Work certified and work uncertified can be found in the following manner:

Cost of Work Certified:	Cost of Work Uncertified:
Cost of work to date	Total cost to date
Less: Cost of work uncertified	Less: Cost of work certified
Materials on hand	Materials on hand
Plant at site	Plant at site
= Cost of work certified	= Cost of work uncertified

WORK-IN-PROGRESS

Work-in-progress includes the amount of work certified (valued at contract price) and the amount of work uncertified. The work-in-progress account will appear on the asset side of the balance sheet. The amount of cash received from the contractee and reserve for contingencies (as discussed in the case of incomplete contracts) will be deducted out of this amount. The work-in-progress account appears as follows in the balance sheet.

1. When work certified has been treated according to the first method:

   Balance sheet as on _____

   Work-in-progress:
   Balance in the contractee's A/c
   Add: Work uncertified
   Less: Reserve for unrealised profit

2. When work certified has been treated according to the second method:

   Balance sheet as on _____

   Work-in-progress:
       Value of work certified   _____
       Cost of work uncertified   _____
   Less: Reserve for unrealised profit   _____
   Less: Amount received from contractee   _____

In contract accounts the value of work-in-progress consists of: (i) the cost of work completed, both certified and uncertified, (ii) the cost of work not yet complete; and (ii) the amount of profit taken as credit. Taking these into account, the work-in-progress in the balance sheet can be shown as follows:

Balance sheet as on _____

Work-in-progress:
    Cost of work certified   _____
    Cost of work uncertified   _____
Less: Amount received from contractee   _____
Add: Profit taken as credit to profit and loss A/c   _____

PROFIT ON INCOMPLETE CONTRACTS

Many contracts take more than one financial year to be completed. A problem arises whether profit on such a contract should be worked out only on its completion or whether some profits may be computed every year. The conservative method is to value work-in-progress only at cost and no credit is taken for profit till it is actually earned. This method, however, results in wide fluctuations in the net profit of the enterprise from year

to year. If several contracts are completed in a year, the profit will be high while in extreme cases in some years, when not a single contract is fully completed, the profit will be nil. It becomes necessary, therefore, to compute profit on partly completed contracts and take credit for a part of it in the accounts at the year end.

The manner of computation of profit is largely dependent upon how for the contract has advanced, that is, the stage of completion it has reached.

1. Profit should be considered in respect of work certified only, work uncertified should always be valued at cost.

2. For contracts which have been completed less than one-fourth of the contract, no profit should be computed and credited to the profit and loss account.

3. In case of contracts which are complete by more than 25% but less than 50%, one-third of notional profit, reduced in the ratio of cash received to work-certified, is transferred to profit and loss A/c. The balance in the notional profit is carried forward in the same contract as profit in suspense as a provision against future losses, increase in costs and other contingencies. The following formula is used to determine the amount of profit to be transferred to profit and loss A/c.

$$\frac{1}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

Notional profit is the difference between the value of work certified and cost of work certified. It is determined in the following manner.

Notional profit = Value of work certified–(cost of work to date–cost of work not yet certified)

4. In case contracts are complete between 50% and 90% (more than 50% but less than 90%), two-third of notional profit, reduced by the proportion of cash received to work certified, is transferred to profit and loss A/c. The formula to be used for this purpose is:

$$\frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

5. In case contracts are complete by 90% or more than 90%, the contract is considered almost complete. In such contracts, the estimated total profit is first determined by deducting the total costs to date and additional expenditure necessary to complete the contract from the contract price. A portion of this estimated total profit is credited to profit and loss A/c, which can be determined by using any one of the following formulae:

(i) $\text{Estimated Profit} \times \dfrac{\text{Work Certified}}{\text{Contract Price}}$

(ii) $\text{Estimated Profit} \times \dfrac{\text{Work Certified}}{\text{Contract Price}} \times \dfrac{\text{Cash Received}}{\text{Work Certified}}$

or

$\text{Estimated Profit} \times \dfrac{\text{Cash Received}}{\text{Work Certified}}$

The second formula is preferable to first formula. In case estimated profit cannot be determined due to some reason, for example, if additional expenditure is not mentioned, then the amount of profit to be transferred to profit and loss A/c is determined using the following formula:

$\text{Notional Profit} \times \dfrac{\text{Work Certified}}{\text{Contract Price}}$

6. The total of loss, if any, should be transferred to the profit and loss account by crediting the contract account.

In contract accounting, the profit earned on contracts is reduced proportionately by the amount of cash received, otherwise the unrealised profit may stand for distribution as dividends. Also, the sound principle of conservatism requires that all future contingencies and possible losses should be accounted for before determining the profit on contract.

COST-PLUS CONTRACT

A cost-plus contract is a contract in which the value of the contract is determined by adding a fixed margin of profit to the total cost of the contract. The contractee agrees to pay this inflated value of contract which includes a profit margin as per the agreement. Both the parties determine in advance the possible costs that would be included in the cost of contract. The profit to be added to the cost of contract may be agreed as a percentage on cost or the capital employed. Cost-plus contracts are generally needed when the costs of contracts cannot be accurately determined due to unstable and fluctuating conditions of materials, labour and service, etc. The price of materials, labour and services usually tend to fluctuate over a long period.

Cost-plus contracts are useful to both the parties, contractor (manufacturer), contractee (customer). The contractor is suitably protected against any fluctuations in the prices of materials, labour, and overhead which will be used in production or completion of the job. A cost-plus contract is beneficial to the contractee (customer) also. The contractee is protected against an uncertain market which may push up the cost of the contract. The price agreed to be paid by the contractee is based on actual cost. In this way the contract price is not determined arbitrarily.

Sometimes a contract may contain an "escalator clause" which provides for change in the price of the contract due to change in the prices of the raw materials, labour and overhead services. The contractor presents evidential proof of increased costs to the contractee to claim reimbursements. Under the escalator clause the contract price is increased for a given increase in the prices of inputs. For instance, it may be agreed that if the prices of raw materials go up by 15%, the contract price will be increased by 2%.

Example 10.5

An amount of Rs. 19,80,000 was incurred on a contract work up to 31.03.2004. Certificates have been received to date to the value of Rs. 24,00,000 against which Rs. 21,60,000 has been received in cash. The cost of work done but not certified amounted to Rs. 45,000. It is estimated that by spending an additional amount of Rs. 1,20,000 (including provision for contingencies) the work can be completed in all respects in another two months. The agreed contract price of the work is Rs. 25 lakhs. Compute a conservative estimate of the profit to be taken to the Profit and Loss Account. *(ICWA, Inter, Stage 1, Dec 2004)*

Solution:

COMPUTATION OF ESTIMATED TOTAL PROFIT

	Rs.
Expenditure incurred upto 31ˢᵗ March, 2004	19,80,000
Estimated additional expenditure (including provision for contingencies)	1,20,000
Estimated total cost (A)	21,00,000
Contract price (B)	25,00,000
Estimated total profit (B–A)	4,00,000

COMPUTATION OF A CONSERVATIVE ESTIMATE OF THE PROFIT TO BE TAKEN TO PROFIT AND LOSS ACCOUNT

(1) Estimated Profit $\times$ $\dfrac{\text{Value of work certified}}{\text{Contract price}} \times \dfrac{\text{Cash received}}{\text{Value certified}}$

$= 4,00,000 \times \dfrac{24,00,000}{25,00,000} \times \dfrac{21,60,000}{24,00,000} = $ Rs. 3,45,600

or

(2) Estimated profit $\times$ $\dfrac{\text{Cash of work to date}}{\text{Estimated total cost}} \times \dfrac{\text{Cash received}}{\text{Value certified}}$

$= 4,00,000 \times \dfrac{19,80,000}{21,00,000} \times \dfrac{21,60,000}{24,00,000} = $ Rs. 3,39,429 that is, 3,39,430 (rounded off)

or

(3) Estimated profit $\times$ $\dfrac{\text{Cash received}}{\text{Value certified}} = 4,00,000 \times \dfrac{21,60,000}{24,00,000} = $ Rs. 3,60,000

or

$2/3 \times$ National Profit $\times \dfrac{\text{Cash received}}{\text{Work certified}}$

or

$= 2/3 \times 4,00,000 \times \dfrac{21,60,000}{24,00,000} = $ Rs. 2,40,000

or

(4) National Profit $\times \dfrac{\text{Work Certified}}{\text{Contract price}}$

$= 4,00,000 \times \dfrac{24,00,000}{25,00,000} = $ Rs. 3,84,000

Example 10.6

Engineers Ltd. undertook several contracts during the year 2001. The following information relate to contract No. 107:

		Rs.
Direct Materials		20,250
Direct Wages		15,500
Stores issued		10,500
Loose Tools		2,400
Tractor Expenses:		
Running Material	Rs. 2,300	
Wages of Driver	Rs. 3,000	5,300
Other Direct charges		2,650

The contract took 13 weeks on its completion. The values of loose tools and stores returned at the end of the period were Rs. 200 and Rs. 3,000 respectively. The plant was also returned at a value of Rs. 16,000 after charging depreciation at 20%. The value of tractor was Rs. 20,000 and the depreciation was to be charged to

the tractors 15% per annum. The administration and office expenses are to be provided at 10% on works cost Profit to be charged at 20% of the total cost.

Prepare the aforesaid Account assuming the balance of the contract was duly received from the contractee.

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

Solution:

Dr.   **Contract Account**   **Cr.**

Particulars		Rs.	Particulars	Rs.
To Direct Material		20,250	By Stores returned	3,000
To Direct Wages		15,500	By Loose Tools returned	200
To Stores Issue		10,500	To Plant returned	16,000
To Loose Tools		2,400	By balance being Works	
To Tractor Expenses:			Cost c/d	58,150
Running Material	2300			
Wages to Drivers	3000	5,300		
To Depreciation on Tractor				
@ 15% on Rs. 20,000				
for 13 weeks		750		
To other direct charges		2,650		
		77,350		77,350
To Balance being works				
cost b/d		58,150	By Balance being Total	
To Administrative and			Cost c/d	63,965
Office Expenses @ 10%				
on works cost that is on		5,815		
Rs. 58,150				
		63,965		63,965
To Total Cost b/d		63,965	By Contract's A/c	76,758
To Profit and Loss A/c		12,793		
@ 20% on Total cost				
that is Rs. 63,965		76,758		76,758
To Contract A/c		76,758	By Bank A/c	76,758

Example 10.7

The following is the summarised information relating to contract accounts number 100:

	Rs.
Contract price	6,00,000
Wages	1,64,000
General expenses	8,600
Materials	1,20,000
Cash received (80% of certified work)	2,40,000
Materials at site	10,000
Plant	20,000

Included in the above information are wages Rs. 3,500, materials Rs. 4,000 and other expenses Rs. 2,500 which were incurred since certification. Depreciate plant at 10%. Prepare contract A/c

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

Solution:

Contract Account No. 100

Dr.   Cr.

Particulars	Rs.	Particulars		Rs.
To Materials	1,20,000	By Material at site		10,000
To Wages	1,64,000	By Plant in hand		
To General expenses	8,600	Cost	20,000	
To Plant	20,000	Less: Dep	2000	18,000
		By work in progress:		
To Balance c/d	25,400	Value of work certified		
		$\dfrac{2,40,000 \times 100}{80} = 3,00,000$		
		Work-uncertified 10000		3,10,000
	3,38,000			3,38,000
To P and L A/c		By Balance b/d		25,400
$\left(25,400 \times \frac{2}{3} \times \dfrac{80}{100}\right)$	13,547			
To work in progress	11,853			
	25,400			25,400

Work uncertified   = Material + wages + other exp.

= Rs. 4,000 + Rs. 3,500 + Rs. 2,500 = Rs. 10,000

Example 10.8

The following is the trial balance of Premier Construction Company engaged on the execution of Contract No. 1047 for the year 31st Dec., 2005:

		Rs.
Contractee's account (amount received)		3,00,000
Buildings	1,60,000	
Creditors		72,000
Bank balance	35,000	
Capital account		5,00,000
Materials	2,00,000	
Wages	1,80,000	
Expenses	47,000	
Plant	2,50,000	
	8,72,000	8,72,000

The work on contract 1047 was commenced on 1st January 2005. Material costing Rs. 1,70,000 were sent to the site of the contract but those of Rs. 6,000 were destroyed in an accident. Wages of Rs. 1,80,000 were paid during the year. Plant costing Rs. 50,000 was used on the contract all through the year. Plant with a cost of Rs. 2 lakhs was used from 1st January to 30th September and was then returned to stores. Materials of the cost of Rs. 4,000 were at site on 31st December, 2005.

The contract was for Rs. 6,00,000 and the contractee pays 75% of the work certified. Work certified was 80% of the total contract work at the end of 2005. Uncertified work was estimated at Rs. 15,000 on 31st December, 2005. Expenses are charged to contract at 25% of wages. Plant is to be depreciated at 10% p.a.

Prepare Contract No. 1047 account for the year 2005 and make out the Balance Sheet as on 31st December, 2005 in the books of Premier Construction Company.   *(B.Com. (Hons), Delhi, 2006)*

Solution:

Contract No. 1047 Account for the year ended 2005

To Material	1,70,000	By Abnormal loss – P and L A/c		6,000
To Wages	1,80,000	By Plant returned to	2,00,000	
To Expenses (25% of wages)	45,000	store	1,85,000	
To Plant	2,50,000	Less: Dep @ 10%		
To Profit c/d	90,000	for 9 months	15,000	1,85,000
		By Plant at site	50,000	
		Less: Depreciation		
		@ 10% for the year	5,000	45,000
		By Material at site		4,000
		By Work in Progress		
		Work certified	4,80,000	
		Work uncertified	15,000	4,95,000
	7,35,000			7,35,000
To Profit & Loss A/c (W.N. 1)	45,000	By Profit b/d		90,000
To work in Progress (Reserve)	45,000			
	90,000			90,000

Working Note. Profit taken to Profit and Loss Account

$$90,000 \times \frac{2}{3} \times \frac{75}{100} = \text{Rs. } 45,000$$

Balance Sheet of Premier Construction Company as on 31st December 2005

Liabilities		Amount	Assets		Amount
Capital		5,00,000	Building		1,60,000
Profit and Loss A/c	45,000		Plant		
Less: Abnormal Loss	6,000		in store	1,80,000	
	39,000		at contract site	45,000	2,25,000
Less: Depreciation on					
plant	5,000		Materials:		
	34,000		in store	30,000	
Less: Unabsorbed	2,000	32,000	at contract site	4,000	34,000
Expenses (W.N. 2)					
Creditors		72,000	Work in Progress:		
			Work certified	4,80,000	
			Work uncertified	15,000	
				4,95,000	
			Less: Reserve	45,000	
				4,50,000	
			Less: Cash Received	3,00,000	1,50,000
			Bank balance		35,000
		6,04,000			6,04,000

Working Note. Actual Expenses	47,000
Absorbed Expenses (25% of wages)	45,000
Unabsorbed Expenses	2,000

Example 10.9

ABC Ltd. began to trade on 1st January, 2006. During 2006 the company was engaged on only one contract of which the contract price was Rs. 5,00,000. Of the plant and materials charged to the contract, plant which cost Rs. 5,000 and materials which cost Rs. 4,000 were lost in an accident. On 31st December, 2006 plant which cost Rs. 5,000 was returned to the store, the cost of work done but uncertified was Rs. 2,000 and materials costing Rs. 4,000 were in hand on site. Charge 10% depreciation on plant. Prepare Contract A/c and the Balance Sheet from the following:

Trial Balance as on 31st December, 2006

	Rs.	Rs.
Share Capital		1,20,000
Creditors		10,000
Cash recd.		
(80% of work certified)		2,00,000
Land and Building	43,000	
Bank Balance	25,000	
Charged to contract:		
Materials	90,000	
Plant	25,000	
Wages	1,40,000	
Expenses	7,000	
	3,30,000	3,30,000

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

Solution:

Contract A/c

	Rs.		Rs.	Rs.
To Material	90,000	By W.I.P		
To Plant	25,000	Work Certified	2,50,000	
		Work Uncertified	2,000	2,52,000
To Wages	1,40,000	By P and L A/c (Ab. Loss)		
To Expenses	7,000	Material	4,000	
To balance c/d	21,000	Plant	5,000	9,000
		By Plant returned to stores		4,500
		(Cost Less Depreciation (5000 – 500))		
		By Plant at site		13,500
		By Material at site		4,000
	2,83,000			2,83,000
To P and L A/c	11,200	By balance b/d		21,000
To Reserve	9,800			
	21,000			21,000

Balance Sheet of ABC Ltd. as on 31. Dec. 2006

Liabilities		Amount	Assets		Amount
Share capital		1,20,000	Land and Building		43,000
P and L A/c	11,200		Plant in store		4,500
Less: Ab. Loss	9,000	2200	Plant at the site		13,500
			Material at site		4,000
Creditors		10,000	Work in progress		
			Work certified	2,50,000	
			Work uncertified	2,000	
				2,52,000	
			Less: Reserve	9800	
				2,42,200	
			Less: Cash received	2,00,000	42,200
			Bank		25,000
		1,32,000			1,32,000

Example 10.10

Paramount Engineers are engaged in construction and erection of a bridge under a long-term contract. The cost incurred upto 31.03.2001 was as under:

	(Rs. in Lakh)
Fabrication	
Direct Materials	280
Direct Labour	100
Overheads	60
	440
Erection costs to date	110
	550

The contract price is Rs. 11 crores and the cash received on account till 31.03.2001 was Rs. 6 crores.

A technical estimate of the contract indicates the following degree of completion of work:

Fabrication–Direct Material–70%, Direct Labour and Overheads 60%, Erection–40%. You are required to estimate the profit that could be taken to Profit and Loss Account against this partly completed contract as at 31.03.2001. *(CA Inter, May 2001)*

Solution:

Estimation of Profit to be taken to Profit and loss Account against partly completed contract as at 31.3.2001

$$\text{Profit to be taken to P/L Account} = \frac{2}{3} \times \text{Notional profit} \times \frac{\text{Cash received}}{\text{Work certified}}$$

(Refer to Working Notes 1, 2, 3 and 4)

$$= \frac{2}{3} \times \text{Rs. } 92.48 \text{ lakh} \times \frac{\text{Rs. } 600 \text{ lakh}}{\text{Rs. } 642.48 \text{ lakh}}$$

$$= \text{Rs. } 57.576 \text{ lakh}$$

Working Notes:

1. Statement showing estimated profit to date and future profit on the completion of contract

Particulars	Cost to date		Further costs		Total
	% completion to date	Amount Rs. (a)	% completion to be done	Amount Rs. (b)	cost Rs. (a) + (b)
Fabrication costs:					
Direct material	70	280.00	30	120.00	400.00
Direct labour	60	100.00	40	66.67	166.67
Overheads	60	60.00	40	40.00	100.00
Total fabrication costs: (A)		440.00		226.67	666.67
Erection cost: (B)	40	110.00	60	165.00	275.00
Total estimated costs: (A + B)		550.00		391.67	941.67
Profit		92.48		65.85	158.33
(Refer to Working Note 2)					
		642.48		457.52	1,100.00

2. Profit to date (Notional Profit) and future profit are calculated as below:

$$\text{Profit to date (Notional Profit)} = \frac{\text{Estimated profit on whole contract} \times \text{Cost to date}}{\text{Total cost}}$$

$$= \frac{\text{Rs. } 158.33 \times \text{Rs. } 550}{\text{Rs. } 941.67}$$

$$= \text{Rs. } 92.48 \text{ (lakh)}$$

$$\text{Future profit} = \text{Rs. } 158.33 - \text{Rs. } 92.48$$

$$= \text{Rs. } 65.85$$

3. Work certified:

$$= \text{Cost of the contract to date} + \text{Profit to date}$$

$$= \text{Rs. } 550 + \text{Rs. } 92.48 = \text{Rs. } 642.48 \text{ lakhs}$$

4. Degree of Completion of Contract to date:

$$= \frac{\text{Cost of the contract to date}}{\text{Contract price}} \times 100$$

$$= \frac{\text{Rs. } 642.48 \text{ lakh}}{\text{Rs. } 1,100 \text{ lakh}} \times 100$$

$$= 58.40\%$$

Example 10.11

Brock Construction Ltd. commenced a contract on November 1, 2003. The total contract was for Rs. 39,37,500. It was decided to estimate the total profit of the contract and to take to the credit of P/L A/c that proportion of estimated profit on cash basis, which work completed bore to the total contract. Actual

expenditure for the period November 1, 2003 to October 31, 2004 and estimated expenditure for November 1, 2004 to March 31, 2005 are given below:

		November 1, 2003 to October 31, 2004 (Actuals) Rs.	November 1, 2004 to March 31, 2005 (Estimated) Rs.
Material issued		6,75,000	12,37,500
Labour	Paid	4,50,000	5,62,500
	Prepaid	25,000	—
	Outstanding		2,500
Plant purchased		3,75,000	—
Expenses:	Paid	2,00,000	3,50,000
	Outstanding	50,000	25,000
Plant return to store		75,000	3,00,000
(Historical cost)		(on March 31, 2004)	(on March 31, 2005)
Work certified		20,00,000	Full
Work uncertified		75,000	
Cash received		17,50,000	
Material at site		75,000	37,500

The plant is subject to annual depreciation @ 33% on written down value method. The contract is likely to be completed on March 31, 2005.

Required

Prepare the contract A/c. Determine the profit on the contract for the year November, 2003 to October, 2004 on prudent basis, which has to be credited to P/L a/c *(CA, PE, Exam II, Group II, Nov. 2004)*

Solution:

Brock Construction Ltd. Contract A/c
(November 1, 2003 to Oct. 31, 2004)

Dr.   Dr.

Particulars		Amount (Rs.)			Amount (Rs.)
To Materials issued		6,75,000	By Plant returned to store on 31/03/04		
To Labour paid	4,50,000		at cost	75,000	
Prepaid	25,000	4,25,000	*Less:* Dep (1/3)	10,417	64,583
To Plant purchased		3,75,000	By WIP:		
To Expenses paid	2,00,000		Certified	20,00,000	
To Outstanding	50,000	2,50,000	Uncertified	75,000	20,75,000
To Notional profit c/d		6,89,583	By Plant at site		
		24,14,583	31/10/04 at		
To P/L A/c		1,04,136	Cost	3,00,000	
[2,34,305 ×			*Less:* Dep (1/3)	1,00,000	2,00,000
(17,50,000/			By Materials at site		75,000
20,00,000)					24,14,583
× (20,00,000/					
39,37,500)]			By Notional Profit b/d		6,89,583
To Work-in-progress		5,85,447			
(Profit in reserve)		6,89,583			6,89,583

Brock Construction Ltd. Contract A/c (1 November, 2003 to March 31, 2005)
(For computing estimated profit)

Dr.   Cr.

Particulars	Amount (Rs.)		Amount (Rs.)
To Material issued (6,75,000 + 12,37,500)	19,12,500	By Material at site	37,500
To Labour (paid and outstanding) (4,25,000 + 5,87,500 + 2,500)	10,15,000	By Plant returned to stores on 31/3/04	64,583
To Plant purchased	3,75,000	By Plant returned to stores on 31/3/05	1,72,222
		Cost 3,00,000	
		Less: Dep. 1,00,000	
		Less: 5 month Dep. 27,778	
To Expenses (2,50,000 + 3,25,000)	5,75,000	By Contractee A/c	39,37,500
To Estimated profit	2,34,305		
	42,11,805		42,11,805

Example 10.12

A construction company undertook a contract at an estimated price of Rs. 108 lakh, which includes a budgeted profit of Rs. 18 lakh. The relevant data for the year ended 31.03.2002 are as under:

	(Rs. '000)
Materials issued to site	5,000
Direct wages paid	3,800
Plant hired	700
Site office costs	270
Materials returned from site	100
Direct expenses	500
Work certified	10,000
Progress payment received	7,200

A special plant was purchased specifically for this contract at Rs. 8,00,000 and after use on this contract till the end of 31.02.2002, it was valued at Rs. 5,00,000. This cost of materials at site at the end of the year was estimated at Rs. 18,00,000. Direct wages accrued as on 31.03.2002 was Rs. 1,10,000.

Required

Prepare the Contract Account for the year ended 31st March, 2002 and compute the profit to be taken to the Profit and Loss account.   *(CA, PE, Exam II, Group II, Nov. 2002)*

Solution:

Contract Account for the year ended 31st March, 2002

Dr.   Cr.

	Rs. '000		Rs. '000
To Materials issued to site	5,000	By Materials at site	1,800
To Direct wages	3,800	By Materials returned	100
To Wages accrued	110	By Cost of contract	8,780

(Contd.)

To Plant hire	700		
To Site Office Costs	270		
To Direct expenses	500		
To Depreciation of special plant	300		
	10,680		10,680
To Cost of contract	8,780	By Work certified	10,000
To Profit and Loss A/c	1,200		
(Refer to Working Note 2)			
To Work-in-progress c/d (Profit in reserve)	20		
	10,000		10,000

Working Notes:

1. Percentage of contract completion $= \dfrac{\text{Cost of work certified}}{\text{Value of the contract}} \times 100$

   $= \dfrac{100 \text{ lakh}}{108 \text{ lakh}} \times 100 = 92.59\%$

2. Since the percentage of Contract completion is more than 90% therefore the profit to be taken to Profit and Loss Account can be computed by using the following formula.

   Profit to be taken to P and L A/c $=$ Budgeted/Estimated Profit $\times \dfrac{\text{Cash received}}{\text{Work certified}} \times \dfrac{\text{Work certified}}{\text{Contract price}}$

   $= 1,800 \times \dfrac{7,200}{10,000} \times \dfrac{10,000}{10,800}$

   $= 1,800 \times \dfrac{7,200}{10,800}$

   $=$ Rs. 1,200

Example 10.13

M/s New Century Builders have entered into a contract to build an office building complex for Rs. 480 lakh. The work started in April 1997 and it is estimated that the contract will take 15 months to be completed. Work has progressed as per schedule and the actual costs charged till March 1998 are as follows:

	(Rs. in lakh)
Materials	112.20
Labour	162.00
Hire Charges for equipments and other expenses	36.00
Establishment Charges	32.40
	342.60

The following information are available:

	(Rs. in lakh)
Materials in hand (March 31, 1998)	6.60
Work certified (of which Rs. 324 lakh have been paid) at March 31, 1998	400.00
Work not yet certified at March 31, 1998, at cost	7.50

As per management estimates, the following further expenditure will be incurred to complete the work:

	Rs. (in lakh)
Materials	10.50
Labour	16.00
Sub-contractor	20.00
Equipments hire and other charges	3.00
Establishment charges	6.90

You are required to compute the value of work-in-progress as on March 31, 1998 after considering a reasonable margin of profit and show the appropriate accounts. Make a provision for contingencies amounting to 5% of total costs. *ICWA Inter, Dec. 1998)*

Solution:

Contract Account

Particulars	Rs.	Particulars	Rs.
To Materials	1,12,20,000	By Stock of Materials	6,60,000
To Labour	1,62,00,000	By Work-in Progress:	
To Hire Charges	36,00,000	Work certified	4,00,00,000
To Establishment Charges	32,40,000	Work uncertified	7,50,000
To Profit c/d	71,50,000		
	4,14,10,000		4,14,10,000
To Profit & Loss A/c (WN. 1)	50,00,000	By Profit b/d	71,50,000
To Balance (being Reserve)	21,50,000		
	71,50,000		71,50,000

Contractee's Account

Particulars	Rs.	Particulars	Rs.
To Contract A/c	4,00,00,000	By Bank	3,24,00,000
		By Balance c/d	76,00,000
	4,00,00,000		4,00,00,000

Working Notes:

1. Profit to be taken to P&L

The profit to be taken to P&L Account on the contract for the year ending 31st March, 1998 has been arrived at as follows

Expenditure upto March 31, 1998 (Rs. 3,42,60,000 – 6,60,000)		= Rs. 3,36,00,000
Add: Estimated Expenditure to Complete:		
Materials	10,50,000	
Add: Stock as on March 31, 1998	6,60,000	17,10,000
Labour		16,00,000
Sub Contractors		20,00,000
Hire charges on Equipment etc.		3,00,000
Establishment Charges		6,90,000

		63,00,000
Provision for Contingencies		21,00,000
(@ 5% on total cost (3,99,00,000 × 5/95)		
Total Estimated Cost		4,20,00,000
Total Estimated Profit		60,00,000
Contract Price		4,80,00,000

$$\text{Profit to be taken to P\&L} = \text{Total Estimated Profit} \times \frac{\text{Work Certified}}{\text{Contract Price}}$$

$$= \text{Rs. } 60,00,000 \times \frac{\text{Rs. } 4,00,00,000}{\text{Rs. } 4,80,00,000} = \text{Rs. } 50,00,000*$$

* The amount of profit may further be reduced to cash basis, if desired.

2. Computation of value of work-in-progress

Value of Work Certified	4,00,00,000
Add: Cost of Work Uncertified	7,50,000
	4,07,50,000
Less: Reserve being Profit not taken to P&L as on 31.3.1998	21,50,000
	3,86,00,000
Less: Cash received	3,24,00,000
Balance of Work-in-progress to be shown in Balance Sheet	62,00,000

Example 10.14

One of the building contracts currently engaged in by a construction company commenced 15 months ago and remain unfinished. The following information relating to the work on the contract has been prepared for the year just ended:

Particulars	Rs. '000
Contract price	2,500
Value of work certified at the end of year	2,200
Cost of work not yet certified at the end of year	40
Costs incurred:	
Opening balances:	
Cost of work completed	300
Materials on site (physical stock)	10
During the year:	
Material delivered to site	610
Wages	580
Hire of plant	110
Other expenses	90
Closing balance:	
Materials on site (physical stock)	20

As soon as materials are delivered to the site, they are charged to the contract account. A record is also kept of materials as they are actually used on the contract. Periodically a stock check is made and any discrepancy between book stock and physical stock is transferred to a general contract material discrepancy

account. This is absorbed back to each contract, currently at the rate of 0.5% of materials booked. The stock check at the year end revealed a stock shortage of Rs. 5,000.

In addition to the direct charges listed above, general overheads are charged to contracts at 5% of the value of work certified. General overheads of Rs. 15,000 has been absorbed into the cost of work completed at the beginning of the year.

It has been estimated that further costs to complete the contract will be Rs. 2,20,000. This estimate includes the cost of materials on site at the end of the year just finished and also a provision for rectification.

Required:

(a) Determine the profitability of the above contract and recommend how much profit (to the nearest Rs. '000) should be taken for the year just ended. (Provide a detailed schedule of costs.)

(b) State how your recommendation in (a) would be affected if the contract price was Rs. 40,00,000 (rather than Rs. 25,00,000) and if no estimate has been made of costs to completion. (If required, suitable assumption should be made.) *(CA Inter, Nov. 1995)*

Solution:

(a) Schedule of Costs and Profitability

	(Rs. '000)
Cost of Work Completed (Opening Balance)	300
Materials (See WN)	595
Wages	580
Hire of Plant	110
Stock Discrepancy (0.5% of Rs. 595)	3
Other Expenses	90
General Overheads (5% × Rs. 2,200 – Rs. 15)	95
Cost of Contract to date	1,773
Add: Further Costs to complete the contract	220
Estimated Total Cost (*A*)	1,993
Contract Price (*B*)	2,500
Estimated Profit (*B*) – (*A*)	507

$$\text{Profit to be taken to Costing P\&L A/c} = \frac{\text{Estimated Profit} \times \text{Cost of work to date}}{\text{Estimated total cost}}$$

$$= \frac{\text{Rs. } 5,07,000 - \text{Rs. } 17,73,000}{\text{Rs. } 19,93,000}$$

$$= \text{Rs. } 4,51,034$$

Alternatively, the profit to be taken to P&L Account can be ascertained as follows:

$$= \frac{\text{Estimated profit} \times \text{Work certified}}{\text{Contract price}}$$

$$= \frac{\text{Rs. } 5,07,000 \times 22,00,000}{\text{Rs. } 25,00,000}$$

$$= \text{Rs. } 4,46,160$$

Working Note:

Cost of Material Booked/Utilised (At Site)

Material delivered to site	Rs. 6,10,000
Add: Opening balance of material at site	10,000
	6,20,000
Less: Closing balance of material at site	20,000
	6,00,000
Less: Stock shortage	5,000
Material booked (at site)	5,95,000

When the value of contract is Rs. 40,00,000 and the value of work certified is Rs. 22,00,000 the work completed amounts to more than 50%. The amount of profit to be taken to Costing Profit and Loss Account can be ascertained as follows (if the ratio of cash received/work certified is 80%):

$$= \text{Notional Profit} \times 2/3 \times \frac{\text{Cash received}}{\text{Work certified}}$$

$$= \text{Rs. } 4,67,000^* \times 2/3 \times 80/100$$

$$= \text{Rs. } 2,49,067 \text{ (rounded to Rs. } 2,49,000)$$

* Notional Profit:

$$= (\text{Value of work certified} + \text{Cost of work not certified} - \text{Cost of contract to date})$$

$$= \text{Rs. } 22,00,000 + \text{Rs. } 40,000 - \text{Rs. } 17,73,000)$$

$$= \text{Rs. } 4,67,000$$

Example 10.15

Surya Construction Ltd. with a paid up share capital of Rs. 50 lakhs undertook a contract to construct MIG apartments. The work commenced on the contract on 1st April 2000. The contract price was Rs. 60 lakh. Cash received on account of the contract upto 31st March, 2001 was Rs. 18 lakh (being 90% of the work certified). Work completed but not certified was estimated at Rs. 1,00,000. As on 31st March 2001 material at site was estimated at Rs. 30,000, machinery at site costing Rs. 2,00,000 was returned to stores and wages outstanding were Rs. 5,000. Plant and machinery at site is to be depreciated at 5%.

The following were the ledger balances (Dr.) as per trial balance as on 31st March 2001:

	Rs.
Land and Building	23,00,000
Plant and Machinery	25,00,000
(60% at site)	
Furniture	60,000
Materials	14,00,000
Fuel and Power	1,25,000
Site expenses	5,000
Office expenses	12,000
Rates and taxes	15,000
Cash at Bank	1,33,000
Wages	2,50,000

Prepare the Contract Account and Balance Sheet.   (*B. Com. (Hons), Delhi 2001*)

Solution:

Contract Account

Dr.   **Cr.**

		Rs.		Rs.
To Materials	14,00,000		By Work Certified	
			$\dfrac{18,00,000 \times 100}{90}$	
Less: Material at site				
	(–) 30,000	13,70,000	= 20,00,000	
To Wages	2,50,000		By Work Uncertified	
Add O/s	+ 5,000	2,55,000	= 1,00,000	21,00,000
To Fuel & Power		1,25,000		
To Site Expenses		5,000		
To Office Expenses		12,000		
To Rates & Taxes		15,000		
To Depreciation on Machine at Site				
$\left(\dfrac{25,00,000 \times 60 \times 5}{100 \times 100}\right)$		75,000		
To Balance c/d		2,43,000		
		21,00,000		21,00,00
To Profit and Loss A/c			By Balance b/d	2,43,000
$2,43,000 \times \dfrac{1}{3} \times \dfrac{90}{100}$		72,900		
To Reserve transferred to W/P		1,70,100		
		2,43,000		2,43,000

Working Notes. 1. Work Certified   Rs.

$\dfrac{18,00,000 \times 100}{90} =$ 20,00,000

Less: Ca$^\circ$h Received =   18,00,000

                                                                                     2,00,000

Less: Profit transferred to WIP   1,70,100

                                                                                       29,900

Add: Work uncertified   1,00,000

          Work-in-Progress   1,29,900

2. No depreciation has been charged on Land and Building and furniture as the same have not been shown at site.

3. Machinery returned to stores Rs. 2,00,000 – 5% of Rs. 2,00,000
             = Rs. 2,00,000 – 10,000
             = Rs. 1,90,000

Balance Sheet
as on 31st March 2001

Liabilities	Amt.	Assets		Amt.
Authorised and subscribed		Work in progress (1)		1,29,900
Capital	—	Land and Building		23,00,000
Issued and paid up Capital	50,00,000	Machinery		
		At Site	15,00,000	
O/S Wages	5,000	(–) Depreciation		
Profit and loss A/c	72,900		(–) 75,000	
			14,25,000	
		(–) Returned		
			(–) 1,90,000	12,35,000
		Machinery At office	10,00,000	
		(+) Returned from site	+ 1,90,000	11,90,000
		Furniture		60,000
		Bank		1,33,000
		Materials at site		30,000
	50,77,900			50,77,900

Example 10.16

MNP Construction Ltd. commenced a contract on April 1, 1999. The total contract was for Rs. 17,50,000. It was decided to estimate the total profit and to take to the credit of P/L A/c the proportion of estimated profit on cash basis, which work completed bore to the total contract. Actual expenditure in 1999–2000 and estimated expenditure in 2000–2001 are given below:

	1999–2000 (Actuals) Rs.	2000–2001 (Estimated) Rs.
Materials issued	3,00,000	5,50,000
Labour : Paid	2,00,000	2,30,000
: Outstanding at end	20,000	30,000
Plant purchased	1,50,000	–
Expenses: Paid	75,000	1,50,000
: Prepaid at end	15,000	–
Plant returned to store (historical cost)	50,000	1,00,000 (on Dec. 31, 2000)
Material at site	20,000	50,000
Work certified	8,00,000	Full
Work uncertified	25,000	–
Cash received	6,00,000	Full

The plant is subject to annual depreciation @ 25% of WDV Cost. The contract is likely to be completed on Dec. 31, 2000. Prepare the Contract A/c. Determine the profit on the contract for the year 1999–2000 on prudent basis, which has to be credited to P/L A/c.   *(CA Inter, May 2000)*

Solution:

MNP Construction Ltd.
Contract Account (1st April, 1999 to 31st March, 2000)

Dr.   Cr.

Particulars	(Rs.)	Amount (Rs.)	Particulars	Amount (Rs.)
To Materials issued		3,00,000	By Plant returned to store	37,500
To Labour: Paid	2,00,000		(Refer to Working Note I)	
Outstanding	20,000	2,20,000	By Materials at site	20,000
To Plant purchased		1,50,000	By Work certified	8,00,000
(Refer to Working Note 4)			By Work uncertified	25,000
To Expenses		60,000	By Plant at site	75,000
To Notional profit c/d		2,27,500	(Refer to Working Note 2)	
		9,57,500		9,57,500
To Profit and Loss A/c		66,321.43	By Notional profit b/d	2,27,500.00
(Refer to Working Note 5)				
To Work-in-Progress A/c		1,61,178.57		
(Profit in reserve)				
		2,27,500.00		2,27,500.00

MNP Construction Ltd.
Contract Account
(1st April, 1999 to 31st December, 2000)
(For computing estimated profit)

Dr.   Cr.

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials issued	8,50,000	By Materials at site	50,000
(Rs. 3,00,000 + Rs. 5,50,000)		By Plant returned to store on	37,500
To Labour (paid & outstanding)	4,80,000	31st March 2000	
(Rs. 2,20,000 + Rs. 2,30,000 +		(Refer to Working Note 1)	
Rs. 30,000)		By Plant returned to store	60,937.50
To Plant purchased	1,50,000	on 31st December, 2000	
To Expenses	2,25,000	(Refer to Working Note 3)	
(Rs. 60,000 + Rs. 1,65,000)		By Contractee's A/c	17,50,000
To Estimated profit	1,93,437.50		
	18,98,437.50		18,98,437.50

Working Notes:

1. Value of the plant returned to store on 31st March, 2000

	Rs.
Historical cost of the plant returned	50,000
Less: Depreciation @ 25% of WDV cost for 1 year	12,500
Value of the plant returned to store on 31st March, 2000	37,500

2. Value of plant at site:

	Rs.
Historical cost of the plant at site	1,00,000
Less: Depreciation @ 25% of WDV cost for 1 year	25,000
Value of the plant at site on 31st March, 2000	75,000

3. Value of the plant returned to store on 31st December, 2000

	Rs.
Value of the plant on 31st March, 2000	75,000.00
Less: Depreciation @ 25% of WDV for a period of 9 months	14,062.50
Value of the plant on 31.12.2000	60,937.50

4. Expenses paid:

Total expenses paid	75,000
Less: Prepaid expenses at end	15,000
Expenses paid for the year 1999–2000	60,000

5. Profit to be credited to P/L A/c on 31st March, 2000 for the contract likely to be completed on 31st December, 2000

$$\text{Estimated profit} \times \frac{\text{Cash received}}{\text{Work certified}} \times \frac{\text{Work certified}}{\text{Total contract price}}$$

$$= \text{Rs. } 1,93,437.50 \times \frac{6,00,000}{8,00,000} \times \frac{8,00,000}{17,50,000}$$

$$= \text{Rs. } 66,321.43$$

Example 10.17

A contractor, who prepares his account on 31st December each year, commenced a contract on 1st April, 2001. The costing records concerning the said contract reveal the following information on 31st December, 2001.

Materials charged to site	Rs. 2,58,100
Labour engaged	5,60,500
Foremen's salary	79,300

Plants costing Rs. 2,60,000 had been on site for 146 days. Their working life is estimated at 7 years and their final scrap value at Rs. 15,000. A supervisor, who is paid Rs. 4,000 p.m., has devoted approximately three-fourths of his time to this contract. The administrative and other expenses amounts to Rs. 1,40,000. Materials in hand at site on 31st December, 2001 cost Rs. 25,400. Some of the material costing Rs. 4,500 was found unsuitable and was sold for Rs. 4,000 and a part of the plant costing Rs. 5,500 (on 31.12.2001) unsuited to the contract was sold at a profit of Rs. 1,000.

The contract price was Rs. 22,00,000 but it was accepted by the contractor for Rs. 20,00,000. On 31st December, 2001 two-thrids of the contract was completed. Architect's certificate had been issued covering 50% of the contract price and Rs. 7,50,000 has so far been paid on account. Prepare contract account and state how much profit or loss should be included in the financial accounts on 31st December, 2001. Workings should be clearly given. Depreciation is charged on time basis. *(B. Com. (Hons.), Delhi, 2006),(CA Inter)*

Solution:

Contract Account
(From April 1,Dec. 31 2001)

Particulars	Rs.	Particulars	Rs.
To Materials	2,58,100	By Materials at site	25,400
To Labour engaged	5,60,500	By Materials sold	4,000
To Foremem's salary	79,300	By Profit and Loss A/c	500
To Supervisor's salary (WN:1)	27,000	(Loss on sale of materials)	
To Depreciation of plant (WN: 2)	14,000	By Cost of work done c/d	10,49,000
To Administrative and other expenses	1,40,000		
	10,78,900		10,78,900
To Cost of work done b/d	10,49,000	By Work-in-progress:	
To Profit c/d	2,13,250	Work certified (WN: 3)	10,00,000
		Work uncertified (WN: 3)	2,62,250
	12,62,250		12,62,250
To Profit and Loss A/c	1,06,625	By Profit b/d	2,13,250
(2,13,250 × 2/3 × 7,50,000/10,00,000)			
To work-in-progress A/c (Reserve)	1,06,625		
	2,13,250		2,13,250

Contractee's Account

To Balance c/d	Rs. 7,50,000	By Bank	Rs. 7,50,000

Extracts from Balance Sheet as on 31st December, 2001

Liabilities	Rs.	Assets		Rs.
Profits and Loss A/c (WN: 4)	1,07,125	Work-in-progress:		
		Work certified	10,00,000	
		Work uncertified	2,62,250	
			12,62,250	
		Less: Reserve	1,06,625	
			11,55,625	
		Less: Cash received	7,50,000	4,05,625
		Material at site		25,400
		Plant at site (WN: 5)		2,40,500

Working Notes:

1. Supervisor's Salary: 3/4 (9 months × Rs. 4,000) = Rs. 27,000
2. Depreciation of Plant: (Rs. 2,60,000 − Rs. 15,000)/7 years × 146/365 = Rs. 14,000
3. Cost of Work Uncertified:
Cost of 2/3rd of the contract is Rs.. 10,49,000
The estimated cost of the total contract will amount to Rs. 10,49,000 × 3/2 = Rs. 15,73,500

Cost of 50% of the contract, as certified by the architect would be Rs. 15,73,500/2 = Rs. 7,86,750.
Cost of Work done but uncertified would, therefore be, Rs. 10,49,000 – Rs. 7,86,750 = Rs. 2,62,250.

4. Profit and Loss Account

To Contract A/c	Rs. 500	By Contract A/c	Rs. 1,06,625
(Loss on sale of materials)		(Profit transferred)	
To Balance c/d	1,07,125	By Profit on sale of Plant	1,000
	1,07,625		1,07,625

5. Plant Account

To Balance b/d	Rs. 2,60,000	By Contract A/c (Depreciation)	Rs. 14,000
To Profit and Loss A/c	1,000	By Bank (Sale)	6,500
(Profit on sale of plant)		By Balance c/d	2,40,500
	2,61,000		2,61,000

Example 10.18

The contract Ledger of Alpha Co. revealed the following expenditure on account of contract on 31st December, 2000.

	Rs.
Materials	2,10,000
Plant	70,000
Wages	2,93,000
Expenses	15,000
Establishment charges	10,000

The contract was started on 1st Jan., 2000 and the contract price was Rs. 10,00,000. Cash received to date was Rs. 4,80,000 representing 80% of the work certified, the remaining 20% being retained until completion. The value of plant on 31st December, 2000 was Rs. 20,000 and the value of material on hand was Rs. 6,000. The cost of work finished but not certified on the said date was Rs. 50,000.

Some of the materials, costing Rs. 20,000 were found unsuitable and were sold for Rs. 16,000 and a part of the plant costing Rs. 5,000 unsuited to the contract was sold at a profit of Rs. 1,000.

In order to calculate the profit made on the contract to 31st December, 2000 the contractors estimated further expenditure that would be incurred in completing the contract and took to the credit of Profit and Loss Account for the year that proportion of the estimated net profit to be realised on the contract which the value of work certified bore to the contract price.

The estimaties were as under:

(a) that the contract would be completed by 30th June 2001.
(b) that a further sum of Rs. 30,000 would have to be spent on plant and the residual value of the plant on the completion of the contract would be Rs. 12,000.
(c) the materials in addition to those on hand on 31st December, 2000 would cost Rs. 1,00,000 and that further sundry expenses of Rs. 7,000 would be incurred.
(d) that the wages on the contract for the six months to June, 2001 would amount to Rs. 1,69,900.
(e) that the establishment charges would cost the same amount per month as in the previous year.
(f) that Rs. 18,000 would be sufficient to meet the contingencies.

Prepare the contract account for the year ended 31st December, 2000 and show your calculations of the profit to be credited to Profit and Loss Account of the year. (*B. com (Hons), Delhi, 2007*)

Solution:

Contract A/c
(for the year ended 31.12.2000)

2000	Rs.	2000		Rs.
To Materials	2,10,000	By materials sold		16,000
To Wages	2,93,000	By P and L A/c		
To Plant	70,000	(Loss on material sold)		4,000
To Sundry expenses	15,000	By Plant sold		6,000
To Establishment charges	10,000			
To P and L A/c (Profit on plant sold)	1,000	By Plant on site		20,000
To Balance c/d	1,03,000	By Material in hand		6,000
		By Work-in-progress A/c :		
		Work certified	6,00,000	
		Work uncertified	50,000	6,50,000
	7,02,000			7,02,000
2000, Dec. 31		2000 Dec. 31		
To P and L A/c:		By Balance b/d		1,03,000
$\left(\text{Profit Rs.}\dfrac{1,09,100 \times 6,00,000}{10,00,000}\right)$	65,460			
To Work-in-progress				
(Balance of Profit)	37,540			
	1,03,000			1,03,000

Estimated Contract A/c on Completion

	Rs.		Rs.
To Materials		By Materials sold	16,000
(2,10,000 + 1,00,000)	3,10,000	By P and L A/c (loss on materials sold)	4,000
To Wages (2,93,000 + 1,69,000)	4,62,900	By Plant sold	6,000
To Plant (70,000 + 30,000)	1,00,000	By Plant at the close	12,000
To P and L A/c: Plant sold	1,000	By Contractee's A/c :	
To Sundry Exp. (15,000 + 7,000)	22,000	Contract price	10,00,000
To Establishment charges (10,000 + 5,000)	15,000		
To Contingencies	18,000		
To P and L A/c:			
Profit on completion estimated	1,09,100		
	10,38,000		10,38,000

Example 10.19 (Escalation Clause)

Deluxe Limited undertook a contract for Rs. 5,00,000 on 1st July 2001. On 30th June 2002, when the accounts were closed, the following details about the contract were gathered:

	Rs.
Materials purchased	1,00,000
Wages paid	45,000
General expenses	10,000
Plant purchased	50,000
Materials on hand 30.6.2002	25,000
Wages accrued 30.6.2002	5,000
Work certified	2,00,000
Cash received	1,50,000
Work uncertified	15,000
Depreciation of plant	5,000

The above contract contained an escalation clause which reads as follows:

"In the event of prices of materials and rates of wages increase by more than 5% the contract price will be increased accordingly by 25% of the rise in the cost of materials and wages beyond 5% in each case".

It was found that since the date of signing the agreement the prices of materials and wage rates increased by 25%. The value of the work certified does not take into account the effect of the above clause.

Prepare the contract account. Workings should form part of the answer. *(ICWA Inter, CA Inter)*

Solution:

Contract Account

	Rs.		Rs.
To Materials	1,00,000	By Work-in-progress:	
To Wages (45,000 + 5,000)	50,000	Work certified	2,00,000
To General expenses	10,000	Work uncertified	15,000
To Depreciation on plant	5,000	Contract escalation	
To Profit:		(Working Note 1)	5,000
Transferred to P and L (Working Note 2)	20,000	By Materials in hand	25,000
Taken to WIP	60,000		
	2,45,000		2,45,000

Working Notes:

1. Escalation charges:

   (a) Materials

Effect of increase in price of materials	*Total increase (Rs.)*	*Upto 5% (Rs.)*	*Beyond (Rs.)*
	75,000 × 25/125	75,000 × 5/125	
	= 15,000	= 3,000	= 12,000

   (b) Wages

Effect of increase in wage rates	50,000 × 25/125	50,000 × 5/125	
	= 10,000	= 2,000	= 8,000
Total increase (a) + (b)	= 25,000	= 5,000	= 20,000
Increase in contract			
Price (25% of increase beyond 5%)	20,000 × 25/100	= Rs. 5,000	

2. Computation of profit transferred to Profit and Loss Account: Since more than 1/4th but less than 1/2 of the contract has been completed, 1/3 of the profit earned as reduced on cash basis has been transferred to Profit and Loss Account.

$$80,000 \times \frac{1}{3} \times \frac{1,50,000}{2,00,000} = \text{Rs. } 20,000$$

BATCH COSTING

As stated earlier, a job order can be for an item or a number of items. In the case of the latter, the order is strictly a batch and the total batch cost must be divided by the quantity to give the cost per item. While job costing is concerned with the costing of jobs that are made to a customer's particular requirements, batch costing is used where articles are manufactured in definite batches and held in stock for sale to customers generally. When each order is finished/completed, the cost sheet is totalled and the total cost divided by the quantity produced to show the cost per article or per dozen, etc.

ECONOMIC BATCH QUANTITY

What should be the optimum size of a batch, is an important question. If the size is higher, the unit costs may tend to decline, but the units in inventory will go up. The size of the batch influences the clerical and other machine set-up costs also. Therefore an economic batch quantity should be determined. Generally, the following formula is used which is similar in nature to economic order quantity.

$$E = \sqrt{\frac{2\,U.S}{C\left(I - \dfrac{U}{R}\right)}}$$

where E = Economic order quantity

U = Annual usage in units

S = Set-up and order processing costs

R = Annual rate of production

C = Cost of carrying one unit in inventory for one year

If the production of the batch is done over a short period, $\dfrac{U}{R}$ loses its significance and only then the following formula is applied:

$$E = \sqrt{\frac{2\,U.S}{C}}$$

Example 10.20

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actuals. Overheads are levied at a rate per labour hour. The selling price contracted for is Rs. 8 per piece. From the following data, present the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch output	Material cost (Rs.)	Direct wages (Rs.)	Direct labour (hr)
Jan.	210	650	120	240
Feb.	200	640	140	280
March	220	680	150	280
April	180	630	140	270
May	200	700	150	300
June	220	720	160	320

The other details are:

Month	Chargeable expenses (Rs.)	Direct labour (hr)
Jan.	12,000	4,800
Feb.	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

Solution:

Cost Sheet for Six Months Ending 30th June

(Output 1230 units)

Month	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	210	200	220	180	200	220	1,230
Sales value (in Rs.)	1,680	1,600	1,760	1440	1,600	1,760	9,840
Cost of materials (in Rs.)	650	640	680	630	700	720	4,020
Direct wages (in Rs.)	120	140	150	140	150	160	860
Chargeable expenses (in Rs.)	600	672	672	621	780	800	4,145
Total cost (in Rs.)	1,370	1,452	1,502	1,391	1,630	1,680	9,025
Total cost per unit (in Rs.)	6.52	7.26	6.83	7.73	8.15	7.64	7.34
Profit per batch (in Rs.)	310	148	258	49	−30	80	815
Profit per unit (in Rs.)	1.48	0.74	1.17	0.27	−0.15	0.36	0.66

Overall position of the order for 1,200 units:

Sales value of 1,200 units @ Rs. 8 Per unit — Rs. 9,600

Total cost for 1,200 units @ Rs. 7.34 per unit — Rs. 8,808

Profit — Rs. 792

Note: Chargeable expenses have been charged to different batches on the basis of direct labour hours for different months; for example

$$\text{For January } \frac{\text{Rs. } 12,000}{4,800} \times 240 = 600$$

Example 10.21

Leo Limited undertakes to supply 1,000 units of a component per month for the months of January, February and March 2002. Every month a batch order is opened against which materials and labour cost are booked at actuals. Overheads are levied at a rate per labour hour. The selling price is contracted at Rs. 15 per unit.

From the following data, present the profit per unit of each batch order and the overall position of the order for the 3,000 units.

Month	Batch output (Numbers)	Material cost Rs.	Labour cost Rs.
January 2002	1,250	6,250	2,500
February 2002	1,500	9,000	3,000
March 2002	1,000	5,000	2,000

Labour is paid at the rate of Rs. 2 per hour. The other details are:

Month	Overheads	Total labour hours
January 2002	Rs. 12,000	4,000
February 2002	Rs. 9,000	4,500
March 2002	Rs. 15,000	5,000

Solution:

Leo Limited
Statement of Cost and Profit Per Unit of Each Batch

		January 2002	Feb. 2002	March 2002	Total
(a)	Batch Output (Nos)	1,250	1,500	1,000	3,750
		Rs.	Rs.	Rs.	Rs.
(b)	Sales Value (Rs.. 15 per unit)	18,750	22,500	15,000	56,250
(c)	Costs :				
	Material	6,250	9,000	5,000	20,250
	Wages	2,500	3,000	2,000	7,500
	Overheads (as per note (iii) below)	3,750	3,000	3,000	9,750
	Total	12,500	15,000	10,000	37,500
(d)	Profit per batch (b) – (c)	6,250	7,500	5,000	18,750
(e)	Cost per unit (c) + (a)	10	10	10	
(f)	Profit per unit (d) + (a)	5	5	5	

Working Notes:

		Jan 2002	Feb. 2002	March 2002
(i)	Labour hours:			
	Labour cost/Labour rate per hour	$\dfrac{Rs. 2,500}{2}$	$\dfrac{Rs. 3,000}{2}$	$\dfrac{Rs. 2,000}{2}$
		=1,250	= 1,500	=1,000
(ii)	Overhead per hour:	Rs. 12,000	Rs. 9,000	Rs. 15,000
	Total overheads	4,000	4,500	5,000
	Total labour hours	= Rs. 3	= Rs. 2	= Rs. 3
(iii)	Overhead for the batch (i) × (ii)	Rs. 3,750	Rs. 3,000	Rs. 3,000

Overall Position of the Order for 3,000 units

Sales value (3,000 units × Rs. 15)	Rs. 45,000
Less: Total cost (3,000 units × Rs. 10)	Rs. 30,000
Profit	Rs. 15,000

Example 10.22

A work order for 500 units of a commodity has to pass through four different machines of which the machines hour rates are

	Rs.
No. I	1.25
No. II	3.00
No. III	4.00
No. IV	2.50

The following expenses have been incurred on the work order. Materials Rs. 20,000 and wages Rs. 1,500.

Machine	I	Worked for	200	hours
Machine	II	Worked for	300	hours
Machine	III	Worked for	240	hours
Machine	IV	Worked for	100	hours

After the work order had been executed, materials worth Rs. 1,000 were returned to stores.

Office overheads are to be estimated @ 60% of works cost: 10% of the production is going to be discarded, being unsatisfactory for which 1/2 the amount can be realised from sale in the junk market. Find out the rate of selling price per unit if 20% profit on selling price is desired.

Solution:

Statement Showing Cost and Selling Price for 500 Units

	Rs.	Rs.	Rs.
Material used	20,000		
— Less returned	1,000		19,000
Wages			1,500
Prime Cost			20,500
Work Overhead: Hours × Rate			
Machine No. I 200 × Rs. 1.25		250	
Machine No. II 300 × Rs. 3.00		900	
Machine No. III 240 × Rs. 4.00		960	
Machine No. IV 100 × Rs. 2.50		250	2,360
Work Cost			22,860
Office Overheads: 60% of works cost			13,716
			36,576
Less: Sale of discarded units			
10 % discarded	Rs. 3657.60		
Half to be realised	1828.80		
Loss	1,828.80		1828.80
Total Cost			34,747.20
Profit 20% on selling price or 25% on cost			8,686.80
Sales			43,434.00

Selling Price per unit

$$\frac{\text{Rs. } 43,434}{500} = \text{Rs. } 86.86 \text{ approx.}$$

Note: It has been presumed that net resulted output is 500 units, that is, the quantum of work order, after the discarded units have been adjusted for.

THEORY QUESTIONS

1. (i) What is the nature of job costing? How are the costs recorded on job orders?
   (ii) Explain the meaning of contract costing and batch costing.
2. Indicate how you would deal with the following items:
   (a) Plant and machinery pruchased and used on contract work.
   (b) Amounts received from contractee.
   (c) Materials lying unused at site.
3. (i) Discuss the implications of cost-plus contracts from the viewpoint of:
   (a) Manufacturer
   (b) Customer
   (ii) What is the relevance of the escalation clause provided in a contract?
4. Describe briefly the nature of accounting problems associated with job costing.   *(B.Com. (Hons), Delhi, 2002,*
5. How will you treat profit on incomplete contracts in cost accounts?   *(B.Com. (Hons), Delhi, 2004, 2007,*
6. What do you understand by cost-plus contract and Escalation clause in contract costing?
   (B.Com. (Hons), Delhi, 2005, 2006, ICWA, Inter, Stage I, Dec. 2006)
7. Distinguish between job costing and process costing.   *(B.Com. (Hons), Delhi, 2007)*
8. Explain the following:
   (i) Notional profit in contract costing.
   (ii) Retention money in contract costing.   *(CA, PE, Exam II, Group II, May 2007)*
9. Discuss the process of estimating profit/loss on incomplete contracts.   *(CA, PE, Exam II, Group II, Nov. 2003)*

SELF-EVALUATION QUESTIONS

Choose the correct answer for the following multiple-choice questions:
(i) Which of the following production activities would be most likely to employ job order costing?
   (a) Ship building
   (b) Candy manufacturing
   (c) Toy manufacturing
   (d) Crude oil refining
(ii) In job-order costing, the basic document to accumulate and ascertain the cost of each order is the
   (a) Purchase order
   (b) Requisition sheet
   (c) Invoice
   (d) Job cost sheet
(iii) Which of the following will not be used in job-order costing?
   (a) Standards
   (b) Marginal costing
   (c) Averaging of direct labour and material rates
   (d) Factory overhead allocation based on direct labour hours applied to the job.

PROBLEMS

Job Costing

1. The following information for the year ending December 31, 2001 is obtained from the books and records of a factory:

	Completed jobs Rs.	Work-in-progress Rs.
Raw materials supplied from stores	90,000	30,000
Wages	1,00,000	40,000
Chargeable expenses	10,000	4,000
Materials transferred to work-in-progress	2,000	2,000
Materials returned to stores	1,000	

Factory overheads is 80% of wages and office overhead is 25% of factory cost.
The value of executed contracts during 2002 was Rs. 4,10,000. Prepare the:
(i) consolidated completed jobs acount, and (ii) consolidated work-in-progress account.

Ans: (i) Profit Rs. 63,750

(ii) Balance c/d in WIP Rs. 1,35,000

2. A factory uses a job costing system. The following data are available form the books at the year ending 31st March 2002.

	Rs.
Direct material	9,00,000
Direct wages	7,50,000
Profit	6,09,000
Selling and distribution overhead	5,25,000
Administrative overhead	4,20,000
Factory overhead	4,50,000

Required:

(a) Prepare a cost sheet indicating the prime cost, works cost, production cost, cost of sales and sales value.
(b) In 2002–03, the factory has received an order for a number of jobs. It is estimated that the direct materials would be Rs. 12,00,000 and direct labour would cost Rs. 7,50,000. What would be the price for these jobs if the factory intends to earn the same rate of profit on sales, assuming that the selling and distribution overhead has gone up by 15%. The factory recovers factory overhead as a percentage of direct wages and administrative and selling and distribution overhead as a percentage of works cost, based on the cost rates prevalent in the previous year.

(CA Inter)

Ans: (a) Prime cost Rs. 16,50,000, Works cost Rs. 21,00,000, Production cost Rs. 25,20,000, Cost of sales Rs. 30,45,000, Sales value Rs. 36,54,000.

(b) Sales value Rs. 42,84,000, Profit Rs. 7,14,000.

3. Mayur Engineering, engaged in job work, has completed all jobs in hand on 30th December, 2001 except Job No. 447. The cost sheet on 30th December showed direct materials and direct labour costs of Rs. 40,000 and Rs. 30,000 respectively as having been incurred on Job No. 447.

The costs incurred by the business on 31st December, 2001, the last day of the accounting year, were as follows:

Direct materials (Job 447)	Rs. 2,000
Direct labour (Job 447)	Rs. 8,000
Indirect labour	Rs. 2,000
Miscellaneous factory overhead	Rs. 3,000

It is the practice of business to make the jobs absorb factory over-heads on the basis of 120 per cent of direct labour cost.
Calculate the value of work-in-progress of Job No. 447 on 31st December, 2001   *(B. Com. (Hons), Delhi)*

Ans: Works cost Rs. 1,25,600.

4. Honesty Engineering Works has a machining shop in which it manufactures two auto parts, P1 and P2 out of forging F1 and F2. For the quarter ending December 2003, following cost data are available:

	Rs.
Consumption of raw materials: F1	1,50,000
: F2	2,00,000
Wages and salaries	1,53,000
Stores and spares	12,000
Repairs and maintenance	15,000
Power	16,000
Insurance	8,000
Depreciation	50,000
Factory overheads	68,000
Administration overhead	64,400
Distribution overheads	75,000
Total cost	8,11,400

You are given following further information:

(a) Production and sale of P1 and P2 were as under:

	P1	P2
Production (pieces)	6,000	4,000
Sales of above pieces) (Rs.)	4,80,000	5,20,000

(b) Direct wages paid were Rs. 36,000 in case of P1 and Rs. 32,000 for P2. This basis is used for apportioning wages and salaries and factory overheads. Following machine-hours were utilised in production of these products:

P1	550
P2	450

(c) Stores and spare, repairs and maintenance, power, insurance and depreciation are charged to cost of both the products on the basis of machine hours used.

Administrative overheads are apportioned on the basis of respective conversion costs while distribution overheads on the basis of their sales realisation.

(d) All the production was sold out:

Required: Prepare cost sheets of both the products and work out profit earned on each of them. *(ICWA, Inter)*

Ans: Profit P1 Rs.. 86,940, P2 Rs.. 1,01,660

5. A manufacturing company has an installed capacity of 1,20,000 units per annum. The cost structure of the product manufactured is an under:

Variable cost (per unit)

Material	Rs. 8.00
Labour (subject to a minimum of	
Rs. 56,000 per month)	Rs. 8.00
overheads	Rs. 3.00
Fixed overheads	Rs. 1,04,000 per annum
Semi-variable overheads	Rs. 48,000 per annum at 60% capacity, which increase by Rs. 6,000 per annum for increase of every 10% of the capacity utilisation or any part thereof.

The capacity utilisation for the next year is estimated at 60% for 2 months, 75% for 6 months and 80% for the balance part of the year. If the company is planning to have a profit of 25% on the selling price, calculate the estimated selling price for each unit of production. Assume there is no opening or closing stock. *(CA, Inter,)*

Ans: Selling Price per unit Rs. 28.

6. The expenses of a new machine for a particular month are as under:

(i) power Rs. 50,000, (ii) maintenance and repairs Rs. 10,000, machine operator's wages Rs. 2,000, (iv) supervision Rs. 6,000 (v) Depreciation Rs. 40,000. Other particulars are given below:

Product	Rate of Production (units/hr.)	Production units
A	30	1,800
B	10	500
C	6	300
D	4	260

The entire production was to offered to the Government on 'cost-plus 20%' basis. Material cost per unit are: A: Rs. 40; B: Rs. 60; C: Rs. 100; and D: Rs. 300. Prepare a statement showing product wise 'cost' and 'offer price'. *(ICWA, Inter)*

Ans:

	Products			
	A	B	C	D
Cost per unit (Rs.)	56	108	180	420
Offer price (Rs.)	67.20	129.60	216	504

7. In a manufacturing company, a product passes through five operations. The output of the fifth operation becomes the finished product. The output rejection, output, and labour and overheads of each operation for a period are as under:

Operation	Input (units)	Rejection (units)	Output (units)	Labour and overhead (Rs.)
1	21,600	5,400	16,200	1,94,400
2	20,250	1,350	18,900	1,41,750
3	18,900	1,350	17,550	2,45,700
4	23,400	1,800	21,600	1,40,400
5	17,280	2,880	14,440	86,400

You are required to:

(a) Determine the input required in each operation for one unit of the final output.
(b) Calculate the labour and overhead cost at each operation for one unit of the final output and the total labour and overhead cost of all operations for one unit of the final output. *(CA, Inter)*

Ans:

	Operations				
	1	2	3	4	5
(a) Input required (units)	2.00	1.50	1.40	1.30	1.20
(b) Labour and overhead per unit of output (Rs.)	18.00	10.50	18.20	7.80	6.00

8. A component shop manufactures part–S 1090 in two operations called operation–A and operation–B. After inspection for quality, whole of the accepted output from operation–A is passed to the operation–B for further processing. The whole of the raw materials are introduced in operation–A. The rejection rate and realisation (at scrap value) from the rejects for the two operations are as under:

Operation	Rejection rate (%)	Scrap value (Rs./piece)
A	10	6.50
B	15	13.00

Two pieces from operation-*A* are combined to produce one piece in operation-*B*.

(a) Prepare a statement showing gross production, rejection and accepted production for the two operations.

(b) Prepare a cost sheet showing total cost, quantities and cost per piece of accepted outputs for operations-*A* and operation-*B* from the given data:

	Operation A	Operation B
Raw material cost	Rs. 10 lakhs	
Labour and Overheads	Rs. 10 lakhs	Rs. 5 lakhs
Accepted Outputs	90,000 pieces	38,250 pieces

(ICWA, Inter)

Ans:

	Operation	
	A	B
(a) Accepted production (pieces)	90,000	38,250
(b) Cost per piece (Rs.)	21.50	61.37

Contract Costing

9. Compute a conservative estimate of profit on a contract (which is 80% complete) from the following particulars. Illustrate at least four methods of computing the profit:

	Rs.
(i) Total expenditure to date	1,02,000
(ii) Estimated further expenditure to complete the contract (including contingencies)	20,400
(iii) Contract price	1,83,600
(iv) Work certified	1,20,000
(v) Work uncertified	10,200
(vi) Cash received	97,920

(B. Com. (Hons), Delhi 1997)

Ans: Profit to be taken to P and L A/c
Ist method Rs. 40,000
IInd method Rs. 32,640
IIIrd method Rs. 51,000
IVth method Rs. 41,616

10. An expenditure of Rs. 1,94,000 has been incurred on a contract to the end of 31st March, 2000. The value of work certified is Rs. 2,20,000. The cost of work done but not yet certified is Rs. 6,000. It is estimated that the contract will be completed by 30th June, 2000 and an additional expenditure of Rs. 40,000 will have to be incurred to complete the contract. The total estimated expenditure on the contract is to include a provision of $2\frac{1}{2}$ % for contingencies. The contract price is Rs. 2,80,000 and Rs. 2,00,000 has been realised in cash upto 31st March, 2000.

Calculate the proportion of Profit to be taken to the Profit and Loss Account as on 31st March, 2000 under different methods.
(B. Com. (Hons), Delhi 2000)

Ans: Total notional profit Rs. 32,000;
Profit to be taken to P and L A/c
(a) Rs. 31,546.42 (b) using conservative method Rs. 28678.57

11. A contractor commenced work on a particular contract on 1st April, 2001. He closes the books of accounts for the year on 31st December of each year. The following information is revealed from his costing records on 31st December, 2001.

Materials sent to site	Rs. 43,000
Foreman	12,620
Labour	1,00,220

A machine costing Rs. 30,000 remained in use on site for 1/5th of the year. Its working life was estimated at 5 year and scrap value at Rs. 2,000.

A supervisor is paid Rs. 2,000 per month and had devoted half of his time on contract.

All other expenses were Rs. 14,000. The materials on site were Rs. 2,500. The contract price was Rs. 4,00,000. On 31st December, 2001, 2/3rd of the contract was completed. However, the architect gave certificate only for Rs. 2,00,000 on which 80% was paid. Prepare contract account.

Ans: Profit transferred to P & L A/c Rs. 35,683.

Profit transferred to Reserve 31,222.

12. *SV* construction Ltd. have obtained a contract for construction of a bridge. The value of the contract is Rs. 12 lakhs and the work commenced on 1st October, 2001. The following details are shown in their books for the year ending 30th September 2002.

	Rs.
Plant purchased	60,000
Wages paid	3,40,000
Material issued to site	3,36,000
Direct expenses	8,000
General overheads apportioned	32,000
Wages accrued as on 30.9.2002	2,800
Materials at site as on 30.9.2002	4,000
Direct expenses accrued as on 30.9.2002	1,200
Work not certified at cost	14,000
Cash received being 80% of work certified	6,00,000

Life of plant purchased is 5 years and scrap value is nil.

1. Prepare the contract account for the year ending 30th September, 2002
2. Show the amount of profit which you consider might be fairly taken on the contract and how you have calculated it.

Ans: Profit taken to Profit and Loss A/c Rs. 19,200.

13. Kapoor Engineering Company undertakes a long-term contract which involves the fabrication of prestressed concrete blocks and the erection of the same on consumer's site.

The following is supplied regarding the contract which is incomplete on 31st March, 2001.

Cost incurred:

	Rs.
Fabrication costs to date:	
Direct materials	2,80,000
Direct labour	90,000
Overheads	75,000
	4,45,000
Erection costs to date	15,000
Total	4,60,000
Contract price	8,19,000
Cash received on account	6,00,000

Technical estimate of work completed to date:

Fabrication:

Direct materials 80%

Direct labour and overheads 75%

Erection 25%

You are required to prepare a statement for submission to the management indicating:

(a) the estimated profit on the completion of the contract, and

(b) the estimated profit to date on the contract.

(CA Inter)

Ans: Estimated profit Rs. 1,38,000 on contract.

14. Pioneer Construction Company Ltd. obtained a contract for the erection of a multi-storey building. Building operations started in July 2001. The contract price was Rs. 9,00,000. On 30th June 2002, the end of the financial year, the cash received on account was Rs. 3,60,000, being 80% of the amount on the surveyor's certificate. The following additional information is given:

	Rs.
Materials issued to contract	1,80,000
Materials on hand at site as on 30th June 2002	7,500
Wages	2,46,600
Plant purchased specially for contract and to be depreciated at 10% per annum	30,000
Direct expenses incurred	12,900
General overhead allocated to contract	7,600
Work finished but not yet certified: cost	15,000

You are required to prepare the contract account and statement showing the profit on the contract to 30th June 2002, indicating what proportion of the profit the company would be justified in taking to the credit of the profit and loss account, and to show what entries in respect of the contract would appear in the balance sheet.

Ans: Profit taken to P & L A/C   Rs. 11,946

Balance Sheet

Plant   Rs. 27,000

WIP   Rs.1,02,046

15. The following information relates to a building contract for Rs. 10,00,000.

	2001	2002
	Rs.	Rs.
Materials issued	3,00,000	84,000
Direct wages	2,30,000	1,05,000
Direct expenses	22,000	10,000
Indirect expenses	6,000	1,400
Work certified	7,50,000	10,00,000
Work uncertified	8,000	—
Materials at site	5,000	7,000
Plant issued	14,000	2,000
Cash recd. from contractor	6,00,000	10,00,000

The value of plant at the end of 2001 and 2002 was Rs. 7,000 and Rs. 5,000 respectively.

Prepare: (i) the contract account, and (ii) contractee account for two years 2001 and 2002 taking into consideration such profit for transfer to the profit and loss account as you think proper. *(B. Com. (Hons), Delhi)*

Ans: Profit taken to Profit and Loss account 2001, Rs. 1,05,600; 2002, Rs. 1,32,000

16. Alcon Construction Company Ltd. commenced its business of construction on 1.1.2001. The Trial balance as on 31.12.2001 showed the following balances:

	Dr. (Rs.)	Cr. (Rs.)
Paid up share capital		1,00,000
Cash received on account of contract (80% of work certified)		1,20,000
Land and buildings	30,000	
Machinery at cost (75% at site)	40,000	
Bank	4,000	
Materials at site	40,000	
Direct labour	55,000	
Expenses at site	2,000	
Lorries and vehicles	30,000	
Furniture	1,000	
Office equipment	10,000	

Postage and telegrams	500	
Office expenses	2,000	
Rates and taxes	3,000	
Fuel and power	2,500	
	2,20,000	2,20,000

The contract price is Rs. 3,00,000 and work certified is Rs. 1,50,000. The work completed 'since certification' is estimated at Rs. 1,000 (at cost). Machinery costing Rs. 2,000 was returned to stores at the end of the year. Stock of materials at site on 31.12.2001 was of the value of Rs. 5,000. Wages outstanding were Rs. 200. Depreciation on machinery at 10%.

You are required to calculate the profit from the contract and show how the work-in-progress will appear in the balance sheet as on 31.12.2001. *(B. Com. (Hons), Delhi)*

Ans: Profit taken to Profit and Loss A/c Rs. 28,427
Amount shown in Balance Sheet Rs. 6,127

17. The *PQR* Co. Ltd. undertakes to build a cooling tower at a contract price of Rs. 6,75,000. It is estimated that it will take two years to complete, and work is commenced on Ist May 2001. The company's year ended on 30th September, and on that date, in 2002 the position of the contract was as follows:

Certificates to Sept. 15, 2002		Rs. 4,75,000
Less: 10% retention		47,500
		4,27,500
*Add:*Extra work over contract as agreed	Rs. 3,100	
Last time	230	3,330
This time		4,30,830
Less: Cash paid on account		4,08,330
Amount now due (and paid Oct. 24,2002)		Rs. 22,500

Expenditure on the contract was as follows:

Materials sent by suppliers direct to site	Rs. 2,12,000
Materials sent from plant and stores yard	Rs. 1,500
Wages	Rs. 1,05,000
Haulage of plant	2,400
Expenses incurred on contract	3,800
Establishment charges apportioned to contract	30,300

On 30th September 2002 it is estimated that materials on site amounted to Rs. 3,050.

During the contract, plant to the value of Rs. 35,000 was transferred from the site. The plant remaining on site at 30th September was valued at Rs. 32,000.

The amount of work done (at cost) between the date of the last certificate and the end of the financial year was estimated as Rs. 10,250.

PQR Co. Ltd. are careful as to the amount of profit to be taken on uncompleted contracts, and as only a few months' work had been done at 30th September 2001 no profit at all was then taken.

(a) You are required, supposing the company were to take credit for profit on the contract, to:
   (i) Calculate the amount that you consider may be fairly taken into the firm's accounts at 30th September 2002;
   (ii) Calculate the work-in-progress figure. How would this new figure be shown in the balance sheet of *PQR* Co. Ltd.?

(b) Show the Contract Account in the firm's costing ledger to record the above facts.

Ans: Profit taken to Profit and Loss A/c Rs. 65,240
Work In Progress Rs. 4,39,190

18. A contractor has entered into a long-term contract at an agreed price of Rs. 1,75,000 subject to an escalation clause for materials and wages as spelt out in the contract and corresponding actual are as follows:

Materials	Standard	Actual
A	5,000 kg. @ Rs. 5/-	5,050 kg. @ Rs. 4.80
B	3,500 kg. @ Rs. 8/-	3,450 kg. @ Rs. 7.90
C	2,500 lt. @ Rs. 6/-	2,600 lt. @ Rs. 6.60
Wages:		
P	2,000 hr. @ Rs. 7/-	2,100 hr. Rs. @ 7.20
Q	2,500 hr. @ Rs. 7.50/-	2,450 hr. Rs. @ 7.50
R	3,000 hr. @ Rs. 6.50/-	3,100 hr. Rs. @ 6.60

Reckoning the full actual consumption of materials and wages, the company has claimed a final price of Rs.. 1,77,360. Give your analysis of the admissible escalation claim and indicate the final price payable. *(ICWA, Inter)*

Ans: Final price payable Rs. 1,75,850

Batch Costing

19. Component SW-10X is made entirely in machine shop No. ASW II. Material cost is Rs. 20 per component. Each component takes 6 minutes to produce and the machine operator is paid Rs. 15 per hour. Machine-hour rate is Rs. 72 per hour. The setting up of the machine to produce the equipment takes 3 hours for the operator.

You are required to prepare cost sheets cost sheets showing the setting-up costs and the production costs, both in total (that is, for the batch) and per component, assuming a batch size of (a) 100 components, (b) 150 components and (c) 200 components. *(ICWA, Inter)*

Ans:

	Batch Size		
	100	150	200
Total cost (Rs.)	3,131	4,566	6,301

20. All Play and No. Work Ltd. are specialists in the manufacture of sports goods. They manufacture croquet mallets but purchase the wooden balls, iron arches and stakes required to complete a croquet set.

Mallets consist of a head and handle. The handle uses 1.5 board feet per handle at Rs. 40 per board foot. The spoilage loss is negligible for manufacture of handles. Heads frequently split and create considerable scrap. A head requires 0.20 board feet of high quality lumber costing Rs. 70 per board foot. Spoilage normally works out to 20% of the completed heads, 4% of the spoiled heads can be salvaged and sold as scrap at Rs. 10 per spoiled head.

In the department, machining and assembling the mallets, 12 men work 8 hours per day for 25 days in a month. Each worker can machine and assemble 15 mallets per uninterrupted 50 minutes time frame. In each 8-hour working day, 15 minutes are allowed for coffee-break, 8 minutes on an average for training, and 9 minutes for supervisory instructions. Besides 10% of each day is booked as idle time to cover checking in and checking out, changing operations, getting material and other miscellaneous matters. Workers are paid at a comprehensive rate of Rs. 6 per hour.

The department is geared to produce 40,000 mallets per month and the normally expenses of the department are as under:

	Rs.
Finishing and paining the mallets	50,800
Lubricating oil for cutting machines	300
Depreciation for cutting machines	700
Repairs and maintenance	100
Power to run the machines	200
Plant manager's salary	2,700
Other overheads allocated to the department	1,20,000

As the mallets are machined and assembled in lots of 500, prepare a total cost sheet for one lot and advise the management on the selling price to be fixed per mallet in order to ensure a minimum of 20% margin on selling price.

(CA, Inter)

Ans: Selling price to be fixed at Rs. 1,02,292

PROCESS COSTING

Learning Objectives

After reading this chapter, you should be able to:

1. explain process costing — its nature, characteristics and its costing procedures; its differences with job costing;
2. explain preparation of process cost accounts under various situations;
3. understand waste, scrap, abnormal gain; equivalent production analysis; joint product and by-product, and
4. discuss the procedure of accounting for joint product and by-product as well.

NATURE OF PROCESS COSTING

Process costing is that form of operations costing which is used where standardised goods are produced in large volume with continuous production flow. This costing method is used in industries like chemicals, petroleum, textiles, steel, rubber, cement, plastic, shoes, sugar and coal. Those concerns which produce items such as screws, bolts and small electrical parts can also use this costing method. Process costing is also used in the assembly type industry which manufactures items, such as typewriters, automobiles, aeroplanes and household electrical appliances such as washing machines, refrigerators, electrical irons, radios, television sets, etc. For example, an electronics manufacturing company may have the following process or cost centres: materials set-up, wiring, and soldering. Service industries, such as gas, water, electric power and heat may also follow process cost accounting.

Characteristics

A process costing method has the following distinctive characteristics:

1. *Cost collection*　Manufacturing costs are accumulated for each production department or process.
2. *Time period assumption*　Manufacturing costs are accumulated by department or process for specific time periods, say a month, and the process costing is designed to measure units produced during this time period.
3. *Averaging process*　The most important point is that product costing under process costing is an averaging process. The unit cost is obtained by accumulating all manufacturing costs and dividing it by units produced or some measure of production.

4. *Separate ledger* Each process or department has its own account and records the processing costs incurred by the department.
5. *Homogeneous product* Under processing industries, the production is continuous and emphasis is on uniform or standardised product. It is difficult to identify a specific unit of output with the time of production.
6. *Transfer to finished goods* Completed units and their associated costs are transferred to next process if something is still to be done on those units. Completed units are transferred to finished goods if nothing is to be done.
7. *Cost of spoiled units* Cost of lost or spoiled units is added to the cost of good units completed, thus increasing the average cost per unit.

Process Costing and Job Costing

Process costing and job costing differ on the following counts:

1. *Applicability* Job costing is applicable in situations where the objective is to identify costs with specific products or jobs. Process costing, on the other hand, is used in case of mass production of similar units that continuously pass through different departments or processes.
2. *Cost collection* In job costing, manufacturing costs are accumulated for particular jobs or batches of product using job cost sheets. In process costing, manufacturing costs are accumulated for entire departments or processes and the cost of particular jobs or batches or products is not determinable.
3. *Time period assumption* In job costing, costs are accumulated for a specific product or job without taking into account the production time which may be more than one accounting period. In process costing, costs are accumulated for specific departments/processes for a given time period (say a month). That is, production is measured for specific time periods in process costing.
4. *Purpose* In job costing production is generally dependent on customers' orders and specifications. Under process costing, production is done for storing stock of goods and for future sale.
5. *Computation of unit costs* In job costing unit cost is obtained by dividing the cost of the job order by units produced in the job order. Under process costing, unit costs are obtained by dividing departmental/process costs by process production.
6. *Work-in-progress* In job costing, one work-in-progress account is maintained. But in process costing, individual work-in-progress accounts are prepared for each production/process department to ascertain manufacturing costs by process.

COSTING PROCEDURES UNDER PROCESS COSTING

In process costing, an account is maintained for each process to which all costs of material, labour, direct expenses and overhead are debited:

Materials

In process costing all the materials required for production are issued to the first process, where after processing, they are passed on to the next process and so on; each process merely performs the same operation on the material which has been passed on from the first process. Alternatively, materials may pass from the first process to the second process, where extra or new raw materials are added; then more materials are added in the next process; this may continue until completion.

Labour

Labour costs incurred in a particular process are posted to the debit of the process account concerned. However, where workers are engaged in more than one process, the gross wages are distributed to each process on the basis of time spent on each process.

Direct Expenses

Items of expenditure which can be directly attributed to a process are debited to the relative process account. Examples of such expenses are cost of electricity, depreciation and hire charges of equipments.

Factory Overhead

Expenses which are not charged direct are apportioned on the basis of absorption rates. Also, overhead may be recovered at a predetermined rate based on direct wages, prime cost, etc.

PREPARATION OF PROCESS COST ACCOUNTS

As stated earlier, for each process an individual process account is prepared. The method of preparing process accounts is discussed herewith on the basis of the following situations which may be found in a production situation:

1. Process costing having no process loss and no opening and closing work-in-progress.
2. Process costing having process losses or gains (normal loss, abnormal loss, abnormal gain).
3. Process costing having opening and closing work-in-progress at various stages of completion.
4. Process costing having opening and closing work-in-progress with process losses or gains.
5. Inter-process profits.

Process Costing Having No Process Loss/Gain and No Opening and Closing Work-in-Progress

The preparation of process accounts is very easy, if no loss or gain has arisen during the processing operation of the product. All costs of material, labour, direct expense, and apportioned overhead are debited to the process account. The total (accumulated) costs of the process are transferred to the second process as raw materials (input) for that process.

Example 11.1

From the following figures show the cost of three processes of manufacture. The production of each process is passed on to the next process immediately on completion.

	Process A	Process B	Process C
Wages and materials	Rs. 30,400	Rs. 12,000	Rs. 29,250
Works overheads	5,600	5,250	6,000
Production in units	36,000	37,500	48,000
Stock (Units from preceding process—1st July, 2007)		4,000	16,500
Stock (Units from preceding process—31st July, 2007)		1,000	5,500

Solution:

Process A Account

To Wages and materials	Rs. 30,400	By transfer to process B @ Re 1 per unit	Rs. 36,000
To Works overheads	5,600		
	36,000		36,000

Process B Account

To Stock: unit from preceding process @ Re. 1 per unit	Rs. 4,000	By Stock: units from preceding process @ Re. 1 per unit	Rs. 1,000
To Transfer from Process A	36,000	By Transfer to Process C @ Rs.	
To Wages and material	12,000	1.50 per unit	
To Works overheads	5,250		56,250
	57,250		57,250

Process C Account

To Stock: units from preceding process @ Rs. 1.50 per unit	Rs. 24,750	By Stock: units from preceding process @ Rs. 1.50 per unit	Rs. 8,250
To Transfer from Process B	56,250	By Transfer to finished goods account @	
To Wages and materials	29,250		
To Works overheads	6,000	Rs. 2 per unit	Rs. 1,08,000
	1,16,250		Rs. 1,16,250

Example 11.2

The Neodrug manufacturers process a product 'plant food' through three distinct processes, the product of one process being transferred to the next process and so on to finished product intact.

Raw materials, labour and direct expenses incurred on each of the processes are given below:

Particulars	Process A	Process B	Process C
Raw materials	Rs. 1,00,000	Rs. 80,000	Rs. 20,000
Labour	50,000	60,000	70,000
Direct expenses	15,000	25,000	50,000

The overhead expenses for the period amounted to Rs. 3,60,000 and is to be distributed to the processes on the basis of labour wages.

There were no stocks in any of the processes at the beginning or at the close of the period. Ignore wastages.

(a) Assuming that the output was 1,00,000 kilos, show the process accounts of A, B and C indicating also the unit cost per kilo under each element of cost and the output in each process.

(b) If 10% of the output is estimated to be lost in the course of sale and sampling, what should be the selling price per unit (correct to two decimal place) so as to provide for gross profit of $33\frac{1}{2}$% on selling price.

Solution:

Process A

	Per kg	Total		Per kg	Total
To Raw materials	1.00	1,00,000	By Transfer to		
To Labour	0.50	50,000	Process B	2.65	2,65,000
To Direct expenses	0.15	15,000			
To Overheads	1.00	1,00,000			
	2.65	2,65,000		2.65	2,65,000

Process B

To Transfer from	Rs.	Rs.	By Transfer to	Rs.	Rs.
Process A	2.65	2,65,000	Process C	5.50	5,50,000
To Raw materials	0.80	80,000			
To Labour	0.60	60,000			
To Direct expenses	0.25	25,000			
To Overheads	1.20	1,20,000			
	5.50	5,50,000		5.50	5,50,000

Process C

To Transfer from	Rs.	Rs.	By Transfer to	Rs.	Rs.
Process B	5.50	5,50,000	finished goods		
To Raw materials	0.20	20,000	A/c	8.30	8,30,000
To Labour	0.70	70,000			
To Direct expenses	0.50	50,000			
To Overheads	1.40	1,40,000			
	8.30	8,30,000		8.30	8,30,000

(b) Cost of finished goods   Rs. 8,30,000

Profit (33 $\frac{1}{3}$ % on selling price)   4,15,000

Sales   12,45,000

Gross output   1,00,000 kg

Less = wastage 10%   10,000

90,000 kg

Selling price per kg   = $\dfrac{12,45,000}{90,000 \text{ kg}}$ = Rs. 13.83 per kg

Process Costing Having Process Losses and/or Gains

All materials put into process are not likely to be good saleable products. Some loss, scrap and wastage is inevitable in process industries. Process loss can be divided into two categories: (i) Normal loss, (ii) Abnormal loss. Normal loss is the loss which is unavoidable, uncontrollable and expected in normal conditions. It may be inherent in the manufacturing process. Abnormal process loss is controllable and avoidable and generally caused by abnormal or unexpected conditions, such as bad designing, poor materials, accident and negligence, etc.

The treatment of normal and abnormal losses differ in process accounts. Normal losses are absorbed by good production. Assume, for example, that 25,000 units of a mixture were put into process and that during processing 5,000 units were lost through evaporation. This in an unavoidable loss. If the total cost recorded was Rs. 25,00,000 the remaining 20,000 units would be assigned a unit cost of Rs. 125.

$$\frac{\text{Cost of production}}{\text{Number of units completed}} = \frac{\text{Rs. } 25,00,000}{20,000} = \text{Rs. } 125$$

Abnormal losses are valued as good units. The unit cost which is used to value good units is also applied for valuation of abnormal loss units. The cost of abnormal loss units computed in this manner is transferred to a separate abnormal loss account and credited to relevant process account. Subsequently, this loss is transferred to the costing profit and loss account and the abnormal loss account is thus closed.

Waste

Waste is without any value. If waste is part of the normal process loss, the cost is absorbed by the good production. Alternatively, if waste represents abnormal process loss, the waste (abnormal loss) is valued like good units and treated as abnormal process loss.

Scrap

Scrap means discarded material emerging from certain manufacturing operations. It has some but minor value. Where the normal loss is in the form of scrap and has some realisable value, the process account is credited with the amount which could be realised from sale of normal scrap. The abnormal loss, if represented by scrap may have a similar realisable value. The amount realised from sale of scrap representing abnormal loss is credited to the abnormal loss account and the balance in the abnormal loss account is transferred to the costing profit and loss account. The question of crediting the amount realised from sale of scrap representing abnormal loss in the relevant process account does not arise. The relevant process account is credited and the abnormal loss account is debited with the cost of abnormal loss valued as finished output. In case there are normal loss, abnormal loss, scrap, the following procedure will help in the preparation of process accounts:

1. Normal loss should be computed on the basis of information given in the question.
2. The cost per unit of production after taking into account normal loss units should be determined assuming that abnormal loss does not exist. The cost per unit is calculated on the basis of the following information:

   (a) Normal production, i.e. inputs (units) minus normal loss units.
   (b) Normal cost of production, i.e. all costs incurred (appearing on the debit side of a process account) minus proceeds (if any) realised from the sale of normal loss units.

   Normal cost of production divided by normal production will give the cost per unit of output.
3. The cost per unit determined as above is used to value abnormal loss units and that would be the cost of abnormal loss.
4. The abnormal loss account is debited and the relevant process account credited with the amount and quantity of abnormal loss as calculated in (3) above.
5. The cost per unit as obtained in (3) will also be used to determine the cost of good production units produced by the process.
6. The proceeds realised from the sale of normal loss representing scrap is transferred to the relevant process account.
7. The proceeds realised from the sale of abnormal loss representing scrap is transferred to a separate abnormal loss account and not to the relevant process account.
8. The abnormal loss account is closed by transferring the total cost of abnormal loss units to the costing profit and loss account if there is no scrap. In case abnormal loss represents scrap, only the net amount (total cost of abnormal loss units minus scrap) will be transferred to the costing profit and loss account.

Abnormal Gain (Effectives)

Abnormal gain arises when the actual loss is less than the normal loss expected. The abnormal gain is valued in the same manner as abnormal loss and is credited to a separate account known as the abnormal gain account. The abnormal gain account appears on the debit side of the relevant process account. The amount of scrap which would otherwise have been realised, had there been normal loss and no abnormal gain, is debited to the abnormal gain account and the balance is credited to the costing profit and loss account. Cost per unit of output computed (as mentioned above) is used to value the output transferred to the next process.

Example 11.3

In a manufacturing unit, raw material passes through four processes, I, II, III and IV and the output of each process is the input of the subsequent process. The loss in the four processes I, II, III and IV are respectively 25%, 20%, 20% and $16\frac{2}{3}$ % of the input. If the end product at the end of Process IV is 40,000 kg, what is the quantity of raw material required to be fed at the beginning of Process I and the cost of the same at Rs. 5 per kg?

Find out also the effect of increase or decrease in the material cost of the end product for variation of every rupee in the cost of the raw material. *(B. Com. (Hons), Delhi 1998, CA Inter)*

Solution:

	Input	Loss	Output
Process I	100	25	75
Process II	75	15	60
Process III	60	12	48
Process IV	48	8	40

In case the end product at the Process of IV is 40,000 kg, the quantity of raw material required to be fed at the beginning of Process I comes to:

$$40,000 \times 100/40 = 1,00,000 \text{ kg or } 2.50 \text{ kg for output of 1 kg}$$

$$\text{Total cost of material} = \text{Rs. } 5,00,000$$

For every rupee increase or decrease in the cost of raw material, the cost of the end product will increase or decrease by Rs. 2.50 (that is 2.50 × Re. 1)

This can be verified as follows:

Present cost of raw material of 1,00,000 kg @ Rs. 5 = Rs. 5,00,000

Cost of end product Rs. 5,00,000/40,000 = Rs. 12.50 per kg

Increase in cost

In case the raw material cost increases by Re. 1 per kg

The total cost will be: Rs. 6,00,000

New cost per kg of final product Rs. 6,00,000/40,000 = Rs. 15

Thus, on account of increase of Re. 1 in the cost of raw material, the end product cost has gone up from Rs. 12.50 per kg to Rs. 15 per kg, that is an increase of Rs. 2.50.

Decrease in Cost

In case the raw material cost decreases by Re. 1 per kg

The total cost will be Rs. 4,00,000

New cost per kg of final product Rs. 4,00,000/40,000 = Rs. 10

Thus, the final product cost has come down from Rs. 12.50 to Rs. 10 per kg, that is a decrease of Rs. 2.50 per kg.

Example 11.4

1,000 units of raw material @ Rs. 3 per unit were introduced in Process A in the beginning of a month. The following additional information is given about Process A for the month:

Direct Labour Cost	Rs. 4,000
Overhead expenses	20% of prime cost
Normal wastage	20% of input
Realisable value of wastage	Rs. 2 per unit
Output	900 units

Prepare Process A A/c.

(B.Com, Delhi, 2002)

Solution:

Process A Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Units introduced @ Rs. 3	1000	3000	By Normal Wastage	200	400
To Direct Labour cost		4000	By Transfer to Process B	900	9000
To Overhead expenses		1400			
To Abnormal gain	100	1000			
	1100	9400		1100	9400

Working Note:

	Unit	Amounts (Rs.)
Total cost of units introduced	1000	8400
Less: Normal wastage	200	400
Normal output	800	8000
Value of Abnormal Gain		

$$= \frac{\text{Normal cos t}}{\text{Normal output}} \times \text{Units of Abnormal gain}$$

$$= \frac{8000}{800} \times 100$$

$$= \text{Rs. } 1000$$

Example 11.5

From the following information, prepare a Process Account, Abnormal Gain Account and Normal Loss Account:

  (i) Input of raw material 840 units @ Rs. 40 per unit
  (ii) Direct Material—Rs. 5,924
  (iii) Direct wages—8,000
  (iv) Overheads—Rs. 8,000
  (v) Actual output—750 units

(vi) Normal loss—15%

(vii) Value of scrap per unit—Rs. 10 per unit

(B.Com, Delhi, 2003)

Solution:

Process Acount

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Raw Materials	840	33,600	By Normal Loss (15% of 840 units)	126	1,260
To Direct Material		5,924			
To Direct Wage		8,000	By Transfer to next		
To Overheads		8,000	process A/c @ Rs.		
To Abnormal Gain	36	2,736	76 per unit	750	57,000
	867	58,260		876	58,260

Abnormal Gain Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Normal Loss A/c	36	360	By Process A/c	36	2,736
To Costing Profit and Loss A/c		2,376			
	36	2,736		36	2,736

Normal Loss Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A/c	126	1,260	By Cash (Sale proceeds)	90	900
			By Abnormal Gain A/c	36	360
	126	1,260		126	1,260

* Units of Abnormal Gain = Actual output + Normal loss – Input

$$= 750 + 126 - 840$$

$$= 36 \text{ Units.}$$

$$\text{Value of Abnormal Gain} = \frac{\text{Normal cost}}{\text{Normal output}} \times \text{Units of Abnormal gain}$$

$$= \frac{55,524 \times 1,260}{840 - 126} \times 36$$

$$= \text{Rs. } 2,736$$

Example 11.6

D Ltd. introduced 5,000 units in a process at a cost of Rs. 10,000. The wages and overheads incurred are Rs. 10,000 and Rs. 8,000 respectively. It is expected that 10% of the output is likely to be defective. Actual output of goods is 4,400 units. The rectification of defective units costs Rs. 4 per unit.

Calculate the cost per unit and show how will you deal with the cost of rectification of abnormal defective units.   *(B.Com, Delhi, 2004)*

Solution:

Process Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To unit introduced	5000	10,000	By abnormal loss	100	600
To wages		10,000	(Excessive defective)		
To overheads		8,000	By finished stock		
			A/c-@ Rs. 6	4900	29,400
			(Note 2 and 3)		
To Rectification of normal defective Units (500 × Rs. 4)		2,000			
(Note-1)	5000	30,000		5000	30,000

Notes:

1. Rectification of normal defective units is an item of factory overheads. Hence 10% of 5000 units that is, 500 units multiplied by Rs. 4 that is Rs. 2000 has been added to the cost.
2. Total output = actual output + rectified units = 4400 + 500 = 4900 units.
3. There is no normal loss. Therefore cost per unit

$$= \frac{\text{Normal cost}}{\text{Normal output}} = \frac{\text{Rs. } 30,000}{5000} = \text{Rs. } 6$$

Normal cost   = Total cost – Scrap value of normal loss

= Rs. 30,000 – 0 = Rs. 30,000

Normal output = Units introduced – Units of normal loss

= 5000 – 0 = 5000

4. Units of abnormal loss = 5000 – 4900 = 100 units.

Value of abnormal loss = Units of abnormal loss × Cost per unit

= 100 × 6 = Rs. 600

5. Cost of rectification of abnormal defective units is debited to the Costing Profit and Loss Account.

Example 11.7

Ayush Ltd. produces a Herbal Shampoo which is made by subjecting certain crude herbs to two successive processes: *A* and *B*. The following data in respect of processing have been obtained from the accounting records of the company for a cost period:

Particulars	ProcessA	Process B
Inputs (units)	50,000	46,000
Normal loss	10%	?
Costs Incurred:	Rs.	Rs.
Materials (Herbs)	9,00,000	1,96,000
Direct labour	4,26,000	2,47,000
Production overhead	2,84,000	1,78,000
Realisable scrap value/unit	7	20

The output of Process A is transferred direct to Process B. The output of Process B was 43,200 units, which were sold at Rs. 60 per unit showing a profit of 20% on cost.

You are required to prepare the Process Cost Accounts assuming that there was no closing stock of W.I.P. and finished goods. *(B.Com. Delhi, 2005)*

Solution:

Process of Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Raw Material	50000	9,00,000	By Normal Loss		
To Direct Labour		4,26,000	(10% of Inputs)	5000	35,000
To Production			By Process and A/c	45000	15,75,000
Overhead		2,84,000	good transferred		
	50,000	16,10,000		50,000	16,10,000

$$\text{Rate per unit} = \frac{\text{Rs.}\,16,10,000 - \text{Rs.}\,35,000}{50,000 - 5000} = \text{Rs. }35.$$

Process B Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A A/c	45,000	15,75,000	By Normal Loss [45000 – 43200]	1800	36,000
To Materials		1,96,000	By finished		
To Direct Labour		2,47,000	Stock A/c	43200	21,60,000
To Production					
overhead		1,78,000			
	45,000	21,96,000		45000	21,96,000

Finished Stock Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process B A/c	43200	21,60,000	By Bank A/c		
To Costing Profit and Loss A/c [20% of Rs. 2160000]		4,32,000	(Sales)	43,200	25, 92,000
	43200	25,92,000		43,200	25,92,000

$$\text{Selling Price} = \frac{\text{Rs.}\,25,92,000}{43200} = \text{Rs. }60$$

Example 11.8

A product passes through three distinct processes *A*, *B* and *C*. The normal loss of units in each process is 5%, 10% and 15% and the same is sold at Rs. 2, Rs. 4, Rs. 5 per unit respectively. Expenses for the month were as follows:

	Process A	Process B	Process C
Sundry Materials (Rs.)	5,200	3,960	5,924
Wages (Rs.)	4,000	6,000	8,000
Actual output in unit	1,900	1,680	1,500

2000 units @ Rs. 3 per unit were put into Process *A*. The total overheads are Rs. 18,000 which are to be recovered at 100% of wages. Prepare necessary Process Account. *(B. Com, Delhi, 2006)*

Solution:

Process A Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To units introduced	2000	6,000	By Normal Wastage	100	200
To Sundry Materials		5,200	By Process B A/c		
To Wages		4,000	(Bal fig.) @ Rs. 10	1900	19,000
To Overheads		4,000	each		
	2000	19,200		2000	19,200

Process B Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Transfer from			By Normal Wastage	190	760
Process *A*	1900	19,000	By Abnormal		
To Sundry Materials		3,960	Wastage	30	600
To wages		6,000	By Process C A/c		
To Overheads		6,000	(transfer @	1680	33,600
			Rs. 20 per unit)		
	1900	34,960		1900	34,960

Process C Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Transfer from			By Normal Wastage	252	1,260
Process *B* A/c	1680	33,600	By Finished		
To Sundry Materials		5,924	Goods Stock		
To Wages		8,000	A/c @ Rs.	1500	57,000
To Overheads		8,000	38 per unit		
To Abnormal Gain	72	2,736			
(Note 2)					
	1752	58,260		1752	58,260

Notes : 1. Value of Abnormal Loss

$$= \frac{Rs.\,34,960 - Rs.760}{Units\,1900 - 190} \times 30 = Rs.\,600$$

2. Value of Abnormal Gain

$$= \frac{Rs.\,55,524 - Rs.1,260}{Units\,1680 - 252} \times 72 = Rs.\,2,736$$

Example 11.9

At the end of process *A*, carried on in a factory during the week ending July 31st, 2001 the number of units produced was 850 excluding 50 units damaged at the very end of the process. The damaged units realised Rs. 3 per unit as scrap. A normal wastage of 10 per cent occurs during the process, the wastage realised was Rs. 2 per unit.

A unit of raw material costs Rs. 4. The other expenses for the week were:

	Rs.
Wages	500
Power	200
General expenses	450

40% of the output is sold so as to show a profit of 16 $\frac{2}{3}$ per cent on the selling price; the rest of the output is transferred to Process *B*.

Prepare Process *A* Account. *(B.Com.(Hons), Delhi 2002)*

Solution:

Dr.   **Process A A/c**   **Cr.**

Particulars	Units	Rs.	Particulars	Units	Rs.
To Material	1000	4,000	By Normal Wastage @ Rs. 2 per unit)	100	200
@ Rs. 4 per unit					
To Wages		500	By Damaged Unit sold (@ Re. 3 per unit)	50	150
To Power		200			
To General Expenses		450	By Sale		
To P & L A/c		384	(40% of production at profit of 16 $\frac{2}{3}$ % on S.P.)	340	2,304
			By Transfer to process *B* (60% of production at cost price)	510	2,880
	1000	5,534		1,000	5,534

Working Notes:

Material input = 1,000 units

1. Normal wastage $= \dfrac{1,000 \times 10}{100} = 100$ units

     sold @ Rs. 2 per unit = 100 × 2 = Rs. 200

2. Damaged units = 50
   sold @ Rs. 3 per unit = 50 × 3 = Rs. 150
3. Cost of production of 850 units
   Rs. 4,000 + 500 + 200 + 450 – (Rs. 200 + 150) = Rs. 4,800
4. Sale 40% of production at profit of $16\frac{2}{3}$ % on S.P. or 20% on C.P.

$$\frac{4,800 \times 40 \times 120}{100 \times 100} = \text{Rs. } 2,304$$

5. Remaining 60% of production transferred to Process A at cost

$$= \frac{\text{Rs. } 4,800 \times 60}{100} = \text{Rs. } 2,880$$

Example 11.10

The following particulars relate to two process—X and Y for the month of Jan. 2005:

	Process X	Process Y
Total input (units)	50,000	1,000
@ Rs. 1.50 p.u.		
Normal loss (% of input)	10%	5%
Additional costs incurred:		
Materials	—	3,600
Direct Labour	35,000	45,000
Overheads	27,500	39,500
Realisable value of scrap p.u.	Re. 0.50	Rs. 2
Output (units)	43,000	43,000

The entire output of process X was transferred to process Y. The entire output of process Y was sold at Rs. 6 per unit. Assume, there was no opening or closing stock or any type in process X or Y.

You are required to prepare the necessary accounts for the period.   *(B.Com. (Hons), Delhi, 2005)*

Solution:

Process X

	Units	Amt.		Units	Amt
To Inputs	50000	75,000	By Normal Loss	5000	2,500
To Material	—	—	By Abnormal Loss	2000	6,000
To Direct Labour	—	35,000	By Cost of Prod-	43000	1,29,000
To Overheads	—	27,500	uction tranferred to Y		
	50000	1,37,500		50000	1,37,500

Cost of Abnormal Loss

$$= \frac{1,35,00}{45,000} \times 2,000$$

$$= \text{Rs. } 6,000$$

Process Y

	Units	Amt.		Units	Amt
To Process X	43000	1,29,000	By Normal Loss	2150	4,300
To Material	—	3,600	By Cost of	43000	2,24,000
To Labour		45,000	Production		
To Overhead		39,500			
To Abnormal gain	2150	11,200			
	45150	2,28,300		45150	2,28,300

Normal output = 43,000 – 2,150 = 40,850 units

Cost of Normal output = 2,17,100 – 4,300 = Rs. 2,12,800

$$\text{Cost of abnormal gain (effectiveness)} = \frac{\text{Rs. } 2,12,800}{40850 \text{ units}} = \text{Rs. } 11,200$$

Example 11.11

The product manufactured by the Standard Chemicals Ltd. passes through three processes I, II and III. The following costs have been incurred for the month of September, 1996:

Details		Process I (Rs.)	Process II (Rs.)	Process III (Rs.)
1. Material Consumed		40,000	7,500	5,000
2. Direct Wages		22,500	10,000	10,000
3. Direct Expenses		20,500	2,250	2,505
Total		83,000	19,750	17,505
		(units)	(units)	(units)
4. Output		3,900	3,850	3,200
5. Finished Process Stock:				
(i) 01.9.1996		600	550	800
(ii) 30.9.1996		500	800	Nil
6. Stock Valuation on 01.9.1996 (Rs. per unit)		24.50	31.00	37.00
7. Percentage of Wastage		2	5	10
8. Net Realisable Value of wastage per unit	(Rs.)	13.50	16.25	21.00

Four thousand units of raw materials were introduced in Process No. I at a cost of Rupees twenty thousand. Stocks are valued and transferred to subsequent processes at weighted average cost. The percentage of wastage is computed on the number of units entering the process concerned.

Prepare: (i) Process Accounts; (ii) Process Stock Accounts; (iii) Normal Wastage Accounts; (iv) Abnormal Wastage/Effectives Account. *(B. Com. (Hons), Delhi 1997)*

Solution:

(i) and (ii)   **Process I Account**

Particulars	Units	Rs.	Particulars	Units	Rs.
To Input	4000	20,000	By Normal Wastage	80	1,080
To Materials		40,000	By Abnormal Wastage	20	520
To Direct Wages		22,500	By Process I Stock A/c	3900	1,01,400
To Direct Expenses		20,500			
	4000	1,03,000		4000	1,03,000

Process I Stock Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Balance b/d	600	14,700	By Process II A/c	4000	1,03,200
(@ Rs. 24.5 per unit)			By Balance c/d	500	12,900
To Process I A/c	3900	1,01,400	(@ Rs. 25.8 per unit)		
	4500	1,16,100		4,500	1,16,100

Process II Account

Particulars	Units	Rs	Particulars	Units	Rs.
To Process I Stock A/c	4000	1,03,200	By Normal Wastage	200	3,250
(@ Rs. 25.8 per unit)			By Process Stock A/c	3850	1,21,275
To Direct Material		7,500	(@ Rs. 31.5 per unit)		
To Direct Wages		10,000			
To Direct Expenses		2,250			
To Abnormal					
Effectives A/c	50	1,575			
	4050	1,24,525		4050	1,24,525

Process II Stock Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Balance b/d	550	17,050	By Process III A/c	3600	1,13,175
(@ Rs. 31 per unit)			By Balance c/d	800	25,150
To Process II A/c	3850	1,21,275	(@ Rs. 31.44 per unit)		
	4400	1,38,325		4400	1,38,325

Process III Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process II Stock A/c	3600	1,13,175	By Normal Wastage A/c	360	7,560
To Materials		5,000	By Abnormal Wastage A/c	40	1,520
To Direct Wages		10,000	By Process III Stock A/c	3200	1,21,600
To Direct Expenses		2,505			
	3600	1,30,680		3600	1,30,680

Process III Stock Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Balance b/d (@ Rs. 37 per unit)	800	29,600	By Finished Goods Stock A/c (@ Rs. 37.8 per unit)	4,000	1,51,200
To process III A/c	3,200	1,21,600			
	4,000	1,51,200		4,000	1,51,200

(iii) Normal Wastage Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process I A/c	800	1,080	By Sale Proceeds:		
To Process II A/c	200	3,250	Process I	800	1,080
			Process II	150	2,438
			By Abnormal Effectives A/c	50	812
	1,000	4,330		1,000	4,330

(iv) Abnormal Wastage Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process I A/c	20	520	By Sales Proceeds:		
To Process III A/c	40	1,520	Process I	20	270
			Process III	40	840
			By Costing P/L A/c		930
	60	2,040		60	2,040

Abnormal Effectives Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Normal Wastage A/c	50	812	By Process II A/c	50	1,575
To Costing P/L A/c		763			
	50	1,575		50	1,575

Working Notes:

1. *Cost of Abnormal Wastage in Process* $I = \dfrac{\text{Normal Cost}}{\text{Normal Output}} \times$ Ab. Wastage in Units

$$= \frac{1,03,000 - 1,080}{3,920} \times 20$$

$$= \frac{1,01,920}{3,920} \times 20 = \text{Rs. } 520$$

2. *Cost of Abnormal Effectives in Process II* $= \dfrac{\text{Normal Cost}}{\text{Normal Output}} \times$ Ab. Effectives in Units

$$= \frac{1,22,950 - 3,250}{3,800} \times 50$$

$$= \frac{1,19,700}{3,800} \times 50 = Rs.\ 1,311$$

3. *Cost of Abnormal Wastage in Process* $III = \dfrac{\text{Normal Cost}}{\text{Normal Output}} \times \text{Ab. Wastage in units}$

$$= \frac{1,30,680 - 7,560}{3,600 - 360} \times 40$$

$$= \frac{1,23,120}{3,240} \times 40 = Rs.\ 1,520$$

Example 11.12

A product passes through two processes. The output of Process I becomes the input of Process II and the output of Process II is transferred to warehouse. The quantity of raw materials introduced into Process I is 20,000 kg. at Rs. 10 per kg. The cost and output data for the month under review are as under:

	Process I	Process II
Direct Materials	Rs. 60,000	Rs. 40,000
Direct Labour	Rs. 40,000	Rs. 30,000
Production Overheads	Rs. 39,000	Rs. 40,250
Normal Loss	8%	5%
Output	18,000	17,400
Loss realisation of Rs./Unit	2.00	3.00

The company's policy is to fix the Selling price of end product is such a way as to yield a Profit of 20% on Selling price.

Required
   (i) Prepare the Process Accounts
   (ii) Determine the Selling price per unit of the end product.   *(CA, PE, Exam. II, Group II, Nov. 2002)*

Solution:

Process I Account

Dr.   Cr.

Particulars	kg.	Rate / kg. Rs.	Amount Rs.	Particulars	kg.	Rate / kg. Rs.	Amount. Rs.
To Raw Material	20,000	10	2,00,000	By Normal loss	1,600	2.00	3,200
To Direct Material			60,000	By Abnormal	400	18.25	7,300
To Direct Labour			40,000	loss (Refer			
				to Working			
				Notes 1 and 2)			
To Production				By Transfer to			
overheads			39,000	Process II	18,000	18.25	3,28,500
	20,000		3,39,000		20,000		3,39,000

Process II Amount

Dr.   Cr.

Paraticulars	kg	Rate /kg. Rs.	Amount Rs.	Paraticulars	kgs	Rate/ kg. Rs.	Amount Rs.
To Process I Account	18,000	18.25	3,28,500	By Normal loss	900	3.00	2.700
To Direct materials			40,000	By Transfer to warehouse	17,400	25.50	4,43,700
To Direct labour			30,000				
To Production overheads			40,250				
To Abnormal gain	300	25.50	7,650				
	18,300		446400		18300		446400

Working Notes:

1. **Abnormal Loss in Process I:**

   Required production (20,000 kg. – 1,600 kg.)   18,400

   Actual production (in kg.)   18,000

   Abnormal loss (in kg.)   400

2. **Value of Abnormal Loss in Process I:**

$$= \left(\frac{\text{Normal cost of normal ourput}}{\text{Normal output}} \right) \times \text{Abnormal loss}$$

$$= \left(\frac{\text{Rs. } 3,35,800}{18,400 \text{ kg.}} \right) \times 400 \text{ kg.} = \text{Rs. } 18.25 \times 400 \text{ kg.} \qquad = 7,300$$

3. **Abnormal Gain in Process II:**

   Required production (18,000 kg. – 900 kg.)   17,100

   Actual production   17,400

   Abnormal gain (in kg.)   300

4. **Value of Abnormal Gain in Process I:**

$$= \left(\frac{\text{Rs. } 4,36,050}{17,100 \text{ kgs}} \right) \times 300 \text{ Kg.} = \text{Rs. } 25.50 \times 3,000 \text{ kg.} = \text{Rs. } 7,650.00$$

(ii) **Determination of Selling Price of the End Product:**

If the cost price of end product is Rs. 80 the unit sale price is Rs. 100

If the cost price of end product is Re. 1, the unit sale price is $\dfrac{100}{80}$

If the cost price is Rs. 25.50, then the sale price of the end product is $\dfrac{100}{80} \times 25.50$

$$= \text{Rs. } 31.875$$

Example 11.13

A company manufactures its sole product by passing the raw material through the distinct processes in its factory. During the months of April 2004, the company purchased 96,000 kg of raw material at Rs. 5 per kg and introduced the same in process I. Further particulars of manufacture for the month are given below:

	Process I	Process II	Process III
Material consumed	Rs. 33,472	Rs. 27,483	Rs. 47,166
Direct labour	80,000	72,000	56,000
Overheads	1,20,000	1,08,000	84,000
Normal waste in process as % of input	3%	1%	1%
Sale value of waste (Rs./kg)	2	3	5
Actual output during the month (kg)	93,000	92,200	91,500

Prepare the three process accounts and accounts relating to abnormal loss/gain, if any.

(ICWA, Inter Stage 1, Dec. 2004)

Solution:

Process I Account

	Quantity (kg.)	Rate (Rs.)	Amount (Rs.)		Quantity (kg.)	Rate (Rs.)	Amount (Rs.)
To Input of raw material	96000	5.00	4,80,000	By Process-II A/c (Transferred to)	93,000	7.60	7,06,800
To Other materials			33,472	By Normal waste A/c (3% of 96000)	2880	2.00	5,760
To Direct labour			80,000	By Abnormal Loss A/c	120	7.60	912
To Overheads			1,20,000				
	96000		7,13,472		96000		7,13,472

Process II Account

	Quantity (kg.)	Rate (Rs.)	Amount (Rs.)		Quantity (kg.)	Rate (Rs.)	Amount (Rs.)
To Process-I A/c (Transferred form)	93000	7.60	7,06,800	By Process-III A/c (Transferred to)	92200	9.90	12,780
To Materials			27,483	By Normal Waste A/c			
To Direct labour			72,000	(1% of 93000)	930	3.00	2,790
To Overheads			1,08,000				
To Abnormal gain	130	9.90	1287				
	93130		9,15,570		93130		9,15,570

Process-III Account

	Quantity (kg.)	Rate (Rs.)	Amount (Rs.)		Quantity (kg.)	Rate (Rs.)	Amount (Rs.)
To Process-II A/c (Transferred from)	92200	9.90	9,12,780	By Finished Good Stock	91500	12.00	10,98,000
To Materials			47,166	By Normal Waste	922	5.00	4,610
To Direct Labour			56,000	(1% of 92200)			
To Overheads			84,000				
To Abnormal	222	12.00	2,664				
	92422		11,02,610		92422		11,02,610

Abnormal Loss Account

	Quantity (kg.)	Amount (Rs.)		Quantity (Kg.)	Amount (Rs.)
To Process I Account	120	912	By Cash @ Rs. 2 (normal waste)	120	240
			By Profit and Loss Account		672
	120	912		120	912

Abnormal Gain Account

	Quantity (kg.)	Amount (Rs.)		Quantity (Kg.)	Amount (Rs.)
To Process-II A/c (normal waste) @ Rs. 3	130	390	By Process II A/c	130	1,287
To Process-III A/c Normal waste @ Rs. 5	222	1,110	By Process-III A/c	222	2,664
To Profit and Loss	—	2,451			
	352	3,951		352	3,951

Working Notes:

Valuation of Output, Abnormal Loss/Gain are worked out below:

$$\frac{\text{Total cost of Input} - \text{Sale Value of Normal Waste}}{(\text{Input quantity} - \text{Quantity of Normal Waste})}$$

Process I:

$$\frac{713472 - 5760}{96000 - 2880} = \frac{707712}{93120} = \text{Rs. } 7.60$$

Process II:

$$\frac{914283 - 2790}{93000 - 930} = \frac{911493}{92070} = \text{Rs. } 9.90$$

Process III:

$$\frac{1099946 - 4610}{92200 - 922} = \frac{1095336}{91278} = \text{Rs. } 12.00$$

Example 11.14

A product passes through two distinct processes X and Y before completion. During a certain period, 10000 units of crude material were introduced in process X at a cost of Rs. 40,000. After processing in dept X, 9000

units of processed material were transferred to process Y for finishing. From process Y finally 8,600 units of the finished product were obtained and transferred to Finished Goods store.

Further data regarding normal waste, costs etc. are given below:

		Process X	Process Y
Costs incurred:	Material	Rs. 10,000	Rs. 5,000
	Labour	20,000	15,000
	Overheads	10,000	8,000
Normal waste (% of input)		8%	5%
Realisable value of waste per unit		Rs. 5	Rs. 8

There was no opening or closing stock in any process.

Required:

(a) Process Accounts
(b) Normal Loss Account
(c) Abnormal Loss/Gain Accounts
(d) Selling price per unit of the finished product, if management wants 25% profit on sales.

(ICWA, Inter, Stage 1, Dec 2005)

Solution:

(a)   **Process X Account**

Particulars	Units	Rate (Rs.)	Amount (Rs.)	Particulars	Units	Rate	Amount (Rs.)
To Units introduced	10000	4.00	40,000	By Process Y A/c (Transtd to)	9000	8.26	74,348
To Materials			10,000	By Normal Loss	800	5.00	4,000
To Labour			20,000	By By Abnormal			
To Overheads			10,000	Loss	200	8.26	1,652
	10000		80,000		10000		80,000

Process Y Account

Particulars	Units	Rate (Rs.)	Amount (Rs.)	Particulars	Units	Rate (Rs.)	Amount (Rs.)
To Process-X A/c (Transferred from)	9000	8.26	74348	By Finished good stock	8600	11.55	99,325
To Materials			5,000	By Normal loss	450	8.00	3,600
To Labour			15,000				
To Oveheads			8,000				
To Abnormal gain	50	11.55	577				
	9050		1,02,925		9050		1,02,925

(b)   **Normal Loss Account**

Particulars	Units	Rate (Rs.)	Amount (Rs.)	Particulars	Units	Rate (Rs.)	Amount (Rs.)
To Process X A/c	800	5.00	4,000	By Abnormal	50	8.00	400
To Process Y A/c	450	8.00	3,600	gain (Process Y)			
To Abnormal Loss	200	5.00	1,000	By Cash/Bank	1400		8,200
(Process X)	1450		8,600		1450		8,600

(c)   **Abnormal Loss Account**

Particulars	Units	Rate (Rs.)	Amount (Rs.)	Particulars	Units	Rate (Rs.)	Amount (Rs.)
To Process X A/c	200	8.26	1,652	By Normal Loss	200	5.00	1,000
				By Profit and Loss A/c			652
	200		1,652		200		1,652

Abnormal Gain Account

Particulars	Units	Rate (Rs.)	Amount (Rs.)	Particulars	Units	Rate (Rs.)	Amount (Rs.)
To Normal Loss A/c	50	8	400	By Process Y	50	11.55	577
To Profit and Loss A/c			177				
	50		577		50	11.55	577

(d) Computation of Selling price per unit of the finished product.

Cost of Finished Product	Rs. 11.55
Profit required (25% of sales that is, $33\frac{1}{3}$% of cost)	Rs. 3.85
Selling price per unit	Rs. 15.40

Working Notes:

Valuation of abnormal loss, Abnormal gain and output/finished product are worked out below:

$$\frac{\text{Total cost of Input} - \text{Sale Value of Normal loss}}{(\text{Input units Normal loss units})}$$

$$\text{Process } X = \frac{\text{Rs. } (80,000 - 4,000)}{(10000 - 800)} = \frac{\text{Rs. } 76,000}{9200 \text{ units}} = \text{Rs. } 8.26$$

$$\text{Process } Y = \text{Rs. } \frac{\text{Rs. } 1,02,348 - 3,600}{9000 - 450} = \frac{\text{Rs. } 98,748}{8550}$$

$$= \text{Rs. } 11.55$$

Example 11.15

A company manufactures a chemical product by a series of operations in three processes. Raw material is fed into Process I and the finished chemical that comes out of Process III is transferred to the finished goods store. The following particulars relating to operations for April 2007 are given below:

	Process I	Process II	Process III
Raw materials issued 80,000 kg	Rs. 9,60,000		
Direct wages	Rs. 1,25,600	Rs. 1,72,000	Rs. 1,42,500
Overhead costs	Rs. 1,68,000	Rs. 1,77,280	Rs. 1,24,690
Normal processing loss (% of input)	3%	2%	1%
Output transferred to next process	74,000 kg	69,400 kg	69,000 kg
Work-in-process (processed material awaiting transfer to next process)	3,000	2,400	–

Prepare the accounts of Process I, II and III and also abnormal loss and abnormal gain accounts, if any.

(ICWA, Inter, Stage I, June 2007)

Solution:

If waste sold has nil value Process Accounts would appear as follows:

Process I Account

	Quantity (kg)	Amount (Rs.)		Quantity (kg)	Amount (Rs.)
To Materials Issued	80000	9,60,000	By Normal Loss	2400	–
To Direct Wages		1,25,600	By Abnormal Loss	600	9693
To Overheads		1,68,000	By W.I.P. (Closing Balance)	3000	48,464
			By Process II	74000	11,95,443
	80000	12,53,600		80000	12,53,600

(Rate for valuation: $\dfrac{\text{Actual Cost}}{\text{Normal Output}} = \dfrac{\text{Rs.}12,53,600}{80,000 - 2,400} = \dfrac{12,53,600}{77,600\,\text{kg}} = \text{Rs. }16.1546$)

Process II Account

	Quantity (kg)	Amount (Rs.)		Quantity (kg)	Amount (Rs.)
To Process I	74000	11,95,443	By Normal Loss	1480	–
To Direct Wages		1,72,000	By Abnormal Loss	720	15,336
To Overheads		1,77,280	By W.I.P. (Closing Balance)	2400	51,122
			By Process III	69400	14,78,265
	74000	15,44,723		74000	15,44,723

(Rate for valuation: $\dfrac{\text{Actual Cost}}{\text{Normal Output}} = \dfrac{15,44,723}{74,000 - 1,480} = \dfrac{15,44,723}{72,520\,\text{kg}} = \text{Rs. }21.30$)

Process III Account

	Quantity (kg)	Amount (Rs.)		Quantity (kg)	Amount (Rs.)
To Process II	69,400	14,78,265	By Normal Loss	694	–
To Direct Wages		1,42,500	By Finished goods store	69,000	17,52,924
To Overheads		1,24,690			
To Abnormal Gain	294	7,469			
	69,694	17,52,924		69,694	17,52,924

(Rate for valuation: $\dfrac{\text{Actual Cost}}{\text{Normla Output}} = \dfrac{17,45,455}{69,400-694} = \dfrac{17,45,455}{68,706} = $ Rs. 25.4047)

Abnormal Loss Account

	Quantity (kg)	Amount (Rs.)		Quantity (kg)	Amount (Rs.)
To Process I	600	9,693	By Profit and Loss A/c	–	25,029
To Process II	720	15,336			
		25,029			25,029

Abnormal Gain Account

	Quantity (kg)	Amount (Rs.)		Quantity (kg)	Amount (Rs.)
To Profit and Loss A/c	–	7,469	By Process III	294	7,469
		7,469			7,469

Process Costing Having Work-in-Progress at Different Stages of Completion

When a process consists of opening and closing stock fully completed, the cost unit is obtained by dividing the total cost including the cost of opening stock by the number of units completed. This unit cost is used to price the output transferred to the next process and to value the units which remain in inventory. The following example illustrates this situation:

Process I

	Units	Rs.		Units	Rs.
To Stock (opening)	2000	3,500	By Transfer to	9000	27,000
To Materials	10000	20,050	second process		
To Wages		9,450	By Stock	3000	9,000
To Overhead		3,000			
	12000	36,000		12000	36,000

$$\text{Unit cost} = \frac{\text{Rs.} 36,000}{12000 \text{ units}} = \text{Rs. } 3 \text{ per unit}$$

The unit cost, Rs. 3 per unit, has been used to price the goods transferred to the second process as well as to the stock.

Closing Work-in-Progress

In most situations, process may consist of partially completed closing units at the end of an accounting period. It is apparent that a partially completed unit must carry a cost that is lower than a finished unit. It follows that where there are inventories of closing work-in-progress, units costs cannot be computed by simply dividing the total cost by the number of units processed. Units in work-in-process must be converted to a base that can be equated with finished production. This analysis is known as Equivalent Production Analysis.

Equivalent units are defined in I.C.M.A. Terminology of Management and Financial Accountancy as follows:

"Equivalent units are a notional quantity of completed units substituted for an actual quantity of incomplete physical units in progress, when the aggregate work content of the incomplete units is deemed to be equivalent to that of the substituted quantity. The principle applies when operations costs are being apportioned between work-in-progress and completed output."

Equivalent Production Analysis

Before unit costs can be computed, closing inventories of work-in-progress must be converted into finished equivalents (also called equivalent production). This is done by multiplying the actual number of units in process by their stage of completion measured in terms of cost. Thus 2,000 units in an inventory estimated to be 50% complete are equal in cost to 1,000 units that have been completed:

Actual number of units × Stage of completion = Finished equivalent

$$2,000 \times 50\% = 1,000 \text{ units}$$

The following four possibilities may exist with regard to work-in-progress or the question of equivalent production:

1. Closing work-in-progress without any process loss or gain.
2. Closing work-in-progress with process loss or gain.
3. Opening and closing work-in-progress with no process loss or gain.
4. Opening and closing work-in-progress along with process loss or gain.

Situation I (Only Closing Work-in-Progress)

In this case equivalent production is determined in the case of closing work-in-progress by applying percentages of completion for each element of cost. After computing equivalent production, the cost per unit of equivalent production is found and this cost per unit is used to value the finished output transferred to the second process and also closing work-in-progress units. It should be noted that the cost per unit (for each element of cost) is applied to equivalent production of work-in-progress units and not to work-in-progress units directly.

Examples 11.16 to 11.18 explain the preparation of process accounts in this situation.

Example 11.16

Prepare statement of equivalent production, statement of cost and process account from the following information:

Units introduced	7,600
Output (units)	6,000
Process cost (Rs):	
Material	14,560
Labour	21,360
Overhead	14,240
Degree of completion for closing work-in-progress	
Material	80%
Labour	70%
Overhead	70%

Solution:

Statement of Equivalent Production

Input	Output items	Units	Materials units	%	Labour units	%	Overhead units	%
					Equivalent Production			
Units introduced	1. Units completed and transferred	6,000	6,000	100	6,000	100	6,000	100
7,600	2. Work-in-progress	1,600	1,280	80	1,120	70	1,120	70
7,600		7,600	7,280		7,120		7,120	

Statement of Cost

Element cost	Cost (Rs.)	Equivalent production	Cost per completed unit (Rs.)
Material	14,560	7,280	2
Labour	21,360	7,120	3
Overhead	14,240	7,120	2
	50,160		7

Statement of Apportionment of Cost

Output transferred		6,000 × Rs. 7 = Rs. 42,000
Work-in-progress:		
Material	1,280 × 2 = 2,560	
Labour	1,120 × 3 = 3,360	
Overhead	1,120 × 2 = 2,240	= 8,160
	—	50,160

Process Account

	Units	Amount Rs.		Units	Amount Rs.
To Materials	7,600	14,560	By Output transferred	6,000	42,000
To Labour		21,360	By Closing work-in-progress	1,600	8,160
To Overhead		14,240			
	7,600	50,160		7,600	50,160

Example 11.17

The product manufactured by a light engineering factory undergoes two operations. The following data are available relating to expenses incurred on production during November, 2005:

	Machining	Finishing
Units as input	90,000	60,000
Expenses incurred in process :	Rs.	Rs.
Direct material	2,70,000	Nil
Direct labour	1,28,000	45,000
Overheads	64,000	1,35,000

At the end of the month there were 30,000 units lying incomplete in Machining Operation. While the full quantity of material has been consumed for the total production, the expenditure on Labour and Overheads was estimated to be $66\frac{2}{3}$ % in respect of the incompleted products.

You are required to prepare a detailed Cost Statement showing the final cost per unit assuming:

(i) Completed units of Machining Operations are transferred to the Finishing Operation;

(ii) Finishing Operation has completed all the units received from the earlier operation during November 2005 leaving no work-in-progress at the end of the month. *(ICWA Inter)*

Solution:

(i) **Statement of Equivalent Production**

Machining Operation:			Equivalent Units	
	Total units	DM	DL	OV
Completed units	60,000	60,000	60,000	60,000
Incompleted units	30,000	30,000	20,000	20,000
Total	90,000	90,000	80,000	80,000
Finishing operation : units				
Transfer from machining operation	60,000	60,000	60,000	60,000	60,000

(ii) **Statement of Cost per Unit of Machining Operation**

	DM	DL	Overheads
Costs incurred	2,70,000	1,28,000	64,000
Output	90,000	80,000	80,000
Cost per unit	3.00	1.60	.80

Statement of Total Cost

	Total
Machining Operation Costs:	
Direct material	2,70,000
Direct labour	1,28,000
Overheads	64,000
	4,62,000
Less: Closing stock (30,000 Units)	
DM 30,000 × 3 = 90,000	
DL 20,000 × 1.6 = 32,000	
OV 20,000 × .08 = 16,000	1,38,000
Cost of Finished Output from Machining Operation	3,24,000
Add: Finished operation costs:	
Direct Labour	45,000
Overheads	1,35,000
Total cost after finishing operation	5,04,000
Total output	Units 60,000
Cost per unit	Rs 8.40

Example 11.18

A manufacturing concern, engaged in mass production produces standardised electric motor in one of its departments. From the following particulars of a job of 50 motors, you are required to value the work-in-progress and finished goods.

(a) Costs incurred as per job card:

Direct material	Rs. 75,000	Overheads	Rs. 60,000
Direct labour	Rs. 20,000		

(b) Selling price per motor: Rs. 4,500
(c) Selling and distribution expenses are at 30% of sales value.
(d) 25 motors are completed and transferred to finished goods.
(e) Completion stage of work-in-progress:

Direct Material   100%   Direct Labour and Overhead 60%

(ICWA Inter)

Solution:

Statement of Equivalent Production and Cost

Particulars	Direct Material		Labour & Overhead		
	%	Qty	%	Qty	Total
Transferred to finished goods	100	25	100	25	
Work-in-progress	100	25	60	15	
Equivalent units		50		40	
Total cost (Rs.)		75,000		80,000	1,55,000
Cost per equivalent unit (Rs.)		1,500		2,000	3,500

Actual Cost of Production per Unit of Finished Goods

Direct material	Rs. 1,500
Labour & overhead	Rs. 2,000
Total	Rs. 3,500

Market Value per Unit of Finished Goods

Selling price	Rs. 4,500
Less: Selling and distribution overheads @ 30% of Rs 4,500	Rs. 1,350
	Rs. 3,150

Stocks should be at the lower of the cost (that is, Rs 3,500) or market value (that is, Rs. 3,150). Hence, basis of valuation will be market value in this case.

Value of Work-in-Progress

Direct Material: Rs. 1,500 × 25 units	= Rs. 37,500
Labour & Overhead: Rs. (3,150 – 1,500) × 15 units	= Rs. 24,750
	Rs. 62,250

Value of Finished Goods Stock

25 units × Rs. 3,150	= Rs. 78,750
Total Value of Inventory = Rs. 78,750 + Rs. 62,250	= Rs. 1,41,000

Situation 2 (Closing Work-in-Progress and Process Loss or Gain)

Process loss may occur (i) early in a process or during a process; or (ii) at the final stages of a process. The point of occurrence of normal losses (spoiled units) has an important bearing on deciding which of the following two approaches should be used in process accounting:

1. *First Approach*—Cost of normal loss units should be spread over the entire production, that is, cost of normal loss units should be included in the cost of all units computed as equivalent production.
2. *Second Approach*—Cost of normal loss units should be included in the cost of all good units which have been completed and thus cost of normal loss units will not be charged to closing work-in-progress.

The first approach is followed when normal loss occurs at the beginning of or during a process. Since the normal loss occurs early in processing it applies to both completed production and units that are left in process; all work (production) done in that period should be charged with the normal loss. This is achieved by using a value of zero as the finished equivalent of the units lost, thus forcing the good unit that remains to absorb the cost of the bad units. The normal loss units are completely ignored, the cost per unit is increased. Costs for the period are divided by a smaller number of equivalent units, thereby increasing the cost per unit. Cost apportionment to units completed and units still in process is computed using the higher unit cost. Thus, normal spoilage costs are automatically spread over all the equivalent good units (units completed and units in process).

The second approach is followed when normal process loss occurs at the end of a process (for example, loss discovered after final inspection). In this case, as mentioned above, cost of normal loss units is included in the cost of only completed units and not in closing work-in-progress units. If the lost units occur at the end of a process, they are usually regarded as belonging to the completed units and hence costs are charged to those units which have been finished. Since none of the units lost or spoiled (normal loss units) come from

closing work-in-progress, no part of the cost of spoiled units should be charged to the units still in process; the cost of spoiled units must be absorbed by the good units completed. This is done by first treating the normal loss units as completed and charging them with the same cost that applies to good completed units. The cost charged to normal loss units is then added to the cost of the good completed units, thus excluding any of the cost of the normal loss units in cost of work-in-progress units.

In absence of specific information regarding occurrence of normal loss, it should be preferably assumed that normal loss has taken place during a process and not at the end of a process. Hence, in such a case, the first approach (as mentioned above) should be followed.

Examples 11.19 to 11.21 explain the above two approaches.

Example 11.19

During the month of April 2003, 4000 units were introduced into Process *A* at the cost of Rs. 23,200. At the end of the month 3000 units were completed and transferred to Process *B* A/c. 720 units were still in process and 280 units were scrapped. A normal wastage of 5% was expected. It was estimated that the incomplete units have reached a stage in production as follows:

Materials	75%
Labour and overheads	50%

The additional costs incurred were:

Materials	Rs. 6,160
Wages	Rs. 13,760
Overheads	Rs. 6,880

Unit scrapped realised at Rs. 2 per unit.

Prepare:

1. A statement showing equivalent production
2. Statement of evaluation and process *A* Account:

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

Solution:

1. **Statement of Equivalent Production**

Input (units)	Output	Units	Equivalent Production			
			Material		Labour and overhead	
			Qty.	%	Qty.	%
4000	Normal loss	200	–	–	–	–
	Abnormal loss	80	80	100	80	100
	Finished Production	3000	3000	100	3000	100
	Work-in-Progress	720	540	75	360	50
4000	Total	4000	3620		3440	

2. Statement showing cost per unit

Statement of Cost

Elements of Cost	Cost (Rs.)	Equivalent production unit	Cost per units (Rs.)
Materials			
Cost of units introduced	23,200		
Direct Materials	6,160		
	29,360		
Less: Scrap value of Normal loss 200 units × 2	400		
	28,960	3620	8
Wages	13,760	3440	4
Overheads	6,880	3440	2
Total	49,600		14

Statement of Evaluation

Particulars	Element of Cost	Equivalent production (units)	Cost per unit Rs.	Cost Rs.	Total cost Rs.
Abnormal loss	Material	80	8	640	
	Labour	80	4	320	
	Overheads	80	2	160	1,120
Finished Production	Material	3000	8	24,000	
	Labour	3000	4	12,000	
	Overheads	3000	2	6,000	42,000
Work in Progress	Material	540	8	4,320	
	Labour	360	4	1,440	
	Overheads	360	2	720	6,480
					49,600

Example 11.20

SBL LTD. furnishes you the following information relating to Process-*B* for the month of April, 2006:

  (i) Opening Work-in-Progress: Nil

  (ii) Units introduced — 10,000 units @ Rs. 5 per unit

  (iii) Expenses debited to the process *B* Rs. 5,000

  (iv) 8,000 units of finished output were transferred to the next process during the month

  (v) Normal Loss in Process — 10% of input.

  (vi) Closing Work-in-Progress — 800 units.

  (vii) Completion stage, closing work in progress material 100%, labour and overhead 50%. Abnormal loss material 100%, labour and overhead 80%.

  (viii) Scrap realisation: Normal Loss — @ Rs. 2 per unit; Abnormal Loss — @ Rs. 4 per unit.

You are required to prepare:

(1) Statement of Equivalent production.

(2) Statement of Cost of each element.

(3) Statement of Evaluation.

(4) Process B Account

(5) Abnormal Loss Acccount.

(ICWA, Inter, Stage 1, June 2006)

Solution:

SBL LTD.

(1) Statement of Equivalent Production

Input Units	Particulars	Output Units	Equivalent production			
			Material		Labour and overheads	
			Units	%	Units	%
10000	Opening WIP	–	–	–	–	–
	Introduced during the month	–	–	–	–	–
	Finished out put (transferred to next process)	8000	8000	100%	8000	100%
	Normal loss	1000	–	–	–	–
	Abnormal loss	200	200	100%	160	80%
	Closing WIP	800	800	100%	400	50%
10000		10000	9000		8560	

(2) Statement of cost of each element

Particulars	Materials Rs.	Labour Rs.	Overheads Rs.	Total Rs.
Units Introduced	50,000			50,000
Processing Material	24,600	10,400	5,000	40,000
	74,600	10,400	5,000	90,000
Loss: Scrap Realisation for normal Loss (1000 × 2)	2,000			2,000
Net cost	72,600	10,400	5,000	88,000
Equivalent production (Units)	9,000	8,560	8,560	
Cost per unit (Rs.)	8.067	1.215	0.584	9.666

(3) Statement of evaluation

Items	Elements	Equivalent Unit	Cost Per Unit (Rs.)	Cost Rs.	Total
Finished output transferred to next process	Materials Labour Overheads	8000	9.866	78926	78,926
Abnormal loss	Materials	200	8.067	1,613	
	Labour	160	1.215	194	
	Overheads	160	0.584	93	1,900
Closing WIP	Materials	800	8.067	6,454	
	Labour	400	1.215	486	
	Overheads	400	0.584	234	7,174

(4) Process-*B* Account for the month April 2006

Dr.   Cr.

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Units Introduced	10000	50,000	By Finished output	8000	78,926
Processing Materials	-	24,600	Transferred		
Direct labour		10,400	- Normal loss	1000	2,000
Overheads		5,000	- Abnormal loss	200	1,900
			- Closing WIP	800	7,174
	10000	90,000		10000	90,000

(5) Abnormal Loss Account

Dr.   Cr.

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process-*B* A/c	200	1,900	By Cash/Bank (realisation of scrap @ Rs. 4/-	200	800
			By Profit and loss A/c		1,100
	200	1,900		200	1,900

Example 11.21 (Normal Loss during a Process)

R.P. Ltd. furnishes you the following information relating to Process *B* for the month of October 2007.

  (i) Opening work-in-progress—Nil

 (ii) Units introduced—10,000 units @ Rs. 3 per unit.

(iii) Expenses debited to the process:

Direct materials	Rs. 14,650
Labour	Rs. 21,148
Overheads	Rs. 42,000

(iv) Normal loss in process—One per cent of input.

(v) Closing work-in-progress—350 units—Degree of completion

Material	100%
Labour and overheads	50%

(vi) Finished output   9,500 units

(vii) Degree of completion of abnormal loss:

Material	100%
Labour and overheads	80%

(viii) Units scrapped as normal loss were sold at Re. 1 per unit.

(ix) All the units of abnormal loss were sold at Rs. 2.50 per unit.

Prepare:

1. Statement of Equivalent production;

2. Statement of cost of finished goods, Abnormal loss and Closing work-in-progress.   *(ICWA Inter)*

Solution:

1.   **Statement of Equivalent Production (Process B)**

	Equivalent Production						
	Total units	*Material unit*	*Completion %*	*Labour units*	*Completion %*	*Over- heads*	*Completion %*
Finished output	9,500	9,500	100	9,500	100	9,500	100
Normal loss 1% of input of 10,000	100	—	—	—	—	—	—
Abnormal loss (balancing fig.)	50	50	100	40	80	40	80
Closing work-in-progress	350	350	100	175	50	175	50
	10,000	9,900		9,715		9,715	

Statement of Cost per Equivalent Unit

	Material	*Labour*	*Overhead*
Units introduced 10,000 × 3	30,000	—	—
Add: Direct material	14,650		
	44,650		
Less: Sale of normal scrap 100 × 1	100		
	44,550	21,148	42,000
Cost per equivalent unit of production	Rs. 44,550	Rs. 21,148	Rs. 42,000
	$\dfrac{}{9,900}$	$\dfrac{}{9,715}$	$\dfrac{}{9,715}$
	= Rs. 4.50	= Rs. 2.18	= Rs. 4.32
Total cost per unit of production	= (4.50 + 2.18 + 4.32) = Rs. 11.00		

2. **Statement of Cost**

Finished goods	= 9,500 × 11			1,04,500
Abnormal loss:				
Material	= 50 × 4.50	=	225.0	
Labour	= 40 × 2.18	=	87.2	
Overheads	= 40 × 4.32	=	172.8	485
Closing WIP:				
Material	= 350 × 4.50	=	1,575	
Labour	= 175 × 2.18	=	382	
Overhead	= 175 × 4.32	=	756	2,713
		Total		1,07,698

3. **Process B Account**

	Units	Amount (Rs.)		Units	Amount (Rs.)
The Opening WIP	Nil	Nil	By Normal loss	100	100
To Units introduced	10,000	30,000	By Abnormal loss	50	485
To Direct materials		14,650	By Finished output		
			(Rs 11 per unit)	9,500	1,04,500
To Labour		21,148	By Closing WIP c/d	350	2,713
To Overheads		42,000			
	10,000	1,07,798		10,000	1,07,798
To Material	12,000	60,000	By Spoilage	1,000	—
			By Output transferred	10,000	1,10,000
To Labour		33,600			
To Overhead		22,400	By Closing work-in-progress	1,000	6,000
	12,000	1,16,000		12,000	1,16,000

Note: As entire material is placed in the process at the beginning of the first process, it has been assumed that closing work-in-progress is complete 100% with regard to materials. Therefore, percentage of completion of 20% has been applied only in case of labour and overhead.

Situation 3 (Opening and Closing Work-in-Progress without Process Loss or Gain)

A process account may have opening work-in-progress as well as closing work-in-progress. The treatment of closing work-in-progress is the same with regard to equivalent production and determining its cost. In case of opening work-in-progress, the production or finished units completed during the period will comprise two lots: (i) the first lot will be of opening work-in-progress which is partially incomplete and which will be completed during the period; (ii) the second lot of production will be of those units which are introduced into the process during the current period and have been completed during the period.

Since costs tend to vary from period to period, each lot may carry different units costs. The procedure of calculating equivalent production for opening work-in-progress units depends on which method of costing (cost flow assumption) has been used. If standard costing is not used, generally accepted accounting practices permit use of any one of the following three cost flow assumptions:

1. First-in, First-out (FIFO)
2. Weighted Average Costing
3. Last-in, First-out (LIFO)

FIFO   The FIFO method of costing is based on the assumption that opening work-in-progress units are the first to be completed, the first costs incurred in the period should be attached to units in opening work-in-progress. After opening work-in-progress units have been completed, new units are taken up during the current period. Equivalent production of opening work-in-progress can be calculated as follows:

Equivalent production = Units in opening W.I.P × Percentage of work needed to finish the units

Costs associated with the opening inventory in process are separated from costs of units started and completed during the period, and the costs of the two periods are not combined before final transfer of completed units out of process. No unit of opening work-in-progress is automatically found in closing work-in-progress.

Weighted Average Costing   Under average costing, opening work-in-progress units and costs both are combined with new production started in current period (both unit and cost) and weighted average cost per unit is determined by dividing the total cost (opening work-in-progress cost + current cost) by equivalent production. Costs attached with the opening inventory lose their identity because of this merger. The opening inventory cost is treated as if it were current period cost. No distinction is made between completed units from opening inventory and completed units from the new production. In fact, all units finished during the current accounting period are treated as if they were started and finished during that period. Therefore, equivalent production (of opening work-in-progress) will be all units of opening work-in-progress. There is only one final unit cost for all completed units—a weighted average unit cost.

FIFO and average costing, although based on different costing concepts, do not necessarily produce significantly different unit costs. The differences in unit costs between the two costing methods may exist only under the following conditions:

1. Opening work-in-progress units are large, relative to the number of units started during the current period. The lesser number of units in opening inventory will have little influence on the average cost.
2. The stage of completion of the opening work-in-progress units is quite advanced. In absence of this, previous period costs of opening inventory will not have any impact on the average cost.
3. Previous period costs are substantially different from current period costs.

Average costing under normal conditions (if the above conditions do not exist) is the most appropriate, accurate and simple. However, if the above conditions prevail, the average cost may not be helpful in efficiency measurement and cost control.

LIFO   In LIFO method the assumption is that the units entering into the process in the last are the first to be completed. This method influences differently the costs of complete units and the closing work-in-progress. The cost of opening work-in-progress is charged to the closing work-in-progress and thus the closing work-in-progress appears at the cost of opening work-in-progress. The completed units appear at their current costs.

Examples 11.22 to 11.26 present FIFO, Average Costing and LIFO methods in process accounts.

Example 11.22

The following particulars are extracted from the book of Y Ltd. for the month of August 2003:

Opening stock of W.I.P.		200 units
Degree of completion:		
Materials	100%	
Labour	40%	
Overhead	40%	

Units introduced in August, 2003	1,050
Completed units in August, 2003	1,100
Closing W.I.P. (units)	150
Degree of completion:	
Materials	100%
Labour	70%
Overhead	70%

Prepare a statement of equivalent production.   *(B.Com. (Hons), Delhi, 2003)*

Solution:

(i) Average Cost Method

Statement of Equivalent Production

Production	Units	Material		Labour and overhead	
		% of completion	Equivalent units	% of completion	Equivalent prod.
Finished units	1,100	100	1,100	100	1,100
Closing Work-in-Progress	150	100	150	70	105
	1,250		1,250		1,205

(ii) Under FIFO Method

Statement of Equivalent Production

Production	Units	Material		Labour and overhead	
		% of completion	Equivalent production	% of completion	Equivalent production
Opening W.I.P.	200	—	—	60	120
Completely processed during the period (1050-150)	900	100	900	100	900
Closing W.I.P.	150	100	150	70	105
	1250		1050		1125

Example 11.23

The Vega Manufacturing Co. uses FIFO method of inventory valuation in process costing. The following data relate to Process I for the month of April, 2004:

(i) Beginning work in process:
   Quantity   : 1500 units
   Value   : Rs. 4,500
(ii) Introduced during the month   : 5,000 units
(iii) Transferred to Process II   : 5,500 units
(iv) Ending work-in-process   : 1,000 units
(v) Degree of completion:

	Beginning W.I.P	Ending W.I.P
Materials	100%	100%
Conversion	80%	60%

(vi) Cost added during the month:

Materials : Rs. 10,000

Labour : Rs. 9,800

Overheads : Rs. 4,900

You are required to:

(i) Prepare a statement of equivalent production;

(ii) Prepare Process I account.

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

Solution:

Statement of Equivalent Production

Production	Units	Material		Labour	Overhead
		% of completion	Equ. pro.	% of completion	Equ. pro.
Opening WIP	1500	–	–	20	300
Completely processed during the period (5500 – 1000)	4500	100	4500	100	4500
Closing WIP	1000	100	1000	60	600
Total	7000		5500		5400

Statement of Cost

Element of Cost	Cost incurred during the year (Rs.)	Equivalent production units	Cost per units (Rs.)
Materials	10,000	5500	1.818
Labour	9,800	5400	1.815
Overhead	4,900	5400	0.907
	24,700		4.540

Statement of Evaluation

	Rs.	Rs.
Opening work in progress (current cost):		
Material		
Labour: 300 units @ 1.815	545	
Overhead: 300 units @ .907	273	818
Closing WIP:		
Material: 1000 units @ 1.818	1818	
Labour: 600 units @ 1.815	1089	
Overhead: 600 units @ .907	545	3,452
Units completely processed during the year (4500 @ Rs. 4.540)		20,430
		24,700

Process Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To opening WIP	1500	4,500	By finished		
To Material	5000	1,000	stock to next		
To labour		9,800	process		
To Overhead		4,900	(Rs. 4500 + 818 +	5500	25,748
			Rs. 20430)		
			By Closing WIP	1000	3,452
	6500	29,200		6500	29,200

Example 10.24 (LIFO)

From the following information prepare: (a) Statement of equivalent production (b) Statement of cost for each element (c) Statement of apportionment of cost and (d) Process account for Process A using the LIFO method of inventory costing for the month of December 2007.

Units in process, Dec. 2007	10,000
(All material used, 50% completed regarding labour and overhead)	
New units introduced	20,000
Total units	30,000

Production report reveals the following information:

Units completed	15,000
Units in process on December 31, 2007	
(All material used, 50% complete regarding	
labour and overhead)	15,000
Loss in process	Nil

Cost Record

Work-in-process as on December 1, 2007

	Rs.
Material	3,600
Labour	3,900
Overhead	3,900

Cost for December, 2007	Rs.
Material	14,400
Labour	31,150
Overhead	31,150
Total Cost	88,100

Solution:

Process A (LIFO Method)
Statement of Equivalent Production

Input		Output		Equivalent Production					
Particulars	Units	Particulars	Units	Material		Labour		Overhead	
				Units	%	Units	%	Units	%
Opening stock	10,000	Unit completed	15000	15000	100	15000	100	15000	100
New units		Closing inventory							
introduced	20,000	(a) work on O/WIP	10000*	—		—		—	
		(b) New units	5000	5000	100	2500	50	2500	50
	30,000		30000	20000		17500		17500	

*No work has been done on units which represented opening work-in-process.

Statement of Cost of Each Element

Elements of cost	Cost in process Rs.	Equivalent production Units	Cost per unit Rs.
Material	14,400	20000	0.72
Labour	31,150	17500	1.78
Overhead	31,150	17500	1.78
	76,700		

Statement of Apportionment of Cost

Item	Elements	Equivalent production Units	Cost per unit Rs.	Cost Rs.	Total Rs.
Units completed	Material	15000	0.72	10,800	
	Labour	15000	1.78	26,700	
	Overhead	15000	1.78	26,700	64,200
Closing inventory					
Opening WIP	Material	—	0.72	—	
	Labour	—	1.78	—	
	Overhead	—	1.78	—	
New units	Material	5000	0.72	3,600	
	Labour	2500	1.78	4,450	
	Overhead	2500	1.78	4,450	12,500
					76,700

Process A Account

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Opening WIP	10,000	11,400	By Units completed	15,000	64,200
Units introduced	20,000		By Closing stock	15,000	23,900
Material		14,400			
Labour		31,150			
Overhead		31,150			
	30,000	88,100		30,000	88,100

Note: Process A/c has been credited with an amount of Rs. 23,900 being the cost of closing stock, determined as follows:

Costs of opening WIP:	Rs.
Material	3,600
Labour	3,900
Overhead	3,900
	11,400
Add: Cost of work done on opening WIP	Nil
Add: Costs of newly introduced units	12,500
	23,900

Example 11.25 (FIFO)

Vinal Ltd. produces Article *B* from a material which passes through two processes namely *P* and *Q*. The details relating to a month are as under:

	Process P	Process Q
Materials introduced (units)	10000	
Transferred to next process (units)	9000	
Work-in-progress:		
At the beginning of the month (units)	—	600
At the end of the month (units)	1000	400
Expenses:		
Work-in-process at the beginning of the month	—	9400
Materials introduced at the beginning of the process	120000	
Labour and overheads	27600	18200

Stage of completion of work-in-process:

Process *P*: Closing W.I.P. 20% complete in respect of labour and overheads.

Process *Q*: Opening W.I.P. 33 $\frac{1}{3}$ % complete in respect of labour and overheads.

Closing W.I.P. 25% complete in respect of labour and overheads.

The finished output *B* emerging out of Process *Q* is sold at Rs. 20 per unit.

The management is considering an alternative by which the finished output *B* could be further treated by installing a new machine at a capital cost of Rs. 8 lakhs. In such an event, the final product known as article *N* produced by this operation could be sold at Rs. 25 per unit. The operating expenses of the aforesaid further treatment are estimated at Rs. 23,000. The company desires a return on investment of 25%.

Required:

    (a) Prepare the process cost accounts for Process *P* and *Q*.
       (Show the working of equivalent units and cost per equivalent unit in each process).
    (b) Prepare a statement of profitability of Product *B* as it emerges from Process *Q*.
    (c) Advise the management whether further treatment of Product *B* by installing the new machine should
       be taken up or not.   *(ICWA Inter)*

Solution:

    (a) Process Cost Accounts

Equivalent Units—Process P

Input units		Materials		Labour & Overhead	
		Units	Completion (%)	Units	Completion (%)
9,000	Units completed	9,000	100	9,000	100
1,000	Closing stock	1,000	100	200	20
	Equivalent units	10,000		9,200	
	Expenses	Rs. 1,20,000		Rs. 27,600	
	Cost per equivalent unit Rs.	12		Rs. 3	

Cost of closing stock = 1,000 × Rs. 12 + 200 × Rs. 3 = Rs. 12,600
Cost of completed units = Rs. 1,20,000 + Rs. 27,600 − Rs. 12,600 − Rs. 1,35,000

Equivalent Units—Process Q

Input		Materials		Labour & Overhead	
		Units	Completion (%)	Units	Completion (%)
600	Opening stock (work completed in current period)	—		400	66 $\frac{2}{3}$
8,600	Units completed (units started less closing stock; 9,000 − 400)	8600	100	8600	100
400	Closing stock (work done in current period)	400	100	100	25
	Equivalent units	9000		9100	
	Expenses	Rs. 1,35,000		Rs. 18,200	
	Cost per equivalent unit	Rs. 15		Rs. 2	

Cost of closing stock = 400 × Rs. 15 + 100 × Rs. 2 = Rs. 6,200
Cost of finished stock (Product B) = Rs. 9,400 + Rs. 1,35,000 + Rs. 18,200 – Rs. 6,200 = Rs. 1,56,400

Process P Account

	Units	Rs.		Units	Rs.
To Materials	10000	1,20,000	By Transfer to Process Q	9000	1,35,000
To Labour and overhead		27,600	By Closing stock	1000	12,600
	10000	1,47,600		10000	1,47,600

Process Q Account

	Units	Rs.		Units	Rs.
To Opening stock	600	9,400	By Transfer to finished stock (Product B)	9200	1,56,400
To Process P	9000	1,35,000			
To Labour and overhead		18,200	By closing stock	400	6,200
	9600	1,62,600		9600	1,62,600

(b) Profitability of Product B

Sales (9,200 units at Rs. 20 per unit)	Rs. 1,84,000
Cost of production	Rs. 1,56,400
Profit per month	Rs. 27,600

	Units	Rs.	Units	Rs.
(c) Further Processing of Product B to Final Product N				
Sales (9,200 units of N @ Rs. 25)				Rs. 2,30,000
Cost of Production:				
Upto Product B stage			Rs. 1,56,400	
Further processing			Rs. 23,000	Rs. 1,79,400
Profit per month				Rs. 50,600
Profit without further processing				Rs. 27,600
Additional profit by further processing				Rs. 23,000 per month
Desired return on fresh investment			= 25% on Rs. 8,00,000 = 2,00,000 per year = Rs. 16,667 per month	

Further processing results in:

Additional profit per month of Rs. 23,000 which works out to a return of 34.5% $\left(\dfrac{23,000 \times 12 \times 100}{8,00,000} \right)$ on investment as against the desired return of 25%.

Therefore, subject to the consideration of other non-cost factor, if any, the proposal for further processing is recommended for acceptance.

Example 11.26 (Average Costing)

Following information is available regarding Process A for the month of February, 1999:

Production Record

Units in process as on 1.2.1999	4,000
(All materials used, 25% complete for labour and overhead)	
New units introduced	16,000
Units completed	14,000
Units in process as on 28.2.1999	6,000

(All materials used, $33 \frac{1}{3}$% complete for labour and overhead)

Cost Records

Work-in-process as on 1.2.1999	Rs.
Materials	6,000
Labour	1,000
Overhead	1,000
	8,000
Cost during the month:	
Materials	25,600
Labour	15,000
Overhead	15,000
	55,600

Presuming that average method of inventory is used, prepare:

   (i) Statement of equivalent production.

  (ii) Statement showing cost for each element.

 (iii) Statement of apportionment of cost.

 (iv) Process cost account for Process A.

(CA Inter, May 1999)

Solution:

(i)
Statement of Equivalent Production
(Average Cost Method)

Particulars			Materials		Labour		Overhead	
Input (units)	Output	Units	% com-pletion	Equi valent units	% com-pletion	Equi valent units	% com-pletion	Equi-valent units
20,000	Completed	14,000	100	14,000	100	14,000	100	14,000
	WIP	6,000	100	6,000	$33 \frac{1}{3}$	2,000	$33 \frac{1}{3}$	2,000
20,000		20,000		20,000		16,000		16,000

(ii) **Statement of Cost**

Particulars	Materials	Labour	Overhead	Total
Cost of Opening Work-in-progress (Rs.)	6,000	1,000	1,000	8,000
Cost incurred during the month (Rs)	25,600	15,000	15,000	55,600
Total Cost (Rs.): (i)	31,600	16,000	16,000	63,600
Equivalent units: (ii)	20,000	16,000	16,000	
Cost per equivalent unit (Rs.) (iii) = (i)/(ii)	1.58	1	1	3.58

(iii) **Statement of Cost Apportionment**

			Rs.	Rs.
Cost of output transferred: (i)	14,000 units @	Rs. 3.58		50,120
Cost of closing work-in-progress: (ii)				
Materials	6,000 units @	Rs. 1.58	9,480	
Labour	2,000 units @	Re 1	2,000	
Overhead	2,000 units @	Re 1	2,000	13,480
Total Cost: (i) + (ii)				63,600

Dr. (iv) **Process A Account** **Cr.**

Particulars	Units	Rs.	Particulars	20,000	63,600
To Opening *WIP*	4,000	8,000	By Completed units	14,000	50,120
To Materials	16,000	25,600	By Closing WIP	6,000	13,480
To Labour		15,000			
To Overhed		15,000			
	20,000	63,600		20,000	63,600

Situation 4 (Opening and Closing Work-in-Progress with Process Losses or Gains)

In this situation, due adjustments are made for normal loss, abnormal loss, and abnormal gain in calculation of equivalent production. However, there is no change in the treatment of normal loss, abnormal loss and abnormal gain. Normal spoilage cost is borne by the good units produced; proceeds realised from the sale of normal loss scrap are credited to the relevant process account. These proceeds (sale of scrap) are also taken into account while calculating cost per unit of equivalent production. Abnormal loss units are valued like good units.

Examples 11.27 to 11.32 display the preparation of Process Accounts in this situation.

Example 11.27

The following data are available in respect of Process 1 for March, 2007:

    (i) Opening stock of work-in-progress: 800 units at a cost or Rs. 4,000.

    (ii) The degree of completion of opening W.I.P.:

Materials	100%
Labour	60%
Overhead	60%

    (iii) Input of materials at a total cost of Rs. 36,800 units for 9,200 units.

    (iv) Direct wages incurred Rs. 16,740.

(v) Production overheads Rs. 8,370.

(vi) Units scrapped 1,200 units. The stage of completion of these units was:

Materials	100%
Labour	80%
Overhead	80%

(vii) Closing work-in-progress: 900 units. The stage of completion of these units was:

Materials	100%
Labour	70%
Overhead	70%

(viii) 7,900 units were completed and transferred to the next process.

(ix) Normal loss is 8% of the total input (opening stock plus units put into the process).

(x) Scrap value is Rs. 4 per unit.

You are required to:

(a) Compute equivalent production.

(b) Calculate cost per equivalent unit.

(c) Calculate the cost of abnormal loss (or gain), closing work-in-progress and units transferred to the next process using FIFO method.

(d) Show the Process Account for March, 2007.   *(B.Com.(Hons), Delhi, 2007)*

Solution:

Statement of Equivalent Output (FIFO Method)

Input	Particulars	Unit	*Material* %	*Material* Unit	*Labour and Overhead* %	*Labour and Overhead* Unit
	Opening stock	800	–	–	40%	320
	Normal Loss (8% of Total Input)	800	–	–	–	–
	Abnormal Loss (1200 – 800)	400	100%	400	80%	320
	Finished Goods	7100	100%	7100	100%	7,100
	Closing W.I.P.	900	100%	900	70%	630
	Equivalent Output	10000		8,400		8,370

Cost per Equivalent Unit

Particulars	Amount Rs.	Eq. unit	Per unit
Material	36,800		
Less: Scrap (800 × 4)	3,200		
	33600	8400	4
Labour and Overhead (16740 + 8370)	25,110	8370	3
Cost per Equivalent unit			7

(*Contd.*)

Cost per Equivalent Unit

Particulars	Amount Rs.	Eq. unit	Per unit
W.N. Cost of Abnormal Loss			
Material (400 × 4)			1,600
Labour and Overhead (320 × 3)			960
			2,560
Cost of closing W.I.P.			3,600
Material (900 × 4)			1,890
Labour and Overhead (630 × 3)			5,490

Process A/c

Particulars	Unit	Amount Rs.	Particulars	Unit	Amount
To Opening W.I.P.	800	4,000	By Normal Loss	800	3,200
To Material	9200	36,800	By Abnormal Loss	400	2,560
To Labour		16,740	By Finished Goods*	7900	54,660
To Overhead		8,370	By Closing W.I.P.	900	5,490
	10000	65,910		10000	65,910

Cost of Finished Goods

Cost of completing op. stock (4000 + 320 × 3)	4,960
Cost of completing next 7100 units (7100 × 7)	49,700
	54,660

Example 11.28

From the following information prepare:
- (a) Statement of equivalent production;
- (b) Statement of element of cost/unit;
- (c) Statement of apportionment of cost;
- (d) Process II account under FIFO method.
- (i) Opening stock—800 units costing Rs. 6,038 (transferred in cost Rs. 1,200, material Rs. 1,578, labour Rs. 1,710, overheads Rs. 1,550)
- (ii) Transferred from previous Process I—12,000 units costing Rs. 16,350.
- (iii) Cost incurred in Process II:

Material	Rs. 11,600
Labour	Rs. 20,760
Overheads	Rs. 15,570

- (iv) Normal loss in process II—10%
- (v) Scrap realised @ Rs. 10/10 units
- (vi) Closing stock—1800 units
- (vii) Transfer to next process—9,700 units
- (viii) Degree of completion:

	Op. Stock (%)	Cl. Stock (%)	Scrapped Units (%)
Material	60	60	100
Labour	40	51	41
Overheads	40	51	41

(B.Com.(Hons), Delhi, 2006)

Solution:

Statement of Equivalent Production

Input	Particulars	Output	Material %	Material Unit	Labour and Overhead %	Labour and Overhead Unit
800	Opening W.I.P. finished	800	40%	320	60%	480
12000	Input introduced					
	Units introduced and finished	8900	100%	8900	100%	8900
	Normal loss	1200	—	—	—	—
	Abnormal Loss	100	100%	100	41%	41
	Closing stock	1800	60%	1080	51%	918
12800		12800		10400		10339

Statement of Cost per unit

Particulars	Material I	Material II	Labour	Overhead
Cost	16350	11600	20760	15570
Less: Sale of Scrap	—	1200	—	—
	16350	10400	20760	15,570
Equivalent Production	10400	10400	10339	10,339
Per unit cost	1.5721	1	2.0079	1.5059

Statement of Apportionment of cost

Particulars	Item	Equivalent Units	Rate Per Unit	Total
Cost of Completed Units				
Opening cost of 800 units				6,038
further cost on opening stock	Material I	320	1.5721	
	Material II	320	1.0000	
	Labour	480	2.0074	
	Overhead	480	1.5059	2,510
Cost of units Introduced and Finished during the year				
Cost of 8900 completed units	Material I	8,900	1.5721	
	Material II	8,900	1.0000	
	Labour	8,900	2.0079	
	Overhead	8,900	1.5059	54,165
				62,713

(Contd.)

Statement of Apportionment of cost

Particulars	Item	Equivalent Units	Rate Per Unit	Total
Total cost of finished goods Cost of Abnormal Loss 100 units Abnormal Loss	Material I	100	1.5721	
	Material II	100	1.0000	
	Labour	41	2.0079	
	Overhead	41	1.5059	401
Closing Work in Progress 1800 units of closing W.I.P.	Material I	1,080	1.5721	
	Material II	1,080	1.0000	
	Labour	918	2.0079	
	Overhead	918	1.5059	6004

Process II Account

Particulars	Unit	Amount	Particulars	Unit	Amount
To Opening stock	800	6,038	By Normal loss @ Rs. 1 per unit	1,200	1,200
To Units received from Process II	12,000	16,350	By Abnormal loss	100	401
To Material		11,600	By transfer to finished products	9,700	62,713
To Labour		20,760			
To Overhead		15,570	By Closing W.I.P.	1,800	6,004
	12,800	70,318		12,800	70,318

Example 11.29

The following data relate to Process Q:

(i) Opening work-in-process 4,000 units

    Degree of completion:

Materials	100%	Rs.	24,000
Labour	60%	Rs.	14,400
Overheads	60%	Rs.	7,200

(ii) Received during the month of April, 1998 from Process P

    40,000 units   Rs.   1,71,000

(iii) Expenses incurred in Process Q during the month

Materials	Rs.	79,000
Labour	Rs.	1,38,230
Overheads	Rs.	69,120

(iv) Closing work-in-process: 3,000 units

    Degree of completion:

    Materials   100%

    Labour & Overheads   50%

(v) Units scrapped   4,000 units

    Degree of completion:

    Materials   100%

    Labour and Overheads   80%

(vi) Normal loss: 5% of current input

(vii) Spoiled goods realised Rs. 1.50 each on sale.

(viii) Completed units are transferred to warehouse.

Required: Prepare:

(i) Equivalent units statement.

(ii) Statement of cost per equivalent unit and total costs.

(iii) Process *Q* Account.

(iv) Any other account necessary.

(CA Inter, May 1998)

Solution

(i)

Statement of Equivalent Production

Input Units	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			% Comp-letion	Units Comp-letion	% Comp-letion	Units	%	Units
4000	Opening work-in-progress (units, Completed and transferred to warehouse)	40(0	—	—	40	1600	40	1600
40,000	Units completed and transferred to warehouse	33,000	100	33,000	100	33,000	100	33,000
	Closing work-in-progress	3,000	100	3,000	50	1,500	50	1,500
	Normal Loss	2,000	—	—	—	—	—	—
	Abnormal loss	2,000	100	2,000	80	1,600	80	1,600
				38,000		37,700		37,700

(ii)

Statement of Cost Per Equivalent Unit and Total Cost

Particulars	Material I (Process P)	Material II (Process Q)	Labour and Overhead (Process Q)
Cost (Rs.)	1,71,000	79,000	2,07,350
Less: Recovery from sale of scrapped 2,000 units at Rs. 1.50 per unit being normal loss	—	3,000	—
	1,71,000	76,000	2,07,350
Equivalent Production	38,000	38,000	37,700
Cost per unit	Rs. 4.5	Rs. 2	Rs. 5.50

(Contd.)

(ii)   **Statement of Cost Per Equivalent Unit and Total Cost**

Particulars	Material I (Process P)	Material II (Process Q)	Labour and Overhead (Process Q)
Cost of Completed Units:			
Opening Stock 4,000 units			45,600
Costs incurred to complete Opening Stock			
into finished products (1,600 × 5.50)			8,800
			54,400
Cost of 33,000 completed units			
(33,000 units × Rs. 12)			3,96,000
			4,50,400
Total Cost of 37,000 completed units			
Cost of Closing WIP 3,000 units			27,750
(3,000 units × Rs. 6.50) + (1,500 units × Rs. 5.50)			
Cost of 2,000 Abnormal Loss units			21,800
(2,000 units × Rs. 6.50) + (1,600 units × Rs. 5.50)			
			4,99,950

(iii)   **Process Q Account**

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening Work in Progress	4000	45,600	By Normal Loss	2000	3,000
To Units received	40000	1,71,000	By Completed Units (transferred to warehouse)	37000	4,50,400
To Costs Incurred:					
Materials		79,000			
Labour		1,38,230	By Closing Work in Progress	3000	27,750
Overheads		69,120			
			By Abnormal Loss	2000	21,800
	44000	5,02,950		44000	5,02,950

(iv)   **Abnormal Loss Account**

Particulars	Units	Rs.	particulars	Units	Rs.
To Process Q Account	2000	21,800	By Sale Proceeds	2000	3,000
			By Profit & Loss Account (Loss)		18,800
		21,800			21,800

Example 11.30

Following details are related to the work done in Process *A* of *XYZ* Company during the month of March, 2007:

Opening work-in-progress (2000 units)   Rs.
 Materials   80,000
 Labour   15,000
 Overheads   45,000
Materials introduced in Process *A* (38000 units)   14,80,000
 Direct labour   3,59,000
 Overheads   10,77,000

Units scrapped: 3000 units
Degree of completion:
 Materials   100%
 Labour and overheads   80%

Closing work-in-progress: 2000 units
Degree of Completion:
 Materials   100%
 Labour and overheads   80%

Units finished and transferred to Process *B*: 35,000
Normal Loss:

 5% of total input including opening work-in-progress
 Scrapped units fetch Rs. 20 per piece.

You are required to prepare;

(i) Statement of equivalent production;
(ii) Statement of cost;
(iii) Statement of distribution cost; and
(iv) Process *A* Account, Normal and Abnormal Loss Accounts.

(CA, PE, Exam II, Group II, May 2007)

Solution:

Statement of Equivalent Production

Input	Units	Output	Units		Equivalent production		
					Material		Labour and Overheads
				%	Units	%	Units
Opening WIP	2000	Completed and transfer to Process B	35000	100	35000	100	35000
Units introduced	38000	Normal loss (5% of 40000)	2000		–		–
		Abnormal loss	1000	100	1000	80	800
		Closing WIP	2000	100	2000	80	1600
	40000		40000		38000		37400

Statement of Cost

Details	Cost at the beginning of process Rs.	Cost added Rs.	Total cost Rs.	Equivalent Units Rs.	Cost per unit Rs.
Material	80,000	14,80,000	15,60,000		
Less: Value of normal loss (20 × 2,000 =			40,000)	38,000	40
			15,20,000		
Labour	15,000	3,59,000	3,74,000	37,400	10
Overheads	45,000	10,77,000	11,22,000	37,400	30
					80

Statement of Distribution of Cost

(a) Completed and transferred to process B = 35000 units @ Rs. 80 = Rs. 28,00,000

(b) Abnormal loss: 1000 units:

Materials 1000 units @ 40	= Rs.	40,000
Labour and Overheads 800 units @ 40	= Rs.	32,000
	Rs.	72,000

(c) Closing WIP = 2000 units

Materials 2000 units @ 40	= Rs.	80,000
Labour and Overheads 1600 units @ 40	= Rs.	64,000
	Rs.	1,44,000

Process A Account

Dr.   Cr.

	Particulars	Units	Amount		Particulars	Units	Amount
To	Opening WIP	2000	1,40,00 0*	By	Normal Loss	2000	40,000
	Material introduced	38000	14,80,000	By	Abnormal Loss	1000	72,000
	Direct labour		3,59,000	By	Process B A/c transfer to next process	35000	28,00,000
	Overheads		10,77,000	By	Closing WIP		
						2000	1,44,000
		40000	30,56,000			40000	30,56,000

* Materials + Labour + Overheads = Rs. (80,000 + 15,000 + 45,000) = Rs. 1,40,000.

Normal Loss Account

Dr.   Cr.

		Units	Amount			Units	Amount
To	Process A A/c	2,000	40,000	By	By Cost Ledger Control A/c	2,000	40,000
		2,000	40,000			2,000	40,000

Abnormal Loss Account

To	Process 'A' A/c	1,000	72,000	By	By Cost Ledger Control A/c	1,000	20,000
					By Costing Profit and Loss A/c		52,000
		1,000	72,000			1,000	72,000

Example 11.31

From the following information for the month of October, 2003, prepare Process III cost accounts:

Opening WIP in Process III	1800 units at Rs. 27,000
Transfer from Process II	47700 units at Rs. 5,36,625
Transferred to Warehouse	43200 units
Closing WIP of Process III	4500 units
Units scrapped	1800 units
Direct material added in Process III	Rs. 1,77,840
Direct Wages	Rs. 87,840
Production Overheads	Rs. 43,920

Degree of Completion:

	Opening Stock	Closing Stock	Scrap
Material	80%	70%	100%
Labour	60%	50%	70%
Overheads	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ Rs. 6.75 per unit.

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

Solution:

Statement of Equivalent Production
(Process III)

Input		Output		Material A		Material B		Labour and overheads	
Details	Quantity units		Quantity units	Quantity units	%	Quantity units	%	Quantity units	%
Op WIP	1800	Work on Op. WIP	1800	–	–	360	20	720	40
Process II Transfer	47700	Introduced and completed during the month	41400	41400	100	41400	100	41400	100
		Normal loss (5% of 45,000 units)	2250	—	—	—	—	—	—
		Cl. WIP	4500	4500	100	3150	70	2250	50
			49,950	45,900		44910		44370	
		Abnormal gain	–450	–450	100	–450	100	–450	100
	49500		49500	45450		44460		43920	

Working Note

Production units = Opening units + Units transferred from Process II – Closing units

= 1,800 units + 47,700 units – 4,500 units = 45,000 units

Statement of Cost

	Cost Rs. (a)	Equivalent units (b)	Cost per equivalent unit Rs. (a) / (b)
Material A	5,36,625		
(Transfer from previous process)			
Less: Scrap value of normal loss	15,187		
(2,250 units × Rs. 6.75).			
	5,21,438	45,450	11.4728
Material B	1,77,840	44,460	4.0000
Labour	87,840 -	43,920	2.0000
Overheads	43,920	43,920	1.0000
	8,31,037.50		18.4728

Statement of Apportionment of Process Cost

			Rs.
Opening WIP	Material A		27,000
Completed opening WIP units – 1800	Material B	360 units × Rs. 4 = Rs. 1,440	
	Wages	720 units × Rs. 2 = Rs. 1,440	
	Overheads	720 units × Re. 1 = Rs. 720	3,600
Introduced and completed – 41400 units		41,400 units × Rs. 18.4728	7,64,773
Total cost of 43,200 finished goods units			7,95,373
Closing WIP units – 4500	Material A	4,500 units × Rs. 11.4728	51,628
	Material B	3,150 unit × Rs. 4	12,600
	Wages	2,250 units × Rs. 2	4,500
	Overheads	2,250 units × Re. 1	2,250
			70,978
Abnormal gain units — 450 units		450 units × Rs. 18.4728	8,313

Process III A/c

	Units	Rs.		Units	Rs.
To Balance b/d	1800	27,000	By Normal Loss	2250	15,187
To Process II A/c	47700	5,36,625	By Finished goods stock	43200	7,95,373
To Direct material		1,77,840			
To Direct Wages		87,840			
To Production overheads		43,920	By Closing WIP	4500	70,978
To Abnormal gain	450	8,313			
	49950	8,81,538		49950	8,81,538

Example 11.32

The following information is given in respect of Process No. 3 for the month of January, 2001.

Opening stock—2,000 units made-up of:

Direct Material I	Rs. 12,350
Direct Material II	Rs. 13,200
Direct Labour	Rs. 17,500
Overheads	Rs. 11,000

Transferred from Process No. 2: 20000 units @ Rs 6.00 per unit.

Transferred to Process No. 4: 17000 units

Expenditure incurred in Process No. 3:

Direct Materials	Rs. 30,000
Direct Labour	Rs. 60,000
Overheads	Rs. 60,000

Scrap: 1000 units—Direct Materials 100%, Direct Labour 60%, Overheads 40%. Normal Loss 10% of production.

Scrapped units realised Rs. 4 per unit.

Closing Stock: 4000 units—Degree of completion: Direct Materials 80%, Direct Labour 60% and Overheads 40%.

Prepare Process No. 3 Account using average price method, alongwith necessary supporting statements.

(CA Inter, May 2001)

Solution:

Statement of Equivalent Production
(Average cost method)

Particulars	Total units	Material I %	Material I units	Material II %	Material II units	Labour %	Labour units	Overhead units %	Overhead units
Units completely processed	17000	100	17000	100	17000	100	17000	100	17000
Normal Loss 10% of {2,000 units + 20,000 units – 4,000 units} (Refer to working note)	1800	—	—	—	—	—	—	—	—
Abnormal gain	– 800	100	– 800	100	– 800	100	– 800	100	– 800
Closing stock	4000	100	4000	80	3200	60	2400	40	1600
	22000		20200		19400		18600		17800

Statement of Cost

	Cost Rs.	Equivalent units	Rate/Equivalent (unit) Rs.
Material I:			
Opening balance 2000 units	12,350		
Cost of 20000 units @ Rs 6/- per unit	1,20,000		
Less: Scrap realised (1800 units × Rs. 4)	(7,200)		
	1,25,150	20200	6.1955
Material II:			
Opening stock	13,200		
In process II	30,000		
	43,200	19400	2.2268
Labour:			
Opening labour	17,500		
In process II	60,000		
	77,500	18600	4.1667
Overhead:			
Opening stock	11000		
In process II	60000		
	71000	17800	3.9888
Total cost per unit			16.5778

Statement of Evaluation

	Rs.
Cost of 17000 finished goods units (17000 units × Rs. 16.5778)	2,81,822.60 or 2,81,822 (say)
Cost of 800 abnormal unit (800 units × Rs. 16.5778)	13,262.24 or 13,262 (say)
Cost of 4000 closing work-in-progress units:	48,289.92 or 48,290 (say)

			Rs.
Material I	4,000 units × Rs. 6.1955	=	24,782.00
Material II	3,200 units × Rs. 2.2268	=	7,125.76
Labour	2,400 units × Rs. 4.1667	=	10,000.08
Overhead	1,600 units × Rs. 3.988	=	6,382.08
			48,289.92

Process 3 A/c

Dr.   **Cr.**

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening WIP	2000	54,050	By Normal loss	1800	7,200
To Process II	20000	1,20,000	By Finished good units	17000	2,81,822
			By Closing balance	4000	48,290
To Direct Material II		30,000			
To Direct Labour		60,000			
To Overhead		60,000			
To Abnormal gain	800	13,262			
	22800	3,37,312		22800	3,37,312

Working Note: Normal loss given is 10% of production. The word production here means those units which come upto the state of inspection. In that case, opening stock plus receipts minus closing stock of WIP will represent units of production (2000 units + 20000 units – 4000 units). In this case the units of production comes to 18000 units and hence 1800 units as normal loss units.

INTER-PROCESS PROFITS

In processing industries, sometimes, the output of each process transferred to the next process is charged at an inflated cost or market value instead of only at actual cost. That is, each process is charged with its input at current prices. Truly speaking, the efficiency of each process should be determined in terms of current prices and not on the basis of a price relating to the previous period. In this manner profit or loss determined will be realistic and remedial action may be taken where the profit on any process is insufficient. The profit or loss made by the transferor process is thus revealed in the process account.

Inter-process profits accounting tends to make the costing records more complicated. Also, such profits will inflate the value of stock and work-in-progress in excess of the actual costs. For financial accounting purposes such inflated stocks are to be brought down at the lower cost or market value. Thus, for balance sheet purposes, the values of stocks computed under inter-process profits are not useful. Stock adjustment is needed purely for reasons of prudence and to conform to generally accepted accounting principles. But for individual process accounts, the inclusion of departmental process profits may be necessary.

Example 11.33

The following are the details in respect of Process X and Process Y of a processing factory:

	Process X Rs.	Process Y Rs.
Material	10,000	—
Labour	10,000	14,000
Overhead	4,000	10,000

The output of Process X is transferred to Process Y at a price calculated to give a profit of 20% on the transfer price and the output of Process Y is charged to finished stock at a profit of 25% on the transfer price. The finished department realised Rs. 1,00,000 for the finished goods received from Process Y. You are asked to show process accounts and total profits, assuming there was no opening and no closing work-in-progress.   *(CA Inter)*

Solution:

Process X Account

	Rs.		Rs.
To Material	10,000	By Transfer to	30,000
To Labour	10,000	Process Y	
To Overhead	4,000		
To Profit (20% of transfer price)	6,000		
	30,000		30,000

Process Y Account

	Rs.		Rs.
To Transfer from Process X	30,000	By Transfer to finished stock A/c	72,000
To Labour	14,000		
To Overhead	10,000		
To Profit (25% of the transfer period)	18,000		
	72,000		72,000

Profit and Loss Account

	Rs.		Rs.
To Cost of sale	72,000	By Sales	1,00,000
To Profit c/d	28,000		
	1,00,000		1,00,000
To Total profit	Rs. 52,000	By Profit b/d	Rs. 28,000
		By Profit on Process X	6,000
		By Profit on Process Y	18,000
	52,000		52,000

Example 11.34

A Ltd. produces product *AXE* which passes through two processes before it is completed and transferred to finished stock. The following data relate to October 2007.

Particulars	Process		Finished stock
	I	II	
	Rs.	Rs.	Rs.
Opening stock	7,500	9.000	22,500
Direct materials	15,000	15,750	
Direct wages	11,200	11,250	
Factory overheads	10,500	4,500	
Closing stock	3,700	4,500	11,250
Inter-process profit included in opening stock		1,500	8,250

Output of Process I is transferred to Process II at 25% profit on the transfer price.

Output of Process II is transferred to finished stock at 20% profit on the transfer price. Stocks in process are valued at prime cost. Finished stock is valued at the price at which it is received from Process II. Sales during the period are Rs. 1,40,000. Prepare process cost account and finished goods account showing the profit element at each stage.

(CA Inter)

Solution:

Process I Account

	Total (Rs.)	Cost (Rs.)	Profit (Rs.)		Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	7,500	7,500	–	Transfer to	54,000	40,500	13,500
Direct material	15,000	15,000	–	Process II			
Direct wages	11,200	11,200	–	account			
	33,700	33,700					
Less: Closing stock	3,700	3,700					
Prime cost	30,000	30,000	–				
Overhead	10,500	10,500					
Process cost	40,500	40,500	–				
Profit ($33\frac{1}{2}$% of total cost) (See Working Note I)	13,500	–	13,500				
	54,000	40,500	13,500		54,000	40,500	13,500

Process II Account

	Total (Rs.)	Cost (Rs.)	Profit (Rs.)		Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	9,000	7,500	1,500	Transfer to finished stock account	1,12,500	75,750	36,750
Transferred from Process I	54,000	40,500	13,500				
Direct material	15,750	15,750	—				
Direct wages	11,250	11,250	—				
	90,000	75,000	15,000				
Less: Closing stock	4,500	3,750	750				
Prime cost	85,500	71,250	14,250				
Overhead	4,500	4,500	—				
Process cost	90,000	75,750	14,250				
Profit (25% on total cost) (See Working Note 2)	22,500	—	22,500				
	1,12,500	75,750	36,750		1,12,500	75,750	36,750

Finished Stock Account

	Total (Rs.)	Cost (Rs.)	Profit (Rs.)		Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	22,500	14,250	8,250		1,40,000	82,500	57,500
Transferred from Process II	1,12,500	75,750	36,750				
	1,35,000	90,000	45,000				
Less: Closing stock	11,250	7,500	3,750				
Finished stock cost	1,23,750	82,500	41,250				
Profit	16,250	—	16,250				
	1,40,000	82,500	57,500		1,40,000	82,500	57,500

Working Notes:

Let the transfer price be 100 then profit is 25; that is, cost price is 75.

1. If cost is Rs. 75 then profit is Rs. 25.
   If cost is Rs. 40,500 then profit 25/75 × 40,500 = Rs. 13,500.
2. If cost is Rs. 80 then profit is Rs. 20.
   If cost is Rs. 90,000 then profit 20/80 × 90,000 = Rs. 22,500.

JOINT PRODUCT AND BY-PRODUCT

Joint Product

Joint products may be defined as distinctly different major products that are inevitably produced simultaneously from common inputs or by common processing. The quantity and sales value of each joint product are such that none of them may be designated as minor products; all joint products are major products.

Many industries, such as chemicals, oil refining, mining, meat packing and similar industries are involved in such joint production processes and manufacture two or more products from the same raw material. In oil refining, for example, fuel, oil, gasoline, kerosene, lubricating oils are but a few of the many products that emerge.

An increase in the output of one product will bring about an increase in the quantity of others, or vice versa, but not necessarily in the same proportion. At the same phase of production, two or more separately identifiable products will result from the joint production process. This phase or point is referred to as the split-off point.

Joint Products have the following Characteristics:

1. Joint-products are the primary objectives of manufacturing operations.
2. The sales value of each of the joint products are relatively high and none of the joint products are significantly greater in value than other joint products.
3. The joint products may require further processing or may be sold directly after the split-off point.
4. Joint products require simultaneous common processing.
5. The manufacturer has little or no control over the relative quantities of the various products that will result.

By-product

The term "by-product" is often used synonymously with the term "minor products". It refers to those multiple products that have insignificant sales values relative to those of major products. Otherwise, by-products are the same as joint products. By-products are those products that result incidentally from the manufacture of the main product or products. Processing is not aimed in their direction.

ACCOUNTING FOR JOINT PRODUCT COST

When two or more products are classified as joint products, each individual product must be charged with a proportionate share of the total cost of the joint products. Prior to the point of split off, products are not subject to identification and costs are joint; after separation, product identification is possible and costs become separable. Thus, joint cost is a cost incurred prior to the point at which separately identifiable products emerge from the same process.

Accounting for joint product costs achieve the following objectives:

1. Allocating joint product costs incurred prior to the split-off point.
2. Identifying the production costs incurred after the split-off point to process joint products.

If a product is sold immediately after split-off, its unit costs consist totally of allocated joint costs. If a joint product is processed further after split-off, its unit cost will contain allocated joint costs plus the material, labour and overhead costs of additional processing. The following are apportionment bases usually found in practice for apportionment of joint costs:

1. Physical quantity method.
2. Relative market or sales value method.
3. Average unit cost method.
4. Weighted average cost method.

Physical Quantity Method

Under the quantity method, cost allocation is a simple apportionment of cost in proportion to volume. These physical measures may be units, pounds, kilograms, tonnes, gallons, etc.