurred. Profit in cost books may be comparatively (as to financial books) higher or lower depending on the under-absorption or over-absorption of overhead. Reconciliation is necessary to eliminate differences in profits. If the amount of over- or under-absorption is transferred to the costing and profit and loss accounts, then financial profit will tally with the costing profit.

Differences in the Valuation of Stock and Work-in-progress

In financial books, stock is valued at cost or market price whichever is lower. In cost accounting different methods of valuation of stock are in practice such as FIFO, LIFO, Average Costing, Weighted Average Costing, etc. Besides work-in-progress in cost accounts is often valued on a prime cost basis and sometimes variable manufacturing overhead is included therein. In financial accounting, work-in-progress may be valued after taking into account administrative expenses also. Similarly, finished goods in financial accounting is valued at cost or market price whichever is lower. On the contrary, in cost accounting, finished stock is generally valued at total cost of production. Since the value of stocks (raw material, work-in-progress, finished goods) in the financial accounts and cost accounts differs, the profits also differ from financial to cost accounting.

Depreciation

In financial accounts, depreciation may be calculated on straight line method or diminishing balance method. But, in cost accounting, depreciation can be calculated in terms of machine hour or any other base.

Abnormal Losses and Gains

Abnormal losses and gains (discussed earlier) may be transferred to costing profit and loss account or alternatively may not be considered and excluded totally from cost accounts. In the first situation (transfer to costing and profit and loss account) there will be no difference between financial profit and costing profit. But in the second situation (exclusion from cost accounts) financial profit (losses) will differ from costing profit (loss) and adjustments will be required.

RECONCILIATION PROCEDURE

Reconciliation of cost and financial accounts is done on the principle of bank reconciliation statement. One may begin with profit as per the financial books or cost books and thereafter items causing differences in profit may be added or deducted depending on the circumstances. After all such items have been considered,

profit as per other books may be arrived at. This reconciliation may be achieved through a mere statement (Reconciliation Statement) or preparing a Memorandum Reconciliation Account. Both these approaches are discussed below:

1. Reconciliation Statement The following steps are required to be completed to prepare a Reconciliation Statement.

- (i) Profit as per any set of books (cost or financial) may be taken as a starting point. This profit plus making all suitable adjustments (in terms of causes of difference in profit) will finally result into profit figure as per the other set of books.
- (ii) The effect of a particular cause of difference should be determined on the profits shown by the other set of books.
- (iii) In case, the cause (causing the difference in profit) has given as increase in profit shown by the other set of books, the amount of such increase should be added to the profit as per the former set of books which has been taken as a starting point.
- (iv) In case, the cause has decreased the profit shown by other set of books, the amount of such decrease should be deducted from the profit as per the former set of books which has been taken as the starting point.

Completion of the above steps will give the profit as per the other set of books.

2. Memorandum Reconciliation Account This reconciliation procedure is in the form of an account. The debit side (Dr.) of the Memorandum Reconciliation Account shows items to be deducted from the profit as per any set of books taken as a starting point. The credit side of this account shows profit figure accepted as a starting point as well as items to be added to this profit figure. The difference between the credit side and debit side will give profit as per the other set of books. A proforma of Memorandum Reconciliation Account is shown in Fig. 15.1.

Memorandum Reconciliation Account

Dr.		Cr.	
<i>Particulars</i>	<i>Amt (Rs.)</i>	<i>Particulars</i>	<i>Amt (Rs.)</i>
To _____	—	By profits as per cost Accounts	—
To _____	—	By _____	—
To _____	—	By _____	—
To _____	—	By _____	—
To profit as per financial accounts	—		
Total	—	Total	—

Fig. 15.1

Example 15.1

In a factory, works overheads are absorbed at 60% of Labour cost and Office overheads are 20% of Works Cost. Prepare (i) Cost Sheet, (ii) Trading and Profit and Loss Account and (iii) Reconciliation Statement if Total Expenditure consists of Material Rs. 2,00,000; Wages Rs. 1,50,000; Factory Expenses Rs. 1,00,000 and Office Expenses Rs. 85,000.

10% of the Output is Stock at the end and Sales are Rs. 5,20,000.

(B. Com. (Hons), Delhi, 2000)

Solution:**Cost Sheet**

<i>Particulars</i>	<i>Amount Rs.</i>
Material	2,00,000
Wages	1,50,000
Prime Cost	3,50,000
Factory Overhead (60% of Rs. 1,50,000)	90,000
Works cost	4,40,000
Office Overheads (20% of works cost)	88,000
Cost of Production	5,28,000

Cost of goods sold:	Rs.
$\frac{5,28,000 \times 90}{100}$	4,75,200
Profit	44,800
Sales	5,20,000
Profit as per Cost Accounts = Rs. 44,800	

Trading and Profit and Loss Account

<i>Particulars</i>	<i>Amt.</i>	<i>Particulars</i>	<i>Amt.</i>
	Rs.		Rs.
To Material	2,00,000	By Sales	5,20,000
To Wages	1,50,000	By Closing stock	
To Gross profit c/d	2,22,800	$\frac{5,28,000 \times 10}{100}$	52,800
	5,72,800		5,72,800
To Factory Expenses	1,00,000	By Gross Profit b/d	2,22,800
To Office Expenses	85,000		
To Net Profit c/d	37,800		
	2,22,800		2,22,800

Reconciliation Statement

Profit as per cost accounts	Rs. 44,800
Add: Overcharged in Cost accounts : Office Overhead	3,000
	47,800
Less: Undercharged in Cost accounts : Factory Overhead	10,000
Profit as per financial records	37,800

Example 15.2

Prepare a Reconciliation Account from the following details:

Profit as per cost accounts were of Rs. 59,700 while the profits as per financial accounts were of Rs. 60,000. The values of opening and closing stock as shown in cost accounts and financial accounts were as under:

	<i>Financial A/cs</i>	<i>Cost A/cs</i>
Raw materials:		
Opening	25,000	25,300
Closing	30,000	29,600
W.I.P		
Opening	16,000	15,500
Closing	20,000	19,900

(B.Com. (Hons), Delhi, 2003)

Solution:

Reconciliation Account

Dr.		Cr.	
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To under-valuation of W.I.P. in cost books	500	By profit as per cost books	59,700
To profit as per financial books	60,000	By over-valuation of opening stock in cost books	300
		By over-valuation of closing stock in financial books	400
		By over-valuation of closing W.I.P. in financial books	100
	60,500		60,500

Example 15.3

From the following figures prepare reconciliation statement:

	Rs.
Profit as per costing records	5,000
Factory overheads under-recovered in costing	3,000
Selling and Administration overheads over-recovered in costing	2,000
Bank interest credited in financial books	500
Preliminary expenses written off in financial books	6,500
Opening stock value:	
in cost books	5,000
in financial books	4,000
Closing stock value:	
in cost books	12,000
in financial books	10,000

(B.Com, Delhi, 2002)

Solution:**Reconciliation Statement**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Profit as per Cost Accounts		5,000
<i>Add (+):</i>		
Selling and Administration overheads over-recovered in cost books	2,000	
Bank interest credited in financial books	500	
Opening Stock over-valued in Cost Account	1,000	3,500
		+ 8,500
<i>Less (-):</i>		
(i) Factory overheads under-recovered in costing	3,000	
(ii) Preliminary expenses written off in financial books	6,500	
(iii) Closing stock of materials over-valued in cost A/c	2,000	(-) 11,500
Loss as per Financial Accounts		3,000

Example 15.4

From the following information, reconcile the profit as per cost accounts with financial accounts:

	Cost A/c	Financial A/c
	<i>Rs.</i>	<i>Rs.</i>
Profit	86,250	
Opening Stock:		
Material	10,500	10,300
Work-in-progress	8,500	8,000
Closing Stock:		
Material	14,200	15,000
Work-in-progress	6,000	5,600

Dividend and interest received Rs. 600.

Loss on sale of investments Rs. 1,000.

Interest charged by the bank not considered in Financial Accounts and Cost Accounts Rs. 1,500.

Goodwill written off during the year Rs. 2,500.

Preliminary expenses written off Rs. 3,000.

Overhead incurred Rs. 40,000.

Overhead absorbed in Cost Accounts Rs. 38,500.

Find out profit as per Financial Accounts.

(B.Com, Delhi, 2005)

Solution:**Reconciliation Statement**

		Rs.
Profit as per Cost Accounts		86,250
<i>Add:</i> (i) Dividend and interest credited in financial account	600	
(ii) Over valuation of opening stock of material in the cost accounts:	200	
(iii) Over valuation of opening workers progress in cost accounts	500	
(iv) Under valuation of closing stock of material	800	2,100
		88,350
<i>Less:</i> (i) Under-recovery of overheads in cost accounts (Rs. 40,000 – Rs. 38,500)	1,500	
(ii) Over-valuation of closing work-in-Progress in cost accounts	400	
(iii) Loss on sale of Investments	1,000	
(iv) Goodwill written off	2,500	
(v) Preliminary expenses written off	3,000	8,400
Profit as per Financial Accounts		79,950

Example 15.5

From the following figure, prepare a reconciliation statement:

	<i>Cost Books</i> Rs.	<i>Financial Books</i> Rs.
Profit	50,000	?
Marketing overheads	8,000	8,000
Provision for bad debts	—	5,000
Factory overheads	8,500	7,000
Director's fees	—	2,000
Income Tax paid	—	15,000
Rent of owned Premises	6,000	—
Depreciation	11,250	12,000
Share transfer fee (Cr.)	—	1,000
Administrative overheads	5,000	8,000

(B.Com, Delhi, 2006)

Solution:**Reconciliation Statement**

<i>Particulars</i>		Rs.
Profit as per Cost Book		50,000
<i>Add:</i> Factory overhead over-charged in cost accounts	1,500	
Rent of own building charged in cost accounts	6,000	
Share Transfer Fee credited in financial books	1,000	8,500
		58,500
<i>Less:</i> Provision for bad debts charged in financial books	5,000	
Directors' fees in financial books	2,000	
Income tax in financial books	15,000	
Depreciation in financial books	750	
Administrative overheads undercharged in cost books	3,000	25,750
Profit as per financial books		32,750

Example 15.6

From the following information, you are required to prepare:

- (i) Cost sheet for articles *X* and *Y*
- (ii) Profit and Loss Account as per financial books
- (iii) Reconciliation between profit as per cost books and as per financial books.

	Article <i>X</i>	Article <i>Y</i>
	Rs.	Rs.
Material consumed	36,000	48,400
Labour	63,000	83,600
Works overhead (Actual)	1,42,000	
Office expenses (Actual)	95,700	
Number of Articles sold	Price per Article	
	Rs.	
<i>X</i> 180	1,450	
<i>Y</i> 220	1,600	

There was neither opening stock nor any closing stock. Works overheads are charged 100% on labour and office overhead are charged at 25% on works cost.

(B.Com, Delhi, 2006)

Solution:**Cost Sheet for Articles *X* and *Y***

<i>Particulars</i>	<i>Article X</i> (180 Units) Rs.	<i>Article Y</i> (220 Units) Rs.	<i>Total</i> Rs.
Material	36,000	48,400	84,400
Labour	63,000	83,600	1,46,600
Prime cost	99,000	1,32,000	2,31,000
Works overhead (100% on Labour)	63,000	83,600	1,46,600
Work Cost	1,62,000	2,15,600	3,77,600
Office overheads (25% on work cost)	40,500	53,900	94,400
Cost of Production	2,02,500	2,69,500	4,72,000
Profit (<i>Balancing figure</i>)	58,500	82,500	1,41,000
Sales (180 × Rs. 1450) and (220 × Rs. 1600)	2,61,000	3,52,000	6,13,000

Profit and Loss Account (For Financial Accounts)

Dr.		Cr.	
<i>Particulars</i>	Rs.	<i>Particulars</i>	Rs.
To materials consumed:		By sales:	
<i>X</i> 36,000		<i>X</i> (180 × Rs. 1450)	2,61,000
<i>Y</i> 48,400	84,400	<i>Y</i> (220 × Rs. 1600)	3,52,000

(Contd.)

(Contd.)

Dr.		Cr.	
Particulars	Rs.	Particulars	Rs.
To Labour:			
X	63,000		
Y	<u>83,600</u>		
	1,46,600		
To works overheads (Actual)	1,42,000		
To office overheads (Actual)	95,700		
To Net Profit	1,44,300		
	<u>6,13,000</u>		<u>6,13,000</u>

Reconciliation Statement

Particulars	Rs.
Profit as per Cost Books (Rs. 58,500 + Rs. 82,500)	1,41,000
Add: Works overhead over-recovered (1,46,600 – 1,42,000)	<u>4,600</u>
	1,45,600
Less: Office overhead underrecovered (95,700 – 94,400)	<u>1,300</u>
Profit as per financial Profit and Loss A/c	1,44,300

Example 15.7

The following information is made available to you from the financial books of S.V. Ltd. for the year ended December 31, 2001:

	Rs.		Rs.
To Direct materials used	3,00,000	By Sales	
To Direct wages	2,00,000	(2,00,000 units)	7,50,000
To Factory expenses	1,20,000		
To Office expenses	40,000		
To Selling and Distribution expenses	80,000		
To Net Profit	10,000		
	<u>7,50,000</u>		<u>7,50,000</u>

Normal output of the factory is 2,50,000 units. Factory overheads are fixed upto Rs. 60,000 and office expenses are fixed for all practical purposes. Selling and distribution expenses are fixed to the extent of Rs. 50,000; the rest are variable.

Prepare a statement reconciling the profits as per cost and financial Accounts assuming that indirect expenses are absorbed on the basis of normal production capacity in cost accounts.

(B.Com. (Hons), Delhi, 2002)

Solution:

Statement of Cost and Profit		Rs.
Direct Material used		3,00,000
Direct Wages		2,00,000
	Prime Cost	5,00,000
Factory Expenses		
	$\frac{4}{5}$ th of Fixed Overhead $60,000 \times \frac{4}{5} = 48,000$	
	Variable Overhand $(1,20,000 - 60,000) = 60,000$	1,08,000
	Works Cost for Factory Cost	6,08,000
Office Expenses		
	$\frac{4}{5}$ th of Fixed Expenses $40,000 \times \frac{4}{5} = 32,000$	32,000
	Cost of Production	6,40,000
Selling and Distribution Expenses		
	$\frac{4}{5}$ th of Fixed Expenses $50,000 \times \frac{4}{5} = 40,000$	
	Variable Overheads $(80,000 - 50,000) = 30,000$	70,000
	Cost of sales	7,10,000
	Profit	40,000
	Sales	7,50,000

Reconciliation Statement

		Rs.
Profit as per Cost Accounts		40,000
Less: Unabsorbed Factory Expenses	12,000	
Unabsorbed Office Expense	8,000	
Unabsorbed Selling and Distribution Expenses	10,000	
		30,000
Profit as per Financial Accounts		10,000

Out of total factory overhead, Rs. 60,000 are fixed. The fixed factory overhead rate in financial accounts must have been determined on the basis of normal output i.e. 2,50,000 units. Therefore, fixed factory overheads recovered in cost accounts must be Rs. 48,000 (i.e. $\frac{4}{5}$ th of 60,000) and 40,000 (i.e. $\frac{4}{5}$ th of Rs. 50,000) respectively.

Example 15.8

Gain More Ltd. showed a net loss of Rs. 6,30,000 as per the financial accounts for the year ended 31st March, 2004. The cost accounts however disclosed a loss of Rs. 5,00,000 for the same period. On scrutiny of the two accounts the following are available:

	Rs.
Factory overheads under-recovered	70,000
Administration overheads over-recovered	30,000
Depreciation charged to financial accounts	1,50,000
Depreciation charged in cost accounts	1,20,000
Interest on investment not included in cost accounts	30,000
Income Tax provided in financial accounts	1,00,000
Stores adjustments (credit in financial accounts)	10,000
Prepare a Memorandum Reconciliation Account.	

(ICWA, Inter, Stage 1, June 2004)

Solution:**GAIN MORE LTD.**

Dr.	Memorandum Reconciliation Account for the year ended 31 st March, 2004		Cr.
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Loss as per Financial Accounts	6,30,000	By Factory overhead under-recovered	70,000
To Admn. Overheads over-recovered	30,000	By Deprn. undercharged in Cost Accounts (150,000 – 120,000)	30,000
To Intrest on Investment not included in Cost Accounts	30,000	By Provision for Income Tax not taken in Cost Accounts	1,00,000
To Store adjustments credit in financial accounts	10,000	By Balance c/d (net loss) as per Cost Accounts	5,00,000
	7,00,000		7,00,000

Example 15.9

From the following data prepare a Reconciliation Statement:

	Rs.
Profit as per cost accounts	1,45,500
Works overheads under-recovered	9,500
Administrative overheads under-recovered	22,750
Selling overheads over-recovered	19,500
Overvaluation of opening stock in cost accounts	15,000
Overvaluation of closing stock in cost accounts	7,500
Interest earned during the year	3,750
Rent received during the year	27,000
Bad debts written off during the year	9,000
Preliminary expenses written off during the year	18,000

(I.C.W.A. Inter June 1998, B. Com. (Hons) Delhi, 2006)

Solution:**Reconciliation Statement**

	Rs. (+)	Rs. (-)
Profit as per Cost Accounts	1,45,500	
<i>Add:</i> Over-recovery of Selling Overheads in Cost Account	19,500	
Over-valuation of Opening Stock in Cost A/cs	15,000	
Income excluded from Cost Accounts:		
Interest earned	3,750	
Rent received	27,000	
<i>Less:</i> Under-recovery of Works Overhead in Cost A/cs		9,500
Under-recovery of Administration Overhead in Cost A/cs		22,750
Over-valuation of Closing Stock in Cost A/cs		7,500
Expenses excluded from Cost Accounts:		
Bad Debts		9,000
Preliminary Expenses		18,000
	2,10,750	66,750
Profit as per Financial Accounts	1,44,000	

Example 15.10

The following information is available from the financial books of a company having a normal production capacity of 60,000 units for the year ended 31st March, 2005.

- (i) Sales Rs. 10,00,000 (50,000 units).
- (ii) There was no opening and closing stock of finished units.
- (iii) Direct material and direct wages cost were Rs. 5,00,000 and Rs. 2,50,000 respectively.
- (iv) Actual factory expenses were Rs. 1,50,000 of which 60% are fixed.
- (v) Actual administrative expenses were Rs. 45,000 which are completely fixed.
- (vi) Actual selling and distribution expenses were Rs. 30,000 of which 40% are fixed.
- (vii) Interest and dividends received Rs. 15,000.

You are required to:

- (a) Find out profit as per financial books for the year ended 31st March, 2005;
- (b) Prepare the cost sheet and ascertain the profit as per cost accounts for the year ended 31st March, 2005 assuming that the indirect expenses are absorbed on the basis of normal production capacity; and
- (c) Prepare a statement reconciling profits shown by financial and cost books.

(B. Com. (Hons) Delhi, 2006) C.A. Inter May 2005)

Solution:

(a)

**Computation of Profit as per Financial Books
Profit and Loss Account
(for the year ended 31st March, 2005)**

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Direct Material	5,00,000	By Sales (50000 units)	10,00,000
To Direct Wages	2,50,000	By Interest and Dividends	15,000
To Factory Expenses	1,50,000		
To Administrative Expenses	45,000		
To Selling and Distribution Expenses	30,000		
To Profit	40,000		
	10,15,000		10,15,000

(b) Cost Sheet (for the year ended 31st March, 2005)

	Rs.	Rs.
Direct Material		5,00,000
Direct Wages		2,50,000
<i>Prime Cost</i>		7,50,000
Factory Overheads:		
Variable	60,000	
Fixed Rs. 90,000 × 5/6	75,000	1,35,000
<i>Works Cost</i>		8,85,000
Administrative Expenses Rs. 45,000 × 5/6		37,500
<i>Cost of Production</i>		9,22,500
Selling and Distribution Overheads:		
Variable	18,000	
Fixed Rs. 12,000 × 5/6	10,000	28,000
<i>Cost of Sales</i>		9,50,500
<i>Profit</i>		49,500
<i>Sales</i>		10,00,000

(c) Statement of Reconciliation
(Reconciling Profit shown by Financial and Cost Accounts)

	Rs. (+)	Rs. (-)
Profit as per cost Accounts	49,500	
<i>Add:</i> Income from Interest and Dividends excluded in Cost Accounts	15,000	
<i>Less:</i> Factory overheads undercharged in Cost Accounts		15,000
Administrative Overheads undercharged in Cost Accounts		7,500
Selling and Distribution Overheads undercharged in Cost Accounts (Rs. 30,000 – Rs. 28,000)		2,000
Profit as per Financial Accounts		40,000
	64,500	64,500

Example 15.11

The financial records of Modern Manufacturers Ltd. reveals the following for the year ended 30.6.2003:

	(Rs. in thousand)
Sales (20000 units)	4,000
Materials	1,600
Wages	800
Factory Overheads	720
Office and administrative overheads	416
Selling and distribution overheads	288
Finished goods (1230 units)	240
Work-in-progress: Materials	48
Labour	32
Overheads (factory)	32
Goodwill written off	320
Interest on capital	32

In the costing records, factory overhead is charged at 100% of wages, administration overhead at 10% of factory cost and selling and distribution overhead at the rate of Rs. 16 per unit sold.

Prepare a statement reconciling the profit as per cost records with the profit as per financial records of the company.

(ICWA, Inter)

Solution:

(a) Profit and Loss Account for the Year Ended 30th June, 2003 (Rs. '000)

To Materials	1,600	By Sales	4,000
To Wages	800	By Closing stock:	
To Factory overheads	720	Finished goods	240
To Office and administration overheads	416	Work-in-progress	211
To Selling and distribution overheads	288		
To Goodwill written off	320		
To Interest on capital	32		
To Net profit	176		
	<u>4,352</u>		<u>4,352</u>

(b) Profit as per Cost Account (Rs. '000)

Materials	1,600.00
Wages	800.00
Prime cost	2,400.00
Factory overhead (100% of wages)	800.00
Factory cost (gross)	3,200.00
Closing W.I.P.	112.00
Factory cost (net)	3,088.00
Office and administration overheads (10% of factory cost)	308.80
Total cost of production	3,396.80
Closing stock of finished goods	(196.80)
Cost of production of unit sold	3,200.00
Selling and distribution overhead (Rs. 16 × 20000)	320.00
Cost of sales	3,520.00
Profit (balancing figure)	480.00
Sales	4,000.00
Note: Value of closing stock of finished goods:	
Number of units sold	20,000
Closing stock of finished goods	1,230
Number of units produced	21,230
Total cost of production	3,396.80
Value of closing stock of finished goods	
Rs. $\frac{3396.80}{21,230} \times 1,230 = \text{Rs. } 196.80$	

(c) Statement Reconciling the Profit as per Cost Accounts with the Profit as per Financial Accounts

	Rs. '000	Rs. '000
Profit as per cost accounts		480.00
Over-absorbed overhead: Factory overhead (800 – 720)	80.00	
Selling and distribution overhead (320 – 288)	<u>32.00</u>	112.00
Over-valuation of closing stock in financial accounts (240.00 – 196.80)		43.20
Under-absorbed overhead: Office and administration (416.00 – 308.80)		(107.20)
Goodwill written off in financial accounts		(320.00)
Interest on capital in financial accounts		<u>(32.00)</u>
Profit as per Financial accounts		<u>176.00</u>

Example 15.12

M/s Modern Company Limited furnished the summary of the trading, and profit and loss account for the year ending 31st December, 2001.

	Rs.		Rs.
To Raw materials	1,39,600	By Sales (12000 units)	4,80,000
To Direct wages	76,200	By Finished stock (200 units)	8,000
To Production overheads	42,600		
To Selling and distribution overheads	42,700	By Work-in-progress:	
To Administration overheads	39,100	Materials	28,200
To Preliminary expenses: written off	2,200	Wages	11,796
To Goodwill-written off	2,501	Production overhead	<u>7,999</u>
To Dividend (net)	3,000		47,995
To Income tax	4,100	By Interest on securities (gross)	6,000
To Net profit	1,89,994		
	<u>5,41,995</u>		<u>5,41,995</u>

The company manufactures a standard unit. Scrutiny of cost records for the same period shows that:

- (i) Factory overheads have been allocated to the production at 20% on prime cost.
- (ii) Administration overheads have been charged at Rs. 3 per unit on units produced.
- (iii) Selling and distribution expenses have been charged at Rs. 4 per unit on units sold.

You are required to prepare a statement of cost and work out profit as per cost accounts and to reconcile the same with that shown in the financial accounts.

(CA Inter)

Solution:

**M/s Modern Company Limited
Statement of Cost and Profit
(for the year ending Dec. 31st, 2001)**

	Rs.
Materials consumed	1,39,600
Direct wages	<u>76,200</u>
Prime cost	2,15,800

(Contd.)

Factory overheads @ 20% of prime cost		43,160
		<u>2,58,960</u>
<i>Less:</i> Closing work-in-progress:		
Materials	Rs. 28,200	
Wages	11,796	
Production overheads	<u>7,999</u>	
		47,995
	Works cost	<u>2,10,965</u>
Administration overheads @ Rs. 3 per unit on 12200 units		36,600
Total cost of production		<u>2,47,565</u>
<i>Less:</i> Cost of finished goods stock (see Working Note 1)		4,058
Production cost of goods sold		<u>2,43,507</u>
Selling and distribution overheads @ Rs. 4 on 12000 units		48,000
Cost of sales		<u>2,91,507</u>
Profit as per cost accounts		1,88,493
Sales (12000) units @ Rs. 40 per unit		<u>4,80,000</u>

Working Notes:

- The total cost of production is Rs. 2,47,565. Of 12200 units, 200 units are in stock. Hence the stock of finished goods has to be valued at $\frac{\text{Rs. } 2,47,565 \times 200 \text{ units}}{12200 \text{ units}} = \text{Rs } 4,058$
- Administrative overheads are absorbed on the basis of units produced, hence they have been considered a part of the production cost.

**Statement Reconciling Profit as per Cost Accounts and
Profit as per Financial Account**

	Rs. (+)	Rs. (-)
Profit as per cost accounts	1,88,493	
<i>Less:</i> Admn. overheads under-absorbed		2,500
Preliminary expenses		2,200
Goodwill written off		2,501
Dividend		3,000
Tax		4,100
<i>Add:</i> Production overheads over-absorbed	560	
Selling overheads over-absorbed	5,300	
Interest on securities	6,000	
Closing stock over-valued in Financial accounts (at selling price instead of cost)	<u>3,942</u>	
	<u>2,04,295</u>	<u>14,301</u>
Profit as per financial accounts	<u>1,89,994</u>	

Example 15.13

The profit and loss account of Oil India (Pvt) Ltd. for the year ended 31st March, 2003, is as follows:

	Rs.		Rs.
To Materials	4,80,000	By Sales	9,60,000
To Wages	3,60,000	By Closing stock	1,80,000
To Direct expenses	2,40,000		
To Gross profit	1,20,000	By Work-in-progress:	
		Materials	30,000
		Wages	18,000
		Direct expenses	12,000
			60,000
	12,00,000		12,00,000
To Administration expenses	60,000	By Gross profit	1,20,000
To Net profit	60,000		
	1,20,000		1,20,000

As per the cost records the direct expenses have been estimated at a cost of Rs. 30 per kg and administration expenses at Rs. 15 per kg. The profit as per the costing records are Rs. 1,10,400. During the year 6,000 kg were manufactured and 4,800 kg were sold. Prepare a statement of costing profit and loss account and reconcile the profit with financial records.

(B.Com.(Hons) Delhi, 2007, 2001)

Solution:**Statement Showing Profit as per Cost Accounts**

	Rs.	Rs.
Material: Purchased	4,80,000	
Less: Material content in W.I.P.	30,000	
		4,50,000
Wages:	3,60,000	
Less: Wages content in W.I.P.	18,000	
		3,42,000
Direct expenses: @ Rs. 30 on 6,000 kg		1,80,000
Administration expenses: @ Rs. 15 on 6,000 kg		90,000
Cost of production of 6,000 kg		10,62,000
Less: Value of closing stock: $(6,000 - 4,800) \text{ kg} \times \frac{\text{Rs. } 10,62,000}{6,000}$		= (2,12,400)
Cost of goods sold		8,49,600
Profit (balancing figure)		1,10,400
Sales		9,60,000

Reconciliation Statement

		Rs.
Profit as per cost accounts		1,10,400
<i>Add:</i>	Over-absorption of administration overheads:	
	Amount absorbed in cost accounts	90,000
	Amount actually incurred as per profit and loss account	<u>(60,000)</u>
		30,000
		1,40,000
<i>Less:</i>	Under-absorption of direct expenses:	
	Amount as per profit and loss account	2,28,000
	Amount charged in cost accounts	<u>(1,80,000)</u>
		48,000
		92,400
<i>Less:</i>	Difference in valuation of closing stock:	
	Closing stock as per cost accounts	2,12,400
	Closing stock as per profit and loss account	<u>(1,80,000)</u>
		32,400
	Profit as per profit and loss account	<u>60,000</u>
<i>Notes:</i>	Expenses as per profit and loss account:	
	Expenses debited to profit and loss accounts	Rs. 2,40,000
<i>Less:</i>	Direct expenses content in closing W.I.P.	<u>12,000</u>
	Expenses as per profit and loss account	Rs. 2,28,000

Example 15.14

From the following Profit and Loss Account, draw up a Memorandum Reconciliation Account, showing the Profit as per cost accounts:

Profit & Loss Account (as at 31.12.2001)

		Rs.			Rs.
To	Office salaries	11,282	By	Gross profits	54,648
To	Office expenses	6,514	By	Dividend received	400
To	Salesmen's salaries	4,922	By	Interest on bank deposits	150
To	Sales expenses	9,304			
To	Distribution expenses	2,990			
To	Loss on sale of machinery	1,950			
To	Fines	200			
To	Discount on debentures	100			
To	Net Profit	17,936			
		<u>55,198</u>			<u>55,198</u>
To	Income Tax	8,000	Net Profit		17,936
To	Reserve	1,000			
To	Dividend	4,000			
To	Balance c/d	4,936			
		<u>17,936</u>			<u>17,936</u>

The cost accountant of the company has ascertained a profit of Rs. 19,936 as per his books.

(ICWA Inter)

Solution:**Memorandum Reconciliation Account**

	Rs.		Rs.
To Expenses not debited to Cost accounts:		By Profit as per cost accounts	19,636
Fines	200	By Income not credited to cost A/cs:	
Discount on debentures	100	Dividend received	400
Loss on sale of machinery	1,950	Interest on Bank Deposit	150
Income Tax	8,000		
Reserve	1,000		
Dividend	4,000		
Net profit as per financial A/c	4,936		
	20,186		20,186

Example 15.15

In reconciliation between Cost and Financial Accounts, one of the areas of differences is for different methods of stock valuation. State, with reasons, in each of the following circumstances whether Costing Profit will be higher or lower than the Financial Profit.

<i>Items of stock</i>	<i>Cost Valuation Rs.</i>	<i>Financial valuation Rs.</i>
Raw material (Opening)	50,000	60,000
Work-in-progress (Closing)	60,000	50,000
Finished stock (Closing)	50,000	60,000
Finished stock (Opening)	60,000	50,000

(B. Com. (Hons), Delhi 1998)

Solution:

In the reconciliation it does not matter in which form the stock is kept, that is, raw material, work-in-progress or finished stocks. The basic principle is that if the opening stock is larger, Profit is lower, whereas if the closing stock is larger, profit is higher and vice-versa. On the basis of this principle, the following conclusions on the four propositions can be drawn:

1. Raw Material (Opening) is lower in Cost Accounts, the Costing Profit will be higher by Rs. 10,000.
2. Work-in-progress (Closing) is higher in Cost Accounts, Costing Profit will be higher by Rs. 10,000.
3. Finished Stock (Closing) is lower in Cost Accounts, Costing Profit will be lower by Rs. 10,000.
4. Finished Stock (Opening) is higher by Rs. 10,000 in Cost Accounts, Costing Profit will, therefore, be lower by Rs. 10,000.

Example 15.16

The financial books of a company reveal the following data for the year ended 31st March, 2002:

Opening Stock:	Rs.
Finished goods 875 units	74,375
Work-in-process	32,000

612 Cost Accounting

1.4.01 to 31.3.02	
Raw materials consumed	7,80,000
Direct Labour	4,50,000
Factory overheads	3,00,000
Goodwill	1,00,000
Administration overheads	2,95,000
Dividend paid	85,000
Bad Debts	12,000
Selling and Distribution Overheads	61,000
Interest received	45,000
Rent received	18,000
Sales 14,500 units	20,80,000
Closing Stock: Finished goods 375 units	41,250
Work-in-process	38,667

The cost records provide as under:

- Factory overheads are absorbed at 60% of direct wages.
- Administration overheads are recovered at 20% of factory cost.
- Selling and distribution overheads are charged at Rs. 4 per unit sold.
- Opening Stock of finished goods is valued at Rs. 104 per unit.
- The company values work-in-progress at factory cost for both Financial and Cost Profit Reporting.

Required:

- (i) Prepare statements for the year ended 31st March, 2002 show
 - the profit as per financial records
 - the profit as per costing records.
- (ii) Present a statement reconciling the profit as per costing records with the profit as per Financial Records. *(CA, PE, Exam II, Group II, May 2002)*

Solution:

(i) **Statement of Profit as per financial records**
OR
Profit and Loss Account of the company
(for the year ended March 31, 2002)

	<i>Rs.</i>		<i>Rs.</i>
To Opening stock of Finished goods	74,375	By Sales	20,80,000
To Work-in-process	32,000	By Closing stock of finished goods	41,250
To Raw materials consumed	7,80,000	By Work-in-Process	38,667
To Direct labour	4,50,000	By Rent received	18,000
To Factory overheads	3,00,000	By Interest received	45,000
To Goodwill	1,00,000		
To Administration overhead	2,95,000		
To Selling and distribution overheads	61,000		
To Dividend paid	85,000		
To Bad debts	12,000		
To Profit	33,542		
	22,22,197		22,22,917

Statement of Profit as per costing records

(for the year ended March 31, 2002)

	Rs.
Sales revenue (A) (14,500 units)	20,80,000
Cost of sales:	
Opening stock (875 units × Rs. 104)	91,000
Add: Cost of production of 14,000 units (Refer to Working Note 2)	17,92,000
Less: Closing stock	48,000
$\left(\frac{\text{Rs. } 17,92,000 \times 375 \text{ units}}{14,000 \text{ units}} \right)$	
Production cost of goods sold (14,500 units)	18,35,000
Selling and distribution overheads (14500 units × Rs. 4)	58,000
Cost of sales: (B)	18,93,000
Profit: {(A) – (B)}	1,87,000

(ii)

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	Rs.	Rs.
Profit as per Cost Accounts		1,87,000
Add: Administration overheads over absorbed (Rs. 2,98,667 – Rs. 2,95,000)	3,667	
Opening stock overvalued (Rs. 91,000 – Rs. 74,375)	16,625	
Interest received	45,000	
Rent received	18,000	
		83,292
		2,70,292
Less: Factory overheads under recovery (Rs. 3,00,000 – Rs. 2,70,000)	30,000	
Selling and distribution overheads under recovery (Rs. 61,000 – Rs. 58,000)	3,000	
Closing stock overvalued (Rs. 48,000 – Rs. 41,250)	6,750	
Goodwill	1,00,000	
Dividend	85,000	
Bad debts	12,000	
		2,36,750
Profit as per financial accounts		33,542

Working Notes:

1. Number of units produced

	Units
Sales	14500
Add: Closing stock	375
Total	14875
Less: Opening stock	875
Number of unit produced	14000

2. Cost Sheet

	Rs.
Raw materials consumed	7,80,000
Direct labour	4,50,000
Prime cost	12,30,000
Factory overheads (60% of direct wages)	2,70,000
Factory cost	15,00,000
Add: Opening work-in-process	32,000
Less: Closing work-in-process	(38,667)
Factory cost of goods produced	14,93,333
Administration overheads (20% of factory cost)	2,98,667
Cost of production of 14000 units (Refer to Working Note 1)	17,92,000
Cost of production per unit:	

$$= \frac{\text{Total Cost of Production}}{\text{No. of Units Produced}} = \frac{\text{Rs. 17,92,000}}{14000 \text{ Units}} = \text{Rs. 128}$$

Example 15.17

A manufacturing company disclosed a net loss of Rs. 3,47,000 as per their cost accounts for the year ended March 31, 2003. The financial accounts however disclosed a net loss of Rs. 5,10,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	Rs.
(i) Factory Overheads under-absorbed	40,000
(ii) Administration Overheads over-absorbed	60,000
(iii) Depreciation charged in Financial Accounts	3,25,000
(iv) Depreciation charged in Cost Accounts	2,75,000
(v) Interest on investments not included in Cost Accounts	96,000
(vi) Income-tax provided	54,000
(vii) Interest on loan funds in Financial Accounts	2,45,000
(viii) Transfer fees (credit in financial books)	24,000
(ix) Stores adjustment (credit in financial books)	14,000
(x) Dividend received	32,000

Prepare a memorandum Reconciliation Account

(CA, PE, Exam II, Group II, May 2003)

Solution:

Memorandum Reconciliation Accounts

Dr.	Rs.	Cr.	Rs.
To Net Loss as per Costing books	3,47,000	By Administration overhead over recovered in cost accounts	60,000
To Factory overheads under absorbed in Cost Accounts	40,000	By Interest on investment not included in Cost Accounts	96,000
To Depreciation under charged in Cost Accounts	50,000	By Transfer fees in Financial books	24,000

(Contd.)

To Income-Tax not provided in Cost Accounts	54,000	By Stores adjustment (Credit in financial books)	14,000
To Interest on Loan Funds in Financial Accounts	2,45,000	By Dividend received in financial books	32,000
	<u>7,36,000</u>	By Net loss as per Financial books	<u>5,10,000</u>
			<u>7,36,000</u>

Example 15.18

ABC Ltd. has furnished the following information from the financial books for the year ended 31st March, 2007:

Profit and Loss Account			
		Rs.	Rs.
To	Opening stock (500 units at Rs. 140 each)	70,000	
	Material consumed	10,40,000	
	Wages	6,00,000	
	Gross profit c/d	12,10,000	
		<u>29,20,000</u>	
			<u>29,20,000</u>
To	Factory overheads	3,79,000	By Sales (10250 units)
	Administration overheads	4,24,000	By Closing stock (250 units at Rs. 200 each)
	Selling expenses	2,20,000	
	Bad debts	16,000	
	Preliminary expenses	20,000	
	Net profit	<u>1,92,000</u>	By Gross profit b/d
		<u>12,51,000</u>	Interest
			Rent received
			1,000
			<u>40,000</u>
			<u>12,51,000</u>

The cost sheet shows the cost of materials at Rs. 104 per unit and the labour cost at Rs. 60 per unit. The factory overheads are absorbed at 60% of labour cost and administration overheads at 20% of factory cost. Selling expenses are charged at Rs. 24 per unit. The opening stock of finished good is valued at Rs. 180 per unit.

You are required to prepare:

- A statement showing profit as per Cost accounts for the year ended 31st March, 2007; and
- A statement showing the reconciliation of profit as disclosed in Cost accounts with the profit shown in Financial accounts. *(CA, PE, Exam II, Group II, May 2007)*

Solution:
(a) (i) Statement of Profit as per Cost Accounts

	Units	Rs.
Opening stock @ Rs. 180 per unit	500	90,000
Cost of production @ Rs. 240 per unit (Refer Working Note 1)	10,000	24,00,000
Total	10,500	24,90,000
Less: Closing stock @ Rs. 240 per unit	- 250	- 60,000
	10,250	24,30,000
Selling expenses @ Rs. 24 per unit		2,46,000
Cost of sales		26,76,000
Profit		<u>1,94,000</u>
Sales	10,250	<u>28,70,000</u>

Working Notes:**(i) Statement of Cost (10000 units)**

	<i>Total cost</i> Rs.	<i>Cost per unit</i> Rs.
Materials	10,40,000	104.00
Wages	6,00,000	60.00
Factory Overheads 60% of wages	<u>3,60,000</u>	<u>36.00</u>
Factory cost	20,00,000	200.00
Administration overhead 20% of factory cost	<u>4,00,000</u>	<u>40.00</u>
Total cost	24,00,000	240.00

(ii) Statement of differences between the two set of accounts

	<i>Financial A/c</i> Rs.	<i>Cost A/c</i> Rs.	<i>Difference</i> Rs.	<i>Remarks</i>
Factory overhead	3,79,000	3,60,000	19,000	Under recovery
Administrative overhead	4,24,000	4,00,000	24,000	Under recovery
Selling expenses	2,20,000	2,46,000	26,000	Over recovery
Opening stock	70,000	90,000	20,000	Over recovery
Closing stock	50,000	60,000	10,000	Over recovery

(iii) Reconciliation Statement

	Rs.
Profit as per cost accounts	1,94,000
<i>Less:</i> Under recovery of Overhead in Cost A/c	
Factory Overhead	19,000
Administrative Overhead	<u>24,000</u>
<i>Add:</i> Over-recovery of selling overhead in Cost A/c	+ 26,000
<i>Add:</i> Over-valuation of opening stock in Cost A/c	+ 20,000
<i>Less:</i> Over-valuation of closing stock in Cost A/c	- 10,000
<i>Add:</i> Income excluded from Cost A/c	
Interest	1,000
Rent	<u>40,000</u>
	+ 41,000
<i>Less:</i> Expenses excluded from Cost A/c	
Bad debts	16,000
Preliminary expenses	<u>20,000</u>
	- 36,000
Profit as per financial account	<u>1,92,000</u>

Example 15.19

The following figures have been taken from the financial accounts of a manufacturing firm for the year of its operation:

Direct material consumption	Rs. 50,00,000
Direct wages	30,00,000
	(Contd.)

Factory overheads	16,00,000
Administrative overheads	7,00,000
Selling and distribution overheads	9,60,000
Bad debts	80,000
Preliminary expenses written off	40,000
Legal charges	10,000
Dividends received	1,00,000
Interest on deposit received	20,000
Sales—120000 units	1,20,00,000
Closing Stock:	
Finished stock—4000 units	3,20,000
Work-in-progress	2,40,000

The Cost Accounts for the same period reveal that the Direct Material consumption was Rs. 56,00,000; Factory Overhead is recovered at 20% on Prime Cost; Administration Overhead is recovered @ Rs. 6 per unit of production; and Selling and Distribution Overheads are recovered at Rs. 8 per unit sold.

You are required to prepare, Costing and Financial Profit & Loss Accounts and reconcile the difference in the profit as arrived at in the two sets of accounts by preparing a Reconciliation Statement.

(B. Com. (Hons) Delhi, CA Inter)

Solution:

Costing Profit and Loss Account

	Rs.		Rs.
To Direct material consumed	56,00,000	By Sales	1,20,00,000
To Direct wages	30,00,000		
Prime Cost	86,00,000		
To Factory overheads (20% on prime cost)	17,20,000		
	1,03,20,000		
Less: Work-in-Progress	2,40,000		
Works cost	1,00,80,000		
To Administrative overheads (Rs. 6 per unit produced)	7,44,000		
Cost of production (124000 units)	1,08,24,000		
Less: Closing stock (4000 units)	3,49,161		
Cost of production of goods sold	1,04,74,839		
To Selling & distribution overheads (8 × 1,20,000)	9,60,000		
To Net Profit	5,65,161		
	1,20,00,000		1,20,00,000

Financial Profit and Loss Account

	Rs.		Rs.
To Direct materials consumed	50,00,000	By Sales	1,20,00,000
To Direct wages	30,00,000	By Dividends	1,00,000
To Factory overheads	16,00,000	By Interest on deposits	20,000
To Admn. overheads	7,00,000	By Closing Stock:	
To Selling & distribution	9,60,000	Finished stock	3,20,000
To Bad debts	80,000	Work-in-progress	2,40,000
To Pre. expenses	40,000		
To Legal charges	10,000		
To Net profit	12,90,000		
	1,26,80,000		1,26,80,000

Reconciliation Statement

	Rs. (+)		Rs. (-)
Profit as shown by financial books	12,90,000		
<i>Less:</i> Direct Materials overcharged in costs			6,00,000
Factory overheads over-absorbed in costs			1,20,000
Administrative overheads undercharged in cost			44,000
<i>Add:</i> Closing stock of finished goods overvalued in costs	29,161		
Bad debts not recovered in costs	80,000		
Preliminary expenses not charged in costs	40,000		
Legal charges not charged in cost	10,000		
<i>Less:</i> Dividends not included in costs			1,00,000
Interest on deposits not included in costs			20,000
	14,49,161		8,84,000
Profit as per Cost Accounts			5,65,161
	14,49,161		14,49,161

Example 15.20

The Cost Accountant of a company has arrived at a profit of Rs. 73,24,150 based on cost accounting records for the Year ended 31.3.2007. As Cost Auditor, you find the following differences between the financial accounts and cost accounts (figures are in Rupees):

- | | | |
|-----------------------------------------------------------------------------|-------------|-----------|
| (a) Decrease in value of WIP and finished goods inventory | | |
| as per F/A | 1,28,21,995 | |
| as per cost account | 1,31,04,220 | Rs. |
| (b) Profit on sale of fixed assets | | 61,500 |
| (c) Loss on sale of investments | | 11,200 |
| (d) Voluntary retirement compensation included in salaries and wages in F/A | | 16,75,000 |
| (e) Donation paid | | 25,000 |

(f) Major repairs and maintenance written off in F/A (Amount reckoned in Cost Accounts Rs. 6,08,420 for this job)	13,26,000
(g) Insurance claim relating to previous year received during the year	14,29,000
(h) Profit from retail trading activity	7,12,300

You are required to prepare a reconciliation statement between the profit figures as per costing and financial accounts. (Calculate the profit as per financial books) (CA, Inter)

Solution:

Reconciliation of profit between Cost Accounts and Financial Accounts for the year ended 31.3.2007

	Rs.	Rs.
Profit as per Cost Accounts		73,24,150
<i>Add:</i> (a) Difference in valuation of stock:		
Decrease in inventory as per Cost Accounts	Rs. 1,31,04,220	
Decrease in inventory as per Financial Accounts	Rs. 1,28,21,995	
Hence, valuation in Financial Books is higher by	2,82,225	
(b) Profit on sales of assets not included in Cost Accounts	61,500	
(c) Receipts of Insurance claim relating to previous year	14,29,000	
(d) Profit from trading activity	7,12,300	<u>24,85,025</u>
		<u>98,09,175</u>
<i>Less:</i> (a) Loss on sale of investments	11,200	
(b) Voluntary retirement compensation not included in cost	16,75,000	
(c) Donation paid	25,000	
(d) Part of repairs and maintenance costs excluded in Cost Accounts (13,26,000 – 6,08,420)	7,17,580	<u>24,28,780</u>
Profit as per Financial Accounts		<u>73,80,395</u>

THEORY QUESTIONS

1. Explain the need for reconciliation of cost and financial accounts. (ICWA)
2. It has been stated that the results worked out from the costing records and those worked out from the financial accounts may not necessarily agree. Why? (B. Com. Delhi)
3. Give reasons as to why it is necessary to reconcile cost accounts and financial accounts. What is the accounting procedure to be adopted for their reconciliation? (C A, PE, Exam II, Group II, Nov. 2002, May 2004)(CA Inter)
4. Indicate the reasons why it is necessary for the cost and financial accounts of an organisation to be reconciled and explain the main sources of difference which would enter into such a reconciliation.
5. Discuss the main sources of difference between profit shown by financial accounts and profit shown by cost accounts. (B. Com. (Hons), Delhi)
6. Describe in brief the conditions which necessitate reconciliation of financial and cost records. (B. Com. (Hons), Delhi)
7. What is a reconciliation statement?. Give reasons for the difference in profit as per cost accounts and financial accounts.

(B. Com. (Hons), Delhi, 2004, 2007, B. Com. Delhi, 2004)

PROBLEMS

1. The following transactions have been extracted from the financial books of a company:

	<i>Rs.</i>	<i>Units</i>
Sales	2,50,000	20000
Materials	1,00,000	
Wages	50,000	
Factory overheads	45,000	
Office and administration overheads	26,000	
Selling and distribution overheads	18,000	
Closing stock;		
Finished goods	15,000	1230
Work-in-progress:		
Materials	3,000	
Wages	2,000	
Factory overheads	2,000	
	7,000	
Goodwill written off	20,000	
Interest on capital	2,000	

In costing books factory overhead is charged at 100% on wages, administration overhead at 10% of factory cost and selling and distribution at the rate of Re 1 per unit sold. Prepare a statement reconciling the profit as per cost and financial accounts.

(B. Com. (Hons). Delhi)

Ans: Profit as per cost accounts Rs. 30,000
Profit as per financial accounts Rs. 11,000

2. The following figure are available from financial accounts for the year ending 31st March, 2002:

	<i>Rs.</i>
Direct material consumption	2,50,000
Direct wages	1,00,000
Factory overheads	3,80,000
Administration overheads	2,50,000
Selling and distribution overheads	4,80,000
Bad debts	20,000
Preliminary expenses (written off)	10,000
Legal charges	5,000
Dividend received	50,000
Interest on deposit received	10,000
Sales 1,20,000 units	7,00,000
Closing stock:	
Finished stock = 40,000 units	1,20,000
Work-in-progress	80,000

The cost accounts reveal:

Direct material consumption—Rs. 2,80,000

Factory overhead recovered at 20% on prime cost.

Administration overhead at Rs. 3 per unit of production.

Selling and distribution overhead at Rs 4 per unit sold.

Prepare:

1. Costing profit and loss account.
2. Financial profit and loss account.
3. Statement reconciling the profits disclosed by the costing profit and loss account and financial profit and loss account.

(CA Inter)

Ans: Loss as per cost A/c Rs. 4,22,000

Loss as per financial books Rs. 5,35,000

3. During the year a company's profits have been estimated from the costing system to be Rs. 46,126, whereas the financial accounts audited by the auditors disclose a profit of Rs. 33,248. Given the following information, you are required to prepare a reconciliation statement showing clearly the reasons for the difference:

To Opening Stock	Rs. 4,94,358		By Sales	Rs. 6,93,000
To Purchases	1,64,308			
	<u>6,58,666</u>			
Less: Closing Stock	1,50,242	5,08,424		
To Direct Wages		46,266		
To Factory Overhead		41,652		
To Gross Profit c/d		<u>96,658</u>		
		6,93,000		<u>6,93,000</u>
To Administration Expenses		19,690	By Gross Profit b/d	99,658
To Selling Expenses		44,352	By Sundry Income	632
To Net Profit		<u>33,248</u>		
		97,290		<u>97,290</u>

- (a) Stock ledger closing balance is Rs. 1,56,394;
 - (b) Credit balance in wages control account is Rs. 49,734;
 - (c) Credit balance in factory overhead control account is Rs. 39,428;
 - (d) Administration expenses are charged to sales at 3% of selling price in cost accounts;
 - (e) Selling price includes 5% (on sales) provision for selling expenses;
 - (f) Sundry incomes is not considered in cost accounts.
4. From the information given below, prepare (i) a statement showing costing profit and loss and (ii) another statement reconciling the costing profits with those shown by financial accounts:

Profit and Loss A/c for the Year Ending 31st March, 2007

	Rs.		Rs.
To Materials consumed	1,05,000	By Sales (1,50,000 units)	2,00,000
To Direct wages	45,000		
To Indirect factory expenses	30,000		
To Office expenses	9,000		
To Selling and distribution expenses	6,000		
To Net profit	<u>5,000</u>		
	2,00,000		<u>2,00,000</u>

The normal output of the factory is 1,00,000 units. Factory expenses of a fixed nature are Rs. 18,000. Office expenses are for all practical purposes constant. Selling and distribution expenses are constant to the extent of Rs. 3,000 and the balance varies with sales.

(B. Com. (Hons), Delhi)

Ans: Loss as per cost accounts, Rs. 10,000

622 Cost Accounting

5. The profit as per cost accounts is Rs. 1,65,300. The following details are ascertained on comparison of the Cost and Financial Accounts.

	<i>Cost accounts</i> Rs.	<i>Financial accounts</i> Rs.
(a) Opening Stocks:		
Materials	32,600	33,000
Work-in-progress	20,000	21,000
(b) Closing Stocks:		
Materials	36,000	34,400
Work-in-progress	16,000	15,200
Finished Goods	8,000	9,000
(c) Directors' fees paid Rs. 1,000, interest paid Rs. 800; reserve for bad debts Rs. 500, transfer fees collected Rs. 300, and dividends received Rs. 200 are exclusively taken in Financial Accounts, but ignored in Cost Accounts.		
(d) Rent charged in costing but not in Financial Accounts Rs. 6,000.		
(e) Preliminary expenses written off Rs. 13,000, but not charged in costing.		
(f) Overheads charged in Financial Books Rs. 1,21,200, but recovered in costing Rs. 1,26,200.		

Find out profit as per Financial Accounts and draw up a Reconciliation Statement.

Ans: Profit as per financial accounts, Rs. 1,58,700

6. A Company's trading, and profit and loss account was as follows:

Dr.		Cr.
To Purchase	25,210	By Sales: 50000 units
Less: Closing stock	4,080	@ Rs. 1.50 each
	<u>21,130</u>	75,000
To Direct wages	10,500	By Discount received
To Work expenses	12,130	By profit on sale of land
To Selling expenses	7,100	260
To Administration expenses	5,340	2,340
To Depreciation	1,100	
To Net profit	20,300	
	<u>77,600</u>	<u>77,600</u>

The profit as per cost accounts was only Rs. 19,770. Reconcile the financial and cost profits using the following information:

- Cost accounts valued closing stock at Rs. 4,280.
- The work expenses in the cost accounts were taken at 100% of direct wages.
- Selling and administration expenses were charged in the cost accounts at 10% of sales and Re. 0.10 per unit respectively.
- Depreciation in the cost accounts was Rs. 800.

(CA Inter)

7. The following is the trading, and profit and loss account of M/s Time and Tide Limited for the year ending 31st December, 2001.

	Rs.		Rs.
To Materials consumed	7,08,000	By Sales 30,000 units	15,00,000
To Direct wages	3,71,000	By Finished stock	
To Works overheads	2,13,000	1000 units	40,000
To Administration overheads	95,500	By Work-in-progress:	
To Selling and distribution overheads	1,13,500	Material	17,000
To Net profit for the year	69,000	Wages	8,000
	<u>15,70,000</u>	Works overhead	5,000
			<u>30,000</u>
			<u>15,70,000</u>

In manufacturing a standard unit, the company's cost records show that:

- (i) Work overhead have been charged to work-in-progress at 20% on prime cost.
- (ii) Administration overheads have been recovered as Rs. 3 per finished unit.
- (iii) Selling and distribution overheads have been recovered as Rs. 4 per unit sold.
- (iv) The under-absorbed or over-absorbed overheads have not been adjusted into the costing P & L A/c.

Prepare:

- (i) A costing profit and loss account indicating net profit.
- (ii) A statement reconciling the profit as disclosed by the cost accounts and that shown in the financial accounts.

(B. Com. Delhi)

Ans: Profit as per cost account .Rs. 66,000

8. From the accounts of M/s Shankar & Co. Ltd. the trading, and profit and loss accounts are reproduced below:

	Rs.		Rs.
To Raw materials:		By Work-in-progress:	
Opening stock	29,500	Materials	4,000
Purchase	1,86,500	Wages	5,500
To Wages	2,98,000	Work expenses	3,300
To Work expenses	1,90,750	By Cost of goods manufactured	6,59,950
	7,04,750	By Closing stock of raw materials	32,000
			7,04,750
To Cost of goods sold	6,59,950	By Sales (7600 units)	9,12,000
To Administrative expenses	1,22,500	By Finished stock (1400 units)	1,17,600
		By Interest on investment	6,800
To Selling and distribution expenses	1,64,000		
To Bad debts written off	17,500		
To Net profit transferred to appropriation A/c	72,450		
	10,36,400		10,36,400

The following information is also available:

1. Accrued wages of Rs. 17,000 included in wages.
2. Works expenses are allocated to production at 60 per cent of direct labour cost.
3. Administrative expenses are allocated at Rs. 12 per unit of production.
4. Selling and distribution expenses are allocated so as to work out 20% of selling price.

Prepare the costing profit and loss account and statement of reconciliation between the two accounts (cost and financial).

(B. Com. (Hons), Delhi, 2004)

Ans: Profit as per cost account Rs. 91,200

COST ANALYSIS FOR DECISION MAKING AND CONTROL

Part 4 explains the procedure of making cost analysis for managerial decision making, control and planning. Managers need to understand behavior of costs for better planning, effective control and sound decision making. The topics covered in this part are variable costing, alternative choices decisions, pricing decisions, standard costing, budgeting, responsibility accounting and divisional performance measurement.

16. MARGINAL (VARIABLE) COSTING
17. ALTERNATIVE CHOICES DECISIONS
18. PRICING DECISIONS
19. STANDARD COSTING
20. BUDGETING
21. RESPONSIBILITY ACCOUNTING AND DIVISIONAL PERFORMANCE MEASUREMENT

MARGINAL (VARIABLE) COSTING

Learning Objectives

After reading this chapter, you should be able to:

1. explain concepts of marginal cost, marginal and absorption costing;
2. distinguish between absorption costing and marginal costing, advantages and limitations of marginal costing;
3. describe the preparation of income statement under absorption costing and marginal costing;
4. discuss methods of determining cost behaviour, cost-volume-profit (CVP) analysis and its limitations, curvilinear break-even analysis and
5. understand cost indifference point.

CONCEPT OF MARGINAL COST, MARGINAL COSTING

Marginal cost, in cost accounting, means variable production costs, that is, the costs which tend to vary in direct proportion to the changes in the production level. If an extra unit of output is produced, the costs which could be incurred for producing this extra unit, will only be marginal (variable) costs since fixed costs remain constant.

Marginal costing is a costing technique in which only variable manufacturing costs are considered and used while valuing inventories and determining cost of goods sold. That is, only variable manufacturing costs are considered product costs and are allocated to products manufactured. These costs include direct materials, direct labour and variable factory overhead. Fixed factory (manufacturing) overheads are not considered product costs and are not used to value inventories and determine the cost of goods sold and are excluded from the cost of product. Fixed manufacturing costs are treated as period costs in marginal costing, that is, costs which are a function of a time rather than of production. In marginal costing, fixed manufacturing overheads are written off to the profit and loss account in the period in which they are incurred.

Absorption Costing

Absorption costing, also known as full costing, is a costing technique in which all manufacturing costs, variable and fixed, are considered as costs of production and are used in determining the cost of goods manufactured and inventories. All manufacturing costs are fully absorbed into finished goods.

DIFFERENCE BETWEEN MARGINAL COSTING AND ABSORPTION COSTING

Marginal costing and absorption costing differ from each other in the following respects:

1. *Cost element in product cost* Marginal costing and absorption costing differ only in the treatment of fixed factory (manufacturing) overheads in the accounting records and financial statement. In both the costing techniques it is agreed that selling and administrative expenses, whether variable or fixed, are period costs and these costs are not treated as product costs with the result that selling and administrative expenses are not included in the costs of inventories, and costs of goods sold. Similarly, it is also agreed that variable manufacturing costs are products costs, i.e., costs to be charged to the product. The disagreement between the two, is only in regard to the treatment of fixed manufacturing costs.
2. *Inventory values* Marginal costing and absorption costing do influence inventory values differently. The value of inventories under marginal costing is relatively at a lower figure as inventories are determined in terms of only variable production costs. In absorption costing, the value of inventories is comparatively at a higher figure because it considers fixed factory overhead also besides the variable production costs.
3. *Difference in net income* The treatment of fixed factory overhead brings differences in the net income figures in the two costing techniques. The magnitude of any difference in net income is a function of fixed manufacturing costs per unit and the change in inventory levels.

The question of difference in net income has been further explained in the following pages while discussing income statement under absorption costing and marginal costing.

INCOME STATEMENTS UNDER ABSORPTION COSTING AND MARGINAL COSTING

Income Statement under Absorption Costing

Under absorption costing all costs are divided into three categories: manufacturing, selling, and administrative costs. In the income statement, all manufacturing costs (variable and fixed) are subtracted from the sales revenue to get a gross margin/gross profit on sales: and selling and administrative expenses (fixed and variable) are deducted from gross margin to arrive at the net income.

It should be clearly understood that fixed manufacturing overhead are charged to units produced on the basis of per unit fixed manufacturing overhead rate obtained by dividing the standard fixed manufacturing overhead by normal output level as follows:

$$\frac{\text{Standard fixed manufacturing overhead}}{\text{Normal output (Capacity)}}$$

If production is above or below the normal or standard output, adjustments are made for volume (capacity) variances. If the volume (capacity) variance is favourable, i.e., over-absorption (actual production being higher than normal capacity production), the amount of over-absorption is deducted from the total cost of goods manufactured and sold. If the volume (capacity) variance is unfavourable, i.e., under-absorption (actual production being lesser than normal capacity production), the amount of under-absorption is added to the cost of goods manufactured and sold. A proforma of income statement prepared under absorption costing is given in Fig. 16.1.

Income Statement (Absorption Costing)

	<i>Amount</i> Rs.
Sales	_____
<i>Less:</i> Manufacturing costs:	
(1) Variable production costs:	
Direct material cost	_____
Direct labour cost	_____
Variable manufacturing overhead	_____
(2) Fixed factory (manufacturing) overhead	_____
Cost of goods manufactured	_____
<i>Add:</i> Beginning inventory	_____
Cost of goods available for sale	_____
<i>Less:</i> Closing inventory	_____
Cost of goods sold	_____
Over- or under-applied factory (manufacturing) overhead (Over-absorption to be deducted and under-absorption to be added)	_____
Cost of goods sold at actual	_____
Gross profit on sales	_____
<i>Less:</i> Fixed selling and administrative expenses	_____
Variable selling and administrative expenses	_____
Net Income	_____

Fig. 16.1 Income Statement Proforma (Absorption Costing)

Income Statement under Marginal Costing

Under marginal costing, only variable costs of production (direct material, direct labour and variable manufacturing) are subtracted from sales revenue to determine a balance which is known by different names, such as marginal contribution, marginal income (profit), marginal revenue, marginal balance, profit pick-up, etc. All fixed costs, and variable selling, distribution and administrative costs are deducted from this balance to arrive at the net income. Since fixed manufacturing costs are not charged to products under marginal costing, there can be no volume (capacity) variance. Marginal contribution/marginal income under marginal costing is greater than the gross profit/gross margin under absorption costing. Figure 16.2 depicts a proforma of income statement prepared under marginal costing.

Under marginal costing, fixed manufacturing overhead are excluded and therefore inventory values are lower than inventory value computed under absorption costing. Income may be higher or lower depending upon whether inventories are built up or liquidated. That is, the income statement under absorption costing may reflect higher profit if the production is more than the normal capacity production and also lower sales has been made. This happens because above normal capacity production has over-absorbed its actual fixed manufacturing overhead.

Absorption/full costing and marginal costing influence differently gross profit, net profit, and inventory values of different month/periods. The following data and income statement prepared under both costing techniques explain this situation.

Income Statement (Marginal Costing)

	Amount (Rs.)
Sales	_____
<i>Less:</i> Variable production costs:	
Direct material costs	_____
Direct labour cost	_____
Variable manufacturing (factory) overhead	_____
Cost of goods manufactured	_____
<i>Add:</i> Beginning inventory	_____
Cost of goods available for sale	_____
<i>Less:</i> Closing inventory	_____
Cost of goods sold	_____
Marginal contribution	_____
<i>Less:</i> Fixed manufacturing overhead	_____
Variable selling and administrative expenses	_____
Fixed selling and administrative expenses	_____
Net Income	_____

Fig. 16.2 Income Statement Proforma (Marginal Costing)

Data:

- Normal capacity 20,000 units per month
 Variable costs (direct materials, direct labour, variable factory overhead) per unit Rs. 6.
 Fixed factory overhead Rs. 25,000 per month or Rs. 1.25 per unit at normal capacity.
 Fixed selling and administrative expenses are Rs. 5,000 p.m.
 Variable selling and administrative expenses are Re. 1.00 per unit sold.
 Sales prices per unit is Rs. 10.
 Actual production, sales and inventories in units are:

	<i>First month</i>	<i>Second month</i>	<i>Third month</i>	<i>Fourth month</i>
Unit in beginning inventory	—	—	3,000	1,000
Units produced	17,500	21,000	19,000	20,000
Units sold	17,500	18,000	21,000	16,500
Units in closing inventory	—	3,000	1,000	4,500

Solution:

Income Statement (Absorption Costing)

	<i>First month</i>	<i>Second month</i>	<i>Third month</i>	<i>Fourth month</i>
Sales	Rs. 1,75,000	1,80,000	2,10,000	1,65,000
Variable cost per unit Rs. 6	1,05,000	1,26,000	1,14,000	1,20,000
Fixed factory overhead @ Rs. 1.25	21,875	26,250	23,750	25,000
Cost of goods manufactured	1,26,875	1,52,250	1,37,750	1,45,000

(Contd.)

<i>Add:</i> Beginning inventory	—	—	21,750	7,250
Cost of goods available for sales	1,26,875	1,52,250	1,59,500	1,52,250
<i>Less:</i> Ending inventory	—	21,750	7,250	32,625
Cost of goods sold	1,26,875	1,30,500	1,52,250	1,19,625
Over- or under-applied factory overhead	3,125	(1,250)	1,250	—
Cost of goods sold at actual	1,30,000	1,29,250	1,53,500	1,19,625
Gross profit on sales	45,000	50,750	56,500	45,375
Selling and administrative expenses (fixed and variable)	22,500	23,000	26,000	21,500
Net income for the month	22,500	27,750	30,500	23,875

Note: In absorption costing income statement, fixed factory expenses are included in the unit cost and also in the inventory values.

(i) Ending inventory: Second month $\frac{3,000}{21,000} \times 1,52,250 = \text{Rs. } 21,750$

Third month $\frac{1,000}{22,000} \times 1,59,500 = \text{Rs. } 7,250$

Fourth month $\frac{4,500}{21,000} \times 1,52,250 = \text{Rs. } 32,625$

- (ii) In first month, Rs. 3,125 is under-absorbed factory overhead due to production less than normal capacity and should be added to the cost of goods sold.
 (iii) In the second month, Rs. 1,250 is over-absorbed due to higher production and has, therefore been subtracted.
 (iv) In the third month, Rs. 1,250 is under-absorbed and has been added back to cost of goods sold.
 (v) In the fourth month, production is at normal capacity and there is no under- or over-absorption.

Income Statement (Marginal Costing)

	<i>First month</i>	<i>Second month</i>	<i>Third month</i>	<i>Fourth month</i>
Sales (Rs.)	1,75,000	1,80,000	2,10,000	1,65,000
Variable production cost:				
Variable manufacturing costs Rs. 6 per unit	1,05,000	1,26,000	1,14,000	1,20,000
Cost of goods manufactured	1,05,000	1,26,000	1,14,000	1,20,000
<i>Add:</i> Beginning inventory	—	—	18,000	6,000
Cost of goods available for sale	1,05,000	1,26,000	1,32,000	1,26,000
<i>Less:</i> Closing inventory	—	18,000	6,000	27,000
Cost of goods sold	1,05,000	1,08,000	1,26,000	99,000
Contribution	70,000	72,000	84,000	66,000
<i>Less:</i> Fixed factory overhead	25,000	25,000	25,000	25,000

(Contd.)

Fixed selling and administrative expenses	5,000	5,000	5,000	5,000
Variable selling and administrative expenses	17,500	18,000	21,000	16,500
Total fixed costs and non-manufacturing variable costs	47,500	48,000	51,000	46,500
Net income for the month	22,500	24,000	33,000	19,500

Note: Under marginal costing, fixed factory (manufacturing) overhead costs are not included in the product unit costs and costs of inventories.

(i) Valuation of closing inventory

$$\text{Second month} = 3,000 \times \text{Rs. } 6 = \text{Rs. } 18,000$$

$$\text{Third month} = 1,000 \times \text{Rs. } 6 = \text{Rs. } 6,000$$

$$\text{Fourth month} = 4,500 \times \text{Rs. } 6 = \text{Rs. } 27,000$$

(ii) The question of under- or over-absorption of factory overhead does not arise under marginal costing.

A comparison of the income statements leads to the following conclusions:

- Under variable costing, the closing inventory is costed at a smaller figure because only variable production costs are charged to the product.
- Both costing methods report the same amount of profit in periods in which production and sales are equal and there is no inventory change (first month). This is because the amount of fixed factory overhead costs charged to the period was the same in each case. Under marginal costing Rs. 25,000 was deducted from sales as period costs. Under absorption costing Rs. 25,000 was charged to the sales in two parts; (a) Rs. 21,875 as part of the cost of sales (17,500 units \times Rs. 1.25); and (b) Rs. 3,125 as unfavourable volume (capacity) variance.
- When inventory of manufactured goods fluctuates from period to period, net income will differ somewhat under the two methods because absorption costing requires that part of the period costs be included in inventory, whereas marginal costing excludes period costs. Therefore:
 - When production exceeds sales (the inventory is increased), the net income reported under absorption costing is higher than that reported under variable costing. This follows because under absorption costing, a portion of the fixed costs budgeted for the period is shifted to the following period in the closing inventories whereas under marginal costing the total fixed costs are charged against income. This is clear from comparing the net income of the second and fourth month.
 - When sale exceeds production (the inventories are decreased), marginal costing shows a higher profit because only current period costs are being charged against current revenues, whereas under absorption costing the period costs previously included in inventory are now being charged against current revenues. This situation is illustrated by the income of the third month.
- Under marginal costing profits always move in the same direction as sales volume. They cannot, of course, increase or decrease in direct proportion because unit fixed costs do not remain constant. Profit reported under absorption costing behave irregularly and sometimes in the opposite direction from sales. For example, sales of the fourth month are lower than the sales of the first month, yet the net income reported for the fourth month is higher than the net income for the first month.
- The above income statements are prepared on the assumption that selling prices remained constant and that there were no changes in either the manufacturing costs or the selling and administrative expenses. Further, it has been assumed that overheads costs are absorbed at predetermined rates based on normal capacity.

6. The aggregate net income (of different months or periods taken together) will be the same under both costing methods provided production and sales, in total, are equal. In the above example, total production are 77500 units and total sales are 73000 units. Since production and sales are unequal, the combined net income is not the same.

Reconciliation of Net Income

The differences in the net income between absorption costing and marginal costing are due to: (i) amount of fixed factory overhead charged to inventory, (ii) Over- or under-absorbed fixed factory overhead having been deferred in absorption costing. The entire difference in net income can be explained by the amount of fixed factory overhead that is included in the beginning and closing inventories.

Reconciliation of Differences between Absorption and Marginal Costing Income

	<i>Second month (Rs.)</i>	<i>Third month (Rs.)</i>	<i>Fourth month (Rs.)</i>
Marginal costing income	24,000	33,000	19,500
Absorption costing income	27,750	30,500	23,875
Difference to be explained	(3,750)	2,500	(4,375)
I. Differences in the value of opening and closing inventories:			
(a) Second month:			
Opening	0	—	—
Closing 18,000–21,750	(3,750)	—	—
(b) Third month:			
Opening 18,000–21,750	—	3,750	—
Closing 6,000–7,250	—	(1,250)	—
(c) Fourth month:			
Opening 6,000–7,250	—	—	(1,250)
Closing 27,000–32,625	—	—	(5,625)
	(3,750)	2,500	(4,375)

Inventory Values

Differences between the net incomes reported under absorption costing and marginal costing are also reflected in inventory values. As stated earlier, inventories under absorption costing absorb a part of the fixed manufacturing costs of a period, whereas inventories under marginal costing include only the variable manufacturing costs. Closing inventories calculated from the data given above would be as follows:

Closing Inventories

	<i>First month</i>	<i>Second month</i>	<i>Third month</i>	<i>Fourth month</i>
Absorption costing @ Rs. 7.25 per unit	—	21,750	7,250	32,625
Marginal costing @ Rs. 6.00 per unit	—	18,000	6,000	27,000

The following summarises the differences between marginal costing and absorption costing with regard to effect on net income:

1. If production = sales; absorption profit = marginal costing profit.
2. If production > sales; absorption profit > marginal costing profit.

3. If production < sales; absorption profit < marginal costing profit.
4. If production fluctuates and sales are constant; absorption profit fluctuates and marginal costing profit is constant.
5. If production is constant and sales fluctuates; both profits vary in the direction of sales.

APPLICATIONS (ADVANTAGES) OF MARGINAL COSTING

The marginal costing has great potentialities for management in different managerial tasks and decision-making processes. Marginal costing is particularly useful to management in (i) profit planning, (ii) product pricing decisions, (iii) cost control, (iv) managerial decision-making, and (v) the impact of fixed costs.

Profit Planning

Profit planning, generally known as budget or plan of operations, may be defined as the planning of future operations to attain a defined profit goal. Under marginal costing, the cost data needed for profit planning and decision-making are readily available from the accounting records and statements. It facilitates the analysis of cost-volume-profit relationships by separating fixed and variable costs on the income statement. Marginal costing helps management in planning and evaluating the profit resulting from a change in volume, in the sales-mix, in make or buy situations, in the selection of the most profitable products, customers, territories, and other segments of the entire business.

Product Pricing Decisions

Marginal costing provides more useful information to management for pricing than absorption costing. Marginal costing serves as the basis of product pricing in many cases. Under marginal costing, management has the data to determine when it is advisable to accept orders if other than normal conditions exist. In some cases, a sales order can be accepted even if it contributes partly to fixed costs. However, the full cost and not only the variable cost should be the basis of product pricing in the long-run. The full cost is the cost which includes variable manufacturing cost and fixed manufacturing cost incurred in the production process.

Cost Control

Marginal costing provides continuing opportunities to review period costs in relation to the level of sales and net income. Separation of variable and period costs supports the use of standards, budgets, and responsibility reporting to aid management in controlling costs. Marginal costing helps in preparing reports for all departments or responsibility centres based on standard costs, flexible budgets, and a division of all costs into their fixed and variable components. All managers can examine and interpret their reports with respect to the cost variances originating in their respective areas of responsibility. Reports prepared on the marginal costing basis and accompanied by additional information become valuable planning and control tools.

Impact of Fixed Costs

Marginal costing evaluates the impact of fixed costs on profits because the total amount of fixed costs for the period appears in the income statement. It is argued that managerial decisions can be easily made if fixed expenses are separated and are not mixed, in controlling operating costs.

Managerial Decision Making

The identification and classification of costs as either fixed or variable provide a framework for the accumulation and analysis of costs. This also provides a basis for the study of contemplated changes in

production levels or proposed actions concerning new markets, plant expansion or contraction, or special promotional activities. The marginal income figure is useful figure to management because it can be readily projected to measure increments in net income which accompany increments in sales.

LIMITATIONS OF MARGINAL COSTING

The limitations of marginal costing are listed below:

1. The marginal costing method requires that all costs should be divided into fixed and variable components. It cannot be true under all circumstances. Examples of factors that might affect this assumption include quantity discounts on materials, and labour efficiency variances.
2. Complete product cost does not depend only on variable costs. Fixed costs should be considered in determining the product cost, for long-range pricing and other long-run policy decisions.
3. Income figure obtained under marginal costing have to be used carefully if management decides to expand business or drop a product line. Management has to consider other factors also before deciding to drop a product line such as customer goodwill.

COST BEHAVIOUR

Cost behaviour can be defined as the manner in which costs changes due to changes in volume or activity. In relation to cost behaviour analysis, fixed and variable cost classifications are generally found. A proper analysis of cost behaviour patterns is the basis of all profit planning and cost control. The separation of costs into fixed, variable and semi-variable is necessary in order to determine, analyse, control, measure or evaluate the following:

1. Departmental expenses allowed at various levels of production.
2. Operating efficiency of a department.
3. Use of variable costing method.
4. Utilisation of facilities.
5. Break-even point.
6. Relative profitability of territories, departments and customers.
7. Company profit position.
8. Cost-volume-profit analysis.
9. Marginal or differential cost for various decision making purposes.
10. Effect of proposed capital expenditures.
11. Effect of alternative courses of action.

METHODS OF DETERMINING COST BEHAVIOUR

Several methods are used for segregating semi-variable costs into fixed and variable. There are four major techniques that are found in practice and they may be listed as follows:

1. High and low points method
2. Scattergraph method
3. Least squares regression method
4. Accounting or analytical approach.

High and Low Points Method

This approach considers the difference in total cost between two different volumes, and divides the incremental cost by the volume. As the words 'high' and 'low' imply, the two levels of volume chosen are the highest and the lowest for the period under review. The result of this division is the estimated variable cost per unit. Then, the average activity level is computed together with the average cost for the periods in the data base. The fixed cost is estimated by taking the total average cost and subtracting the variable cost for the average activity level. The variable cost is computed by multiplying the average activity level by the variable cost per unit as determined above.

As a simple illustration, assume that a company incurred the following costs in two periods (high and low) in which 5000 units and 10000 units were produced:

	<i>Cost incurred</i>	
	<u>5000 units</u>	<u>10000 units</u>
Insurance on factory building	Rs. 30,000	Rs. 30,000
Indirect material	Rs. 45,000	Rs. 70,000

Since insurance remained constant at the two volumes, there is no variable component. Indirect materials contain both a fixed and variable components.

Separation is made as follows:

Variable components:

Indirect material cost of 10000 units	Rs. 70,000
Indirect material cost of 5000 units	Rs. 45,000
Cost of production of additional 5000 units	Rs. 25,000
Variable cost per unit Rs. 25,000 ÷ 5000 units	Rs. 5

Fixed components:

	<u>5000 units</u>	<u>10000 units</u>
Total indirect material cost	Rs. 45,000	Rs. 70,000
Variable components @ Rs. 5 per unit	Rs. 25,000	Rs. 50,000
Fixed costs for period	Rs. 20,000	Rs. 20,000

Scattergraph Method

In this method, various costs are plotted on a vertical line, the *y*-axis, and measurement figures (activity levels such as direct labour hours, units of output, percentage of capacity or direct labour cost) are plotted along a horizontal line, the *x*-axis. A straight line is fitted to this scatter of points by visual approximation. The slope of the line is used to estimate the variable costs and the intercept of the line with the vertical axis is considered as the estimated fixed cost.

Least Squares Regression Method

The method of least squares uses the equation for a straight line:

$Y = a + bx$, with *a* as the fixed element, and *b* the degree of variability. For many accounting applications, regression provides an accurate estimate of fixed and variable costs.

Accounting or Analytical Approach

This approach to cost behaviour analysis is a close scrutiny of the chart of accounts and a classification of costs into their fixed and variable components according to their basic characteristics determined by the accountant using good judgement, knowledge, and experience. This approach is simple and inexpensive but in its simplicity lies its inherent weakness. The results obtained are not accurate and may happen to be mere guesses.

Example 16.1

The following are the maintenance costs incurred in a machine shop for six months with corresponding machine hours:

<i>Month</i>	<i>Machine hours</i>	<i>Maintenance costs</i>
		Rs.
January	2000	30,000
February	2200	32,000
March	1700	27,000
April	2400	34,000
May	1800	28,000
June	1900	29,000
Total:	12000	1,80,000

Analyse the Maintenance Cost which is semi-variable into fixed and variable element.

Solution:

Computation of Variable Cost and Fixed Cost has been done according to Range Method.

	<i>Machine hours</i>	<i>Maintenance costs</i>
		Rs.
Highest point, April	2400	34,000
Lowest point, March	1700	17,000
	700	7,000

$$\begin{aligned} \text{Variable cost per machine hour} &= \frac{\text{Change in maintenance costs}}{\text{Change in hours}} \\ &= 7000 \div 700 = \text{Rs. } 10 \end{aligned}$$

Total variable cost for 2400 machine hours will be $2400 \times \text{Rs. } 10 = \text{Rs. } 24,000$

Hence, fixed cost is $(\text{Rs. } 34,000 - \text{Rs. } 24,000) = \text{Rs. } 10,000$

Analysis of Maintenance Cost into Fixed and Variable Element

	<i>Machine hours</i>	<i>Maintenance cost (Rs.)</i>	<i>Fixed cost (Rs.)</i>	<i>Variable cost (Rs.)</i>
January	2000	30,000	10,000	20,000
February	2200	32,000	10,000	22,000
March	1700	27,000	10,000	17,000
April	2400	34,000	10,000	24,000
May	1800	28,000	10,000	18,000
June	1900	29,000	10,000	19,000

COST-VOLUME-PROFIT (CVP) ANALYSIS

Profits of business firms are the result of many factors such as: (i) selling prices, (ii) volume of sales (iii) unit variable costs (iv) total fixed costs, (v) combinations in which the various product lines are sold, etc. To do an affective job in planning, management must have analyses which allow reasonably correct predictions of how profits will be affected by a change in any one of these factors. A cost volume profit (CVP) analysis is useful to management in knowing how profit is influenced by sales volume, sales price, variable expenses and fixed expenses.

Broadly, CVP analysis uses the techniques of (i) Break-even analysis and (ii) Profit-volume (P/V) analysis.

Break-even Analysis

A break-even analysis indicates at what level cost and revenue are equal and there is no profit and no loss. It is a simple and easily understandable method of presenting to management the effect of changes in volume on profits. Detailed analysis of break-even data will reveal to management the effect of alternative decisions which reduce or increase costs and which increase sales volume and income. It is a device which portrays the effects of any type of future planning by evaluating alternative courses of action.

Break-even Point

The break-even point can be defined as the point or sales level at which profit are zero and there is no loss. That is, break-even point is that point at which total costs are equal to total sales revenue. At the break-even point profit being zero, contribution (sales-variable cost) is equal to the fixed cost. If the actual volume of sales is higher than the break-even volume, there will be a profit. Beyond the break-even point, all the marginal contribution represents income.

Assume that a company manufactures and sells a single product as follows:

Selling price per unit = Rs. 20

Variable cost per unit = Rs. 10

Total fixed cost = Rs. 1,00,000

The break-even sales to cover fixed costs will be 10000 units,

Selling price per unit = Rs. 20

Variable cost per unit = Rs. 10

Contribution = Rs. 10

$$\text{Break-even volume} = \frac{\text{Rs. 1,00,000 fixed cost}}{\text{Rs. 10 contribution margin}}$$

$$= 10000 \text{ units.}$$

If the company can sell more than 10000 units, it will earn profits because fixed costs remain constant. If less than 10000 units are sold, a loss will be incurred. The profits will be equal to the number of units sold in excess of 10000 units multiplied by the unit contribution margin. For example, if 25000 units are sold the company will be operating at 15000 units above its break-even point and will earn a profit of Rs. 1,50,000 (15000 units × Rs. 10 contribution margin).

Break-even Formula

The break-even point can be obtained directly by a mathematical formula. The basic formula to find out the break-even point is:

$$\text{Break-even sales (units)} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}}$$

$$\text{Break-even sales (volume)} = \frac{\text{Fixed cost}}{\text{C/S ratio (also known as P/V ratio*)}}$$

$$\text{Break-even sales volume} = \frac{\text{Total fixed expenses}}{1 - \text{Total variable expenses/Total sales volume}}$$

$$\text{Cash break-even point (units)} = \frac{\text{Cash fixed cost}}{\text{Cash contribution per unit}}$$

* C/S ratio is popularly known as P/V ratio because after fixed costs are fully recovered, that is, after break-even point, all contributions (sales-variable costs) become profit. However, before break-even point all contributions will not become profit since fixed costs are yet to be recovered.

Break-even Chart

Total revenues and total costs at different sales volume can be estimated and plotted on a break-even chart. This chart is constructed as follows:

1. A horizontal base line, the x -axis, is drawn and spaced into equal distances representing either plant capacity, sales volume or number of units.
2. A vertical line, the y -axis is drawn on the left side of the chart and also spaced into equal parts. This line indicates sales revenue and also costs.
3. A line parallel to the horizontal line (x -axis) is drawn for fixed costs.
4. A total cost line is drawn starting at the y -axis fixed cost point and moving to the right. This total cost line represents the total of all items of cost, fixed and variable.
5. The sales line is drawn starting at the zero point on the vertical axis and ending at the top on the right side.
6. The total cost line intersects the sales line at a point which is known as the break-even point.
7. The area to the left of the break-even point between the total cost line and the sales line is the loss area; the profit area lies to the right of the break-even point above the total cost line.

The data from the previous example are presented on the break-even chart (see Fig. 16.3).

From Fig. 16.3 it can be observed that the break-even point occurs when sales are 10000 units at Rs. 2,00,000.

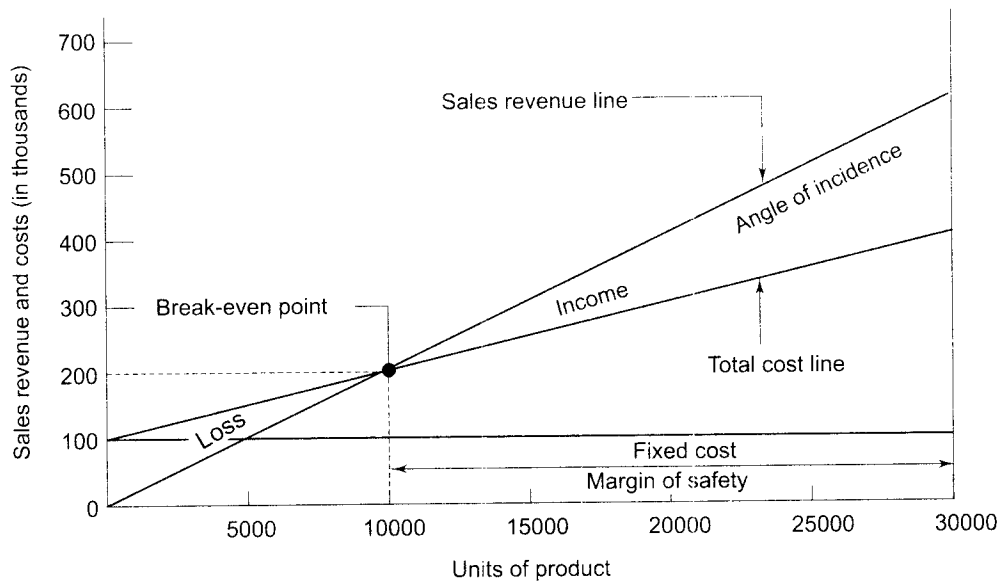


Fig. 16.3 Break-even Chart

Cash Break-Even Point

If a firm has a minimum of available cash or the opportunity cost of holding excess cash is high, management may want to know the volume of sales that will cover all cash expenses, during a period. This is known as the cash break-even point.

Not all fixed operating costs involve cash payments. For example, depreciation expense is a non-cash charge. To find the cash break-even point, the non-cash charges must be subtracted from total fixed operating costs. Therefore, the cash break-even point is lower than the usual break-even point. The formula is:

$$\text{BEP} = \frac{FC - d}{P - V}$$

where P is selling price per unit

V is unit variable cost

FC is Fixed operating costs

d is depreciation expenses

Thus, cash break-even point indicates break-even sales to cover only the fixed costs involving cash payments and to break-even.

This is illustrated below:

Let Sales 20000 units at Rs. 10 per unit

Variable costs, Rs. 4 per unit

Fixed cost Rs. 50,000 including depreciation, Rs. 10,000

Preference dividend to be paid Rs. 20,000

Taxed to be paid Rs. 25,000

Assume that there are no lags in payment.

Break-even point (in units) will be 6667 units as displayed in Fig. 16.4.

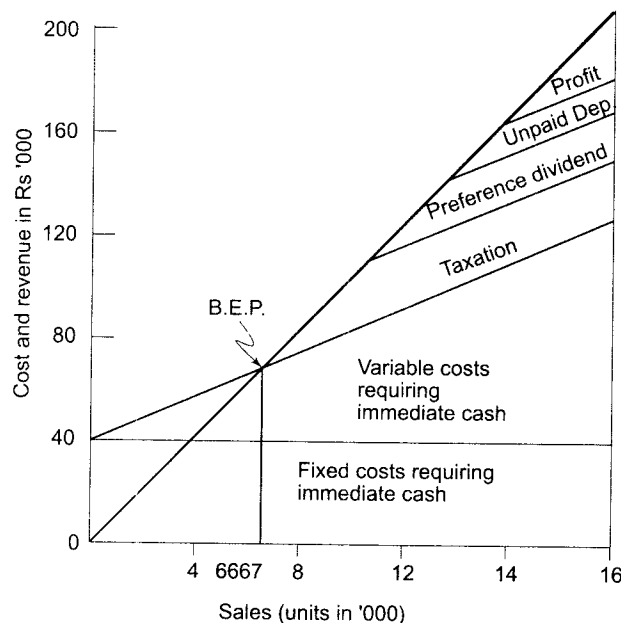


Fig. 16.4 Break-even Chart

Margin of Safety

This is the difference between sales and the break-even point. If the distance is relatively short, it indicates that a small drop in production or sales will reduce profits considerably. If the distance is long, it means that the business can still make profits even after a serious drop in production. It is important that there should be a reasonable margin of safety, otherwise a reduced level of production may prove dangerous. The margin of safety can be found by using the following formula:

$$\text{Margin of safety} = \text{Profit} \div \text{P/V ratio}$$

or

$$\text{Margin of safety} = \frac{\text{Profit} \times \text{Sales}}{\text{Sales} - \text{Variable cost}}$$

Angle of Incidence

This is the angle at which the sales line cuts the total cost line. Management's aim will be to have as large an angle of incidence as possible because a large angle of incidence shows a high rate of profit. A narrow angle would show that even fixed overheads are absorbed and profit accrues at a relatively low rate of return, indicating that variable costs form a large part of cost of sales.

Sales Formula

Often, it is necessary to know what level of sales is required to achieve a desired level of profit. The desired sales can be expressed in various ways:

$$\text{Sales} = \text{Fixed cost} + \text{Variable cost} + \text{Profit}$$

$$\text{Sales} = (\text{Profit} + \text{Fixed cost})/\text{P/V ratio}$$

Basic Assumptions in Break-even Analysis

Break-even analysis is based on several assumptions, listed as follows:

1. Selling prices and pricing policy will remain constant at all sales levels. If this is not true, sales revenue cannot be plotted as a straight line.
2. All costs and expenses can be separated into fixed and variable components.
3. The total of the fixed costs is constant at all sales levels; the unit variable costs remain the same. If this is not true, straight lines cannot be drawn.
4. Production and sales quantities are equal.
5. Managerial policies, technological methods, and efficiency of men and machines will not change and cost control will neither be strengthened nor weakened.
6. Volume is assumed to be the only important factor affecting cost behaviour. Other influencing factors such as unit prices, sales-mix, labour strikes, and production methodology remain constant.
7. In case of multiple products being manufactured by the enterprise, the sales-mix should remain unchanged. That is, the calculation of the break-even point in the case of multiple products predetermines the number of units to be sold in respect of each product. This multiproduct sales-mix should remain unchanged.

Curvilinear Break-even Analysis

Break-even analysis is based on the assumption that total sales line and total cost line are straight lines and have linear relationship between them. However, in reality, this may not be true and there may be not linear relationship between total sales line and total cost line. This may be due to the following reasons:

First, sales value may decline after demand level has reached at the saturation point.

Second, average variable cost per unit may decrease if a firm gets discount on the bulk purchase of raw materials when output increases.

In another situation when the plant is being operated at higher capacity to have higher production, there is likely to be breakdowns and bottle-necks making variable cost per unit to increase. Therefore, after a particular level of output, variable cost per unit may increase.

In such cases, the contribution will not increase in linear proportion that is, the total cost line will not be straight, as assumed but will be of curvilinear shape. This situation will give rise to two break-even points. The optimum profit is earned at the point where the distance between sales and total cost is the greatest. This is displayed in Fig. 16.5.

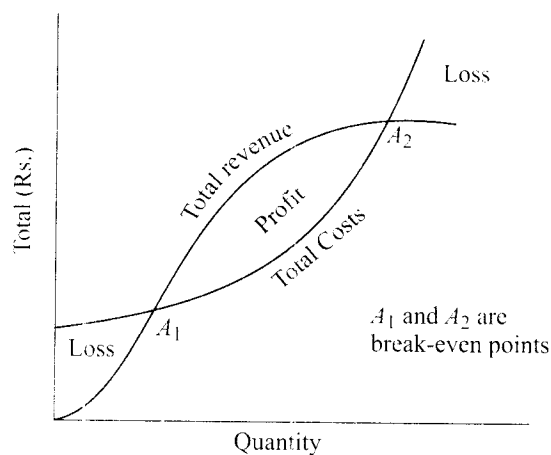


Fig. 16.5 Curvilinear break-even Chart

Profit/Volume (P/V) Analysis

A P/V graph is sometimes used in place of or along with a break-even chart. Profits and losses are given on a vertical scale; and units of products, sales revenue or percentage of activity are given on a horizontal line. The horizontal line is drawn on the graph to separate profits from losses. The profits and losses at various sales levels are plotted and connected by the profit line. The break-even point is measured at the point where the profit line intersects the horizontal line. The P/V graph may be preferred to the break-even chart because profit and losses at any point can be read directly from the vertical scale; but the P/V graph does not clearly show how costs vary with activity.

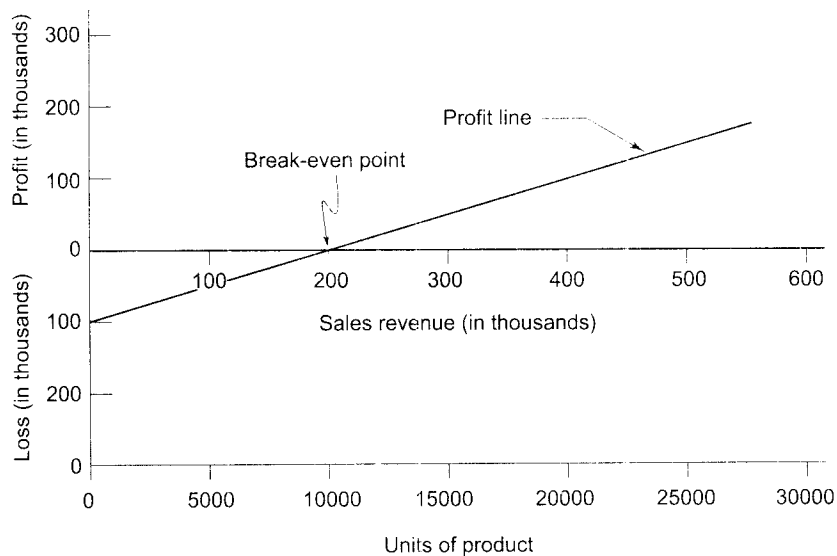
Data used earlier to prepare the break-even chart are also used in preparing the P/V graph (see Fig. 16.6).

A cost-volume profit analysis can be used to measure the effect of factor changes and management decision alternatives on profits. These factors include possible changes in selling prices, changes in variable or fixed cost, expansion or contraction of sales volume, or other changes in operating methods or policies. Cost-volume profit analysis is also useful for problems of product pricing, sales-mix, adding or deleting product lines, and accepting special orders.

Changes in Selling Prices

The CVP graph is frequently used to illustrate the potential profit effects of contemplated price changes. Effects on the profit pattern are as follows:

1. *Increase in selling price* If the selling price is increased, it increases the P/V ratio, and the rate of fixed costs recovery is increased. The break-even point (break-even volume) declines, profit beyond the break-even point increases, losses below the break-even point decreases.


Fig. 16.6 Profit Volume (P/V) Graph

2. *Decrease in selling price* If the selling price decreases, it decreases the P/V ratio and the rate of fixed cost recovery declines. The break-even point increases.

Assume, for example, that a company produces a product with a selling price of Rs. 10 per unit and a variable cost of Rs. 4 per unit. Fixed costs are Rs. 36,000 per year. The effect of a 20% increase and 20% decrease in the present selling price is given below:

	<i>Selling price</i>		
	<i>Present</i>	<i>20% Increase</i>	<i>20% Decrease</i>
Selling price per unit	Rs. 10.00	Rs. 12.00	Rs. 8.00
Variable cost per unit	4.00	4.00	4.00
Marginal contribution per unit	6.00	8.00	4.00
P/V ratio	60%	$66\frac{2}{3}\%$	50%
Fixed costs	36,000	36,000	36,000
Break-even point in units	6,000	4,500	9,000
In volume	60,000	54,000	72,000
Changes in break-even point	—	—	—
In units	0%	- 25%	+ 50%
In sales volume	0%	- 10%	+ 20%

Changes in Variable Costs

The CVP graph is used to evaluate the impact of increases and decreases in variable costs per unit.

1. *Increase in variable costs* An increase in variable costs has the same effect as a decrease in the selling price. It decreases the P/V ratio and the rate of fixed cost recovery is slower. The break-even point moves to higher level; profits after the break-even point decreases; losses before the break-even point increases.

2. *Decrease in variable costs* A decrease in variable costs has the same effect as an increase in the selling price. A higher P/V ratio is achieved and the rate of fixed costs recovery is increased. The break-even point declines, profits beyond the break-even point are higher; losses before the break-even point are lower.

To illustrate the effect of change in variable costs, assume a company is selling a product for Rs. 40 a unit and has a variable cost of Rs. 20 per unit. Fixed costs total Rs. 48,000 per year. The effects of a 20% increase and a 20% decrease in variable cost are given in the following Table:

	<i>Present variable cost (Rs.)</i>	<i>20% Increase (Rs.)</i>	<i>20% Decrease (Rs.)</i>
Unit selling price	40.00	40.00	40.00
Variable cost per unit	20.00	24.00	16.00
Marginal contribution	20.00	16.00	24.00
P/V ratio	50%	40%	60%
Fixed costs	48,000	48,000	48,000
Break-even point:			
Sales volume	96,000	1,20,000	80,000
Units	2,400	3,000	2,000

Changes in Fixed Cost

Increases and decreases in the fixed cost do not have any impact on the P/V ratio but they change the break-even point. With the same P/V ratio, the rate of the fixed costs recovery remains the same.

1. *Increase in fixed costs* If fixed costs are increased, the break-even point (break-even-volume) is higher. Profits above the break-even point are lower by the amount of the increase in fixed costs; below the break-even point losses increase by the amount of increase.
2. *Decrease in fixed costs* If fixed costs are decreased, it lowers the break-even point. The profits are greater by the amount of the decrease, and losses are smaller by the amount of the decrease in fixed costs.

Assume that a company has a P/V ratio of 40% and present fixed costs of Rs. 50,000. The effects of change in the fixed costs by Rs. 10,000 are as follows:

	<i>Present fixed cost</i>	<i>Increase by</i>	<i>Decrease by</i>
Fixed costs	Rs. 50,000	Rs. 10,000	Rs. 10,000
P/V ratio	40%	40%	40%
Break-even point (Rs.)	1,25,000	1,50,000	1,00,000
Decrease	0	+25,000	- 25,000

From the above example, it is clear that the P/V ratio is the same in each situation and break-even point can be determined by dividing the amount of the change by the P/V ratio:

$$\begin{aligned} & \frac{\text{Change in fixed costs}}{\text{P/V ratio}} \\ &= \frac{\text{Rs. 10,000}}{40\%} = \text{Rs. 25,000} \end{aligned}$$

DESIRED OR TARGET PROFIT

Sometimes, management faces two decisions: (i) to increase sales volume through reduction in selling prices, and (ii) to increase selling prices in case the P/V ratio is low, with the expectation that a higher profit will be earned. These decisions should be taken carefully after studying the profit pattern and other factors, otherwise the results can be harmful particularly for those companies whose P/V ratios are already low. Also, if reduction in selling prices does not increase the sales volume, the price reduction will result only in lower profits. Price cuts, like increase in variable unit costs, decrease the contribution margin. On a unit basis, price decreases may appear to be insignificant, but when the unit differential is multiplied by thousands of units, the total effect may be significant. Perhaps, many more units will have to be sold to make up the loss in profit or to earn a target profit.

Assume Company A hopes to increase its profits by selling more units, and to sell more, it plans to reduce its prices by 10%. The present price and cost structure and the desired one is given below:

	<i>Present price and cost</i>	<i>Desired price and cost</i>
Selling price	Rs. 50	Rs. 45
Variable cost	25	25
Contribution margin	25	20
Contribution margin (%)	50%	44.4%

At present, the contribution margin being 50%, Company A will break-even when sales are twice the fixed costs. This means that if fixed costs are 1,00,000, 4000 units must be sold to earn a revenue of Rs. 2,00,000. But when the price is reduced to recover Rs. 1,00,000 in fixed costs, sales revenue must amount to Rs. 2,25,000. Not only must the revenue be higher but with a lower price per unit, more units must be sold to obtain that revenue; 5000 units must be sold just to break-even. To overcome the effect of the cut in price, sales volume in physical units must be increased by 25%.

5000 units to be sold at a lower price to break-even.

4000 units to be sold at present price to break-even.

1000 Increase in number of units.

$$\frac{1000}{4000} = 25\%$$

Sales revenue must be increased by $12\frac{1}{2}\%$.

Rs. 2,25,000 sales revenue at new break-even point.

Rs. 2,00,000 sales revenue at present break-even point.

Rs. 25,000 increase in sales revenue.

$$\frac{25,000}{2,00,000} = \frac{1}{8} = 12\frac{1}{2}\%$$

The increase in sales volume required to overcome the effect of a price reduction is relatively greater when the rate of the contribution margin per unit is relatively low. If a product makes only a small contribution, then a reduction in selling price makes it all the more difficult to recover the fixed costs and to earn profits.

Similarly, a business firm may think of increasing the selling price if the P/V ratio is low. However, increase in selling price may reduce the sales volume.

Suppose a company has the following present and proposed costs and selling price structure:

	<i>Present</i>	<i>Proposed</i>
Selling price per unit	Rs. 100	Rs. 120
Variable cost per unit	70	70
Contribution per unit	30	50
P/V Ratio	30%	41.67%
Increase in contribution	—	20

Decrease in the present sales volume without effecting the present = $\frac{20}{50} = 40\%$

If there is a 20% increase in the selling price, the sales volume should not decline by more than 40%. If decline in sales volume is less than 40% the profit position would be improved. Thus, any company with a P/V ratio of 30% can raise its selling price by 20% and absorbed a 40% reduction in sales volume without reduction in net income regardless of the amount of fixed costs involved.

MULTI-PRODUCT SITUATIONS

When there are multiple products with different contribution margins, the mix of the product has a direct effect on the fixed costs recovery and total profits of the firm. Different products have different P/V ratios because of different selling prices and variable costs. Some products make larger contributions to fixed cost recovery and profit than others. The total profits depends to some extent upon the proportions in which the products are sold.

For example, assume that a company with fixed costs of Rs. 25,000 per year manufactures two products *A* and *B* with P/V ratios as follows:

	<i>Product A</i>	<i>Product B</i>
Unit selling price	Rs. 10	Rs. 20
Variable costs	4	16
Marginal contribution	6	4
P/V Ratio	60%	20%

With comparatively low variable costs, product *A* has a relatively high P/V ratio, each unit of product *A* sold contributes Rs. 6 to fixed costs recovery and profit. Product *B*, with comparatively high variable costs, has a low P/V ratio, each unit sold contributes only Rs. 4 to fixed costs recovery and profit. Other things being equal, the sale of product *A* is more profitable than that of product *B*, despite the fact that the selling price of product *B* is twice that of product *A*. It is correct to say that profits will decline as the sales mix shifts from product *A* to product *B*. This also implies, however, that new analyses of profit volume relationship must be made as the product-mix changes.

Different combinations of sales-mix (based on the above-figure) will result in different net income. For example, if the total sales volume is Rs. 1,00,000 equally divided between the two products, the net income would be Rs. 15,000.

	<i>Product A</i>	<i>Product B</i>	<i>Total</i>
Per cent of sales revenue	50%	50%	100%
Sales revenue	Rs. 50,000	50,000	1,00,000
P/V ratio	60%	20%	40%
Marginal contribution	30,000	10,000	40,000
Fixed costs			25,000
Net income			Rs. 15,000

$$\begin{aligned}\text{Break-even point} &= \frac{\text{Fixed cost}}{\text{P/V ratio}} \\ &= \frac{25,000}{40\%} = \text{Rs. } 62,500\end{aligned}$$

If the sales mix is changed so that product *A* has 60% of the sales revenue, the profit on sales of Rs. 1,00,000 would increase to Rs. 19,000.

	<i>Product A</i>	<i>Product B</i>	<i>Total</i>
Per cent of sales revenue	60%	40%	100%
Sales revenue	Rs. 60,000	40,000	1,00,000
P/V ratio	60%	20%	44%
Marginal contribution	36,000	8,000	44,000
Fixed cost			25,000
Net income			Rs. 19,000
BEP = $\frac{25,000}{44\%} = \text{Rs. } 56,818$			

SALES MIX AND BREAK-EVEN POINT

Sales mix is the relative proportion of each product line to the total sales of various products sold by an enterprise. As stated earlier, if there are no constraints or limitations, management should try to maximise the sales of the product(s) with higher P/V ratio. However, a sales mix results because there are limits to the quantities of any given product that can be produced and there may also be certain market limitations on how much can be sold.

When different products have their own different production facilities, selling prices, variables costs and fixed costs separately, cost-volume-profit analysis can be done for each product separately. But, in many situations, this is not found and different products share common facilities and have common fixed costs. In such a situation CVP analysis is performed by averaging the data using the sales mix as weights. The break-even point is computed for a specified sales mix and break-even chart and P/V graph are constructed for any specified sales mix. But any one break-even chart or P/V graph will show a constant sales mix for the total sales of different products, covering the cost and revenue lines as well. The sales necessary to achieve desired or target level of operating profit can be computed on the basis of specified sales mix. If the sales mix changes, CVP analysis, break-even point, desired sales for target profit, costs and revenue lines will also change accordingly.

To illustrate the computation of break-even point in a sales mix situation, an example is given here. Assume, for a company, the fixed costs are Rs. 6,75,000. Further, assume that the units sales volume, units selling prices, unit variable costs, unit contribution margins for products *A*, *B* and *C* are as follows:

<i>Products</i>	<i>Sales Volume</i> (units)	<i>Unit Selling</i> (price) (Rs.)	<i>Unit Variable</i> <i>Cost</i> (Rs.)	<i>Contribution</i> <i>per unit</i> (Rs.)	<i>Margin %</i> (P/V ratio) (Rs.)
<i>A</i>	20000	50	20	30	60
<i>B</i>	10000	50	30	20	40
<i>C</i>	10000	50	40	10	20
	40000				

Break-even points (in units) will be computed using a weighted average contribution margin as follows:

Products	Sales Mix (%)		Contribution Margin per unit (Rs.)	Weighted Contribution Margin (Rs.)
A	50%	×	30	15
B	25%	×	20	5
C	25%	×	20	2.50
Total weighted contribution margin				Rs. 22.50

$$\begin{aligned} \text{BEP (Units)} &= \frac{\text{Fixed cost}}{\text{Weight contribution margin}} \\ &= \frac{\text{Rs. 6,75,000}}{\text{Rs. 22.50}} = 30000 \text{ units} \end{aligned}$$

The detailed composition of sales and contribution margins at this level (30000 units) are as follows:

Products	Sales Mix		Total Units		Units of Products		Contribution Margin per unit (Rs.)	Total Contribution (Rs.)
A	50%	×	30000	=	15000	×	30	4,50,000
B	25%	×	30000	=	7500	×	20	1,50,000
C	25%	×	30000	=	7500	×	10	75,000
Break-even contribution margin.								Rs. 6,75,000

Break-even point (sales in Rupees) can also be calculated. For this, first, total P/V ratio is required and then divide the fixed costs by total P/V ratio. Using the above information, calculation is shown below:

	Products			Total
	A	B	C	
Sales (units)	20000	10000	10000	40000
Selling Price (Rs.) per unit	50	50	50	
Sales (Rs.)	10,00,000	5,00,000	5,00,000	20,00,000
Less: Variable Costs (Rs.)	4,00,000	3,00,000	4,00,000	11,00,000
Contribution margin	6,00,000	2,00,000	1,00,000	9,00,000
Less: Fixed Costs				6,75,000
Profit before tax				2,25,000

$$\begin{aligned} \text{Total P/V ratio} &= \frac{\text{Total contribution}}{\text{Total sales}} \\ &= \frac{\text{Rs. 9,00,000}}{\text{Rs. 20,00,000}} \\ &= 45\% \end{aligned}$$

$$\begin{aligned} \text{Break-even sales (Rs.)} &= \frac{\text{Fixed cost}}{\text{Total P/V ratio}} \\ &= \frac{\text{Rs. 6,75,000}}{45\%} \\ &= \text{Rs. 15,00,000} \end{aligned}$$

Rs. 15,00,000 as break-even sales can be verified by computing break-even sales of individual products as follows:

Product	Break-even Units	Selling Price (Rs.)	Break-even Sales (Rs.)
A	15000	50	7,50,000
B	7500	50	3,75,000
C	7500	50	3,75,000
Total break-even sales:			15,00,000

If there is any change in the above sales mix, the break-even point, P/V ratio, amount of profit before tax may change. For instance, assume that the quantities sold of products A, B and C are 5000 units, 20000 units and 15000 units, respectively. Further, assume, that there are no changes with regard to fixed costs, variable cost per unit and selling price per unit. The change in the sales mix will influence the factors of CVP analysis as shown below:

Products	Sales Volume (units)	Sales Mix %	Contribution margin per unit (Rs.)	Total Contribution (Rs.)	Sales Revenue (Rs.)
A	5,000	12.50%	30	1,50,000	2,50,000
B	20,000	50%	20	4,00,000	10,00,000
C	15,000	37.5%	10	1,50,000	7,50,000
Total contribution margin				7,00,000	
Less: Fixed Costs				6,75,000	
Profit before tax				25,000	

$$\begin{aligned} \text{Total P/V ratio} &= \frac{\text{Total contribution}}{\text{Total sales}} \\ &= \frac{\text{Rs. 7,00,000}}{\text{Rs. 20,00,000}} \\ &= 35\% \end{aligned}$$

$$\begin{aligned} \text{Break-even sales} &= \frac{\text{Fixed costs}}{\text{Total P/V ratio}} \\ \text{Break-even sales} &= \frac{\text{Rs. 6,75,000}}{\text{Rs. 17.50}} \\ &= \text{Rs. 19,28,571} \end{aligned}$$

Break-even point in units will be computed using a weighted average contribution margin, as stated earlier.

The calculation is shown below:

Products	Sales Mix (%)		Contribution Margin Per unit (Rs.)	Weighted Contribution margin (Rs.)
A	12.50%	×	30	3.75
B	50%	×	20	10.00
C	37.50%	×	10	3.75
Total weighted contribution margin				17.50%

$$\begin{aligned} \text{BEP (units)} &= \frac{\text{Fixed cost}}{\text{Weight contribution margin}} \\ &= \frac{\text{Rs. 6,75,000}}{17.50} \\ &= 38,571 \text{ units} \end{aligned}$$

It can be observed that due to change in sales mix profit before tax is considerably lower (Rs. 25,000) although the amount of sales revenue is the same. The total contribution is less than the earlier ones. P/V ratio has decreased (35%) and break-even-point in units has increased to 38,571 units. These differences are due to changes in sales mix. On the need of promoting products having different P/V ratios, Anderson and Sollenberger advise:

“One way to encourage the sales force to sell more of the high contribution margin lines is to compute sales commissions on the contribution margin and not on sales revenue. If sales commissions are based on sales revenue, a sales force may have a high volume of sales of less profitable product lines and still earn a satisfactory commission. But if sales commission are related to contribution margin, the sales force is encouraged to strive for greater sales of more profitable products, and, in doing so, will help to improve total company profits.”¹

DESIRED PROFIT AND TAX

The amount of desired profit before income taxes is treated as if it were additional fixed costs in finding out the sales units or sales revenue required to give the amount of desired profit. The usual formula is:

$$\text{Desired sales units} = \frac{\text{Fixed cost} + \text{Profit before Tax}}{\text{Contribution Margin per unit}}$$

$$\text{Desired sales revenue} = \frac{\text{Fixed cost} + \text{Profit before Tax}}{\text{P/V ratio}}$$

The amount of desired profit can be mentioned as a profit after income taxes. In such a case, the profit before tax is calculated by the following formula:

$$\text{Profit before tax} = \frac{\text{Profit after Tax}}{(1 - \text{tax rate})}$$

For instance, if profit after tax is Rs. 1,20,000 and tax rate 40%, profit before tax will be Rs. 2,00,000 as calculated below:

$$\begin{aligned} \text{Profit before tax} &= \frac{1,20,000}{(1 - .40)} \\ &= \text{Rs. 2,00,000} \end{aligned}$$

Sometimes management is interested in knowing the sales units required to give a specified amount of profit on per unit basis. The formula for computing such number of sales units to give desired profit per unit is as follows:

$$\text{Sales unit for desired profit per unit} = \frac{\text{Fixed cost}}{(\text{Contribution margin per unit} - \text{Desired profit per unit})}$$

¹ Lane K. Anderson and Harold M. Sollenberger, *Managerial Accounting*, South Western Publishing Co., pp. 156-157.