



dronacharya

FOR
CA INTERMEDIATE

2024

Marathon Part 1

**Cost & Management
Accounting**

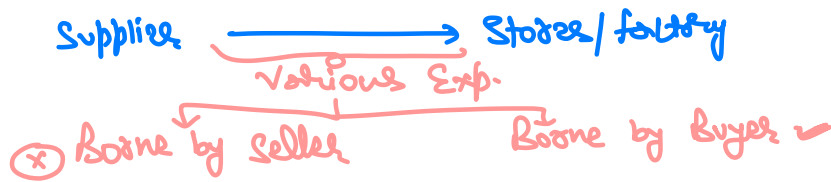
Lecture – 01

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Topics *to be covered*

1. Cost Sheet ✓
2. Material Cost ✓
3. Employee Cost & Direct Expenses ✓
4. Overheads ✓
5. Activity Based Costing ✓
6. Job Costing ✓
7. Batch costing ✓
8. Cost Accounting System ✓
9. Introduction to Cost & Management Accounting ✓ MLQ



COST SHEET - CONCEPTS

1. Cost Sheet

It is a statement which shows the break-up and build-up of costs for a particular period.

2. Statement of Cost/Cost Sheet

Particulars	Total Cost (₹)	Cost per unit (₹)
Opening stock of Raw Material		
Add: <u>Purchases</u>		
Less: <u>Closing stock</u> of Raw Material		
Add: <u>Carriage/Freight inward</u>		
<u>Less:</u> <u>Raw material purchase return</u>		
<u>Less:</u> <u>Sale value of scrap of raw material</u> [Specified in Ques.]		
Direct Material Consumed		
Add: Direct labour cost <i>incurred</i>		
Add: Direct expenses or chargeable expenses <i>incurred</i>		
<u>Prime Cost</u>		
Add: <u>Factory/Work Overheads</u>		
<u>Gross Factory/Work Cost</u>		
Add: <u>Opening stock</u> of <u>WIP</u>		
Less: <u>Closing stock</u> of <u>WIP</u>		
<u>Net Factory/Work cost</u>		
Add: <u>Quality control</u> cost		
Add: <u>Research and Development</u> cost		
Add: <u>Administrative overheads</u> (<i>related to production</i>)		
Add: <u>Packing cost</u> (primary)		
<u>Less:</u> <u>Credit for recoveries/Scrap/Defectives/By-Product</u>		
<u>Cost of Production</u>		
Add: Opening stock of finished goods		
Less: Closing stock of finished goods		
<u>Cost of Goods Sold</u>		
Add: <u>Administrative overheads</u> (general)		
Add: <u>Selling and distribution overheads</u>		
<u>Cost of Sales</u>		

3. Points to Remember (PTR)

(A) Loss or Gain



(B) Certain expenses not appear in cost sheet:

- Goodwill or preliminary expenses written off
- Income tax
- Loss on sale of assets or investment
- Cost pertaining to or arising out of a pandemic e.g. COVID-19
- Penalty, fines, damages etc.

(C) Work = Factory

Work Overheads = Factory Overheads

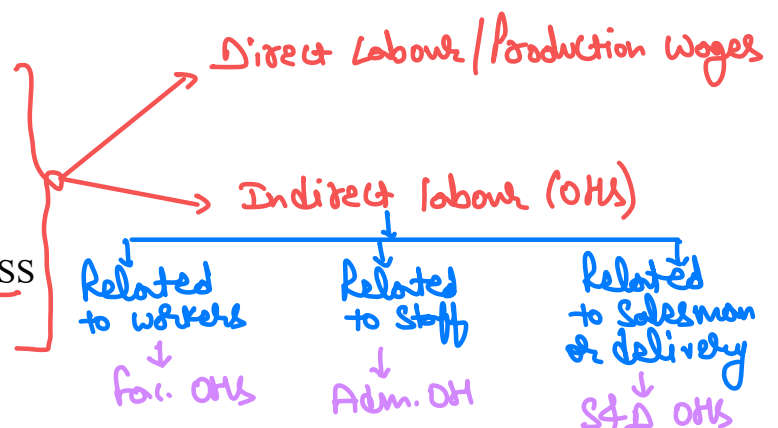
Work Cost = Net Factory Cost (NFC)

(D) Cost of goods available for sale = op. stock FG + Cost of Production

(E) Cost of goods processed during the period = op. stock WIP + Gross factory cost

(G) Employee/Labour cost: It includes-

- Wages
- Bonus
- Allowances
- Overtime
- Employer contribution to PF/ESI/SSS
- Any other benefit



(H) Direct Expenses

- Royalty for production
- Cost of utilities such as power & fuel, steam etc.
- Fee for technical know-how

- Cost of product/service specific design or drawing
- Cost of product/service specific software
- Amortized cost of moulds, patterns, patents etc.
- Job charges paid to job workers
- Hire charges paid for hiring specific equipment
- Other expenses which are directly related with production

4. Treatment of Expenses

Expenses	Treatment
Drawing office expenses	→ Fac. OH
Haulage	→ Fac. OH
Stores Related Expenses Stores Consumed = Opening + Purchases – Closing	→ Fac. OH
Warehouse or Godown Expenses	→ S & D OH
Loose tools written off	→ Fac. OH
Bank charges	→ Adm. OH
Salesmen commission	→ S & D OH
Cost of Samples	→ S & D OH
Audit Fee	→ Adm. OH
General Expenses	→ Adm. OH
Counting House Salaries	→ Adm. OH
Production planning expenses in office	→ Adm. OH (related to Prod.)
Director's fees	→ Adm. OH
Fee for exhibition participation	→ S & D OH
Pollution control expenses	→ Fac. OH
Carriage on raw material return	→ Fac. OH
Bad Debts	→ Ignore
Packaging	
(A) Primary Packaging	→ After NFC
(B) Secondary Packaging	→ S & D OH

GST	
(A) GST Output	→ Add after Sales value
(B) GST Input	
(C) ITC Available	→ Ignore
(D) ITC Not Available	→ Add with respective element of Cost
Custom Duty	→ Add with respective element of Cost
Discount	
(A) Trade Discount	→ Deduct if not already deducted
(B) Cash Discount	→ Ignore
(C) Other discount or discount on sales	→ S & Δ OH
Waste/Scrap	
(A) Scrap <u>for which amount is received on sale</u>	
(1) Related to raw material	→ Deduct from PMC
(2) Arises during production	→ Deduct after NFC
(B) Scrap <u>for which disposal cost is to be incurred</u>	→ Fac. OH
Defectives	
(B) Sold as it is at discount	
(1) When low discount	→ Add with Normal Sales value
(2) When high discount	→ Deduct after NFC
(C) Goods are rectified by incurring rectification cost	→ Add Rectification Cost to Fac. OHs

5. Administration Overheads

If administration overheads is ____ % of NFC or If administration overheads is ₹ ____ per unit produce then in both situation consider them as related to production.

6. Conversion Cost = Direct Labour + Direct Exp. + fac. Ovs

It is the cost to convert raw material into finished goods. It is sum total of direct labour, direct expenses and factory overheads.

7. Valuation of Stock

Stock can be valued either on FIFO basis or LIFO basis or Weighted average method. Unless otherwise provided FIFO method will be used for valuation of stock.

According to FIFO Method,

$$\text{Value of cl. stock of raw material} = \frac{\text{Amount of raw material purchased}}{\text{Raw material purchase quantity}} \times \text{Cl. stock raw material units}$$

$$\text{Value of closing stock of finished goods} = \frac{\text{Cost of Production}}{\text{Units produced}} \times \text{Closing stock finished goods units}$$

According to Weighted Average Method,

$$\text{Value of cl. stock of raw material} = \left[\frac{\text{RM purchase} + \text{Op. Stock of RM}}{\text{RM purchase units} + \text{Op. stock RM units}} \right] \times \text{Cl. stock raw mat. units}$$

$$\text{Value of closing stock of finished goods} = \left[\frac{\text{Cost of Production} + \text{Op. stock FG}}{\text{Units produced} + \text{Op. stock FG units}} \right] \times \text{Closing stock FG units}$$

For raw material,

$$\text{Raw material consumed units} = \text{Op. stock RM units} + \text{RM Purchase units} - \text{Cl. stock RM}$$

For finished goods,

$$\text{Finished goods units sold} = \text{Op. stock FG units} + \text{FG units produced} - \text{Cl. stock FG units}$$

If there is NIL Opening stock

$$\text{Cost per unit of finished goods} = \frac{\text{Cost of Production}}{\text{Units produced}} = \frac{\text{Cost of Goods Sold}}{\text{Units Sold}}$$

8. Calculation of per unit data and vice versa

(A) For calculating per unit data

- Divide all values by Units Produced upto cost of production
- Divide all values by Units Sold from COGS and onwards

(B) If factory overheads or administration overheads (production related) per unit is given then multiply it with number of units produced to get total value.

(C) If administration overheads (general) and selling and distribution overheads per unit is given then multiply it with number of units sold to get total value.

Machine Hours $\times$ Mach. Hr. Rate $\rightarrow$ Fac. OH

9. Recovery Rate

It is the rate which is used to recover/absorb/charge overheads from the products being manufactured or services being provided.

Unless otherwise provided, following basis will be used for recovery of overheads:

Factory overheads $\rightarrow$ Direct Labour

Administration overheads $\rightarrow$ NFC or work cost

Selling and distribution overheads $\rightarrow$ NFC or work cost

10. Change in Cost Effects

Total Cost = No. Of units $\times$ Cost per unit
 $\downarrow$ $\downarrow$
Quantity Price
Effect Effect

	<u>Total VC</u>	<u>Total FC</u>
Quantity Effect	Yes	No
Price Effect	Yes	Yes

Relation between:

- (A) Quantity and Variable cost $\rightarrow$ Direct
 (B) Price and Variable cost $\rightarrow$ Direct
 (C) Price and Fixed cost $\rightarrow$ Direct
 (D) Wages and Efficiency $\rightarrow$ Inverse
- $\left. \begin{array}{l} \text{(A)} \\ \text{(B)} \\ \text{(C)} \end{array} \right\} \rightarrow \text{old value} \times \frac{(100 + \%) }{100}$
 $\left. \begin{array}{l} \text{(D)} \end{array} \right\} \rightarrow \text{old value} \times \frac{100}{(100 + \%)}$

Unless otherwise provided, following points are to be assumed:

- VC per unit will remain same
- Total FC will remain same
- All direct cost are considered to be variable in nature
- All overheads are considered to be fixed in nature

COST SHEET QUESTIONS

Question – 1

SK Ltd. has the following expenditures for the year ended 31st March:

Particulars	Amount (₹)	Amount (₹)
Raw materials purchased → RMC		10,00,00,000
GST paid on the above purchases @18% (eligible for input tax credit) → Ignore		1,80,00,000
Freight inwards → RMC		11,20,600
Wages paid to factory workers → DW		29,20,000
Contribution made towards employees' PF and ESI → DW		3,60,000
Production bonus paid to factory workers → DW		2,90,000
Royalty paid for production → Δ Exp.		1,72,600
Amount paid for power & fuel → Δ. Exp.		4,62,000
Amount paid for purchase of moulds and patterns (life is equivalent to two years production) → $\Delta \cdot \text{Exp.} = \frac{8.96}{2} = 4.48$		8,96,000
Job charges paid to job workers → Δ. Exp.		8,12,000
Stores and spares consumed → F. OH		1,12,000
Depreciation on:		
Factory building → F. OH	84,000	
Office building → A. OH	56,000	
Plant & Machinery → F. OH	1,26,000	
Delivery vehicles → S&D OH	86,000	3,52,000
Salary paid to supervisors → F. OH		1,26,000
Repairs & maintenance paid for:		
Plant & Machinery → F. OH	48,000	
Sales office building → S&D OH	18,000	
Vehicles used by directors → A. OH	19,600	85,600
Insurance premium paid for:		
Plant & Machinery → F. OH	31,200	
Factory building → F. OH	18,100	
Stock of raw materials & WIP → F. OH	36,000	85,300
Expenses paid for quality control check activities → QCC		19,600
Salary paid to quality control staffs → QCC		96,200
Research & development cost paid for improvement in production process → R&D		18,200
Expenses paid for pollution control and engineering & maintenance → F. OH		26,600
Expenses paid for administration of factory work → A. OH (Prod.)		1,18,600
Salary paid to functional managers:		
Production control → A. OH (Prod.)	9,60,000	

Finance & accounts → A.OH	9,18,000	
Sales & Marketing → S+D OH	10,12,000	28,90,000
Salary paid to General Manager → A.OH		12,56,000
Packaging cost paid for:		
Primary packing necessary to maintain quality → After NFC	96,000	
For re-distribution of finished goods → S+D OH	1,12,000	2,08,000
Wages of employees engaged in distribution of goods → S+D OH		7,20,000
Fee paid to auditors → Adm. OH		1,80,000
Fee paid to legal advisors → A. OH		1,20,000
Fee paid to independent directors → A. OH		2,20,000
Performance bonus paid to sales staff → S+D OH		1,80,000
Value of stock as on 1 st April of last year		
Raw materials	18,00,000	
Work-in-process } op. Stock	9,20,000	
Finished goods	11,00,000	38,20,000
Value of stock as on 31 st March of current year		
Raw materials	9,60,000	
Work-in-process } Cl. Stock	8,70,000	
Finished goods	18,00,000	36,30,000

deduct
after
NFC

Amount realized by selling of scrap and waste generated during manufacturing process is ₹ 86,000. From the above data you are required to prepare statement of cost for the year ended 31st March, showing (i) prime cost, (ii) factory cost, (iii) cost of production, (iv) cost of goods sold and (v) cost of sales.

Solution

Particulars		Amount (₹)
Opening stock of raw material		18,00,000
Add: Raw material purchases		10,00,00,000
Less: Closing stock of raw material		(9,60,000)
Add: Freight inwards		11,20,600
Raw material consumed		10,19,60,600
Direct Labour:		
Wages paid to factory workers	29,20,000	
Contribution to PF & ESI	3,60,000	
Production bonus paid to factory workers	<u>2,90,000</u>	35,70,000
Direct Expenses:		
Royalty paid for production	1,72,600	
Amount paid for power & fuel	4,62,500	
Amortised cost of moulds and patterns	4,48,000	
Job charges paid to job workers	<u>8,12,000</u>	35,70,000
Prime Cost		10,74,25,200
Factory overheads:		
Stores and spares consumed	1,12,000	
Depreciation on factory building	84,000	

Depreciation on plant & machinery	1,26,000	
Repairs & maintenance for plant & machinery	48,000	
Insurance premium paid for plant & machinery	31,200	
Insurance premium paid for factory building	18,100	
Insurance premium paid for stock of raw material	36,000	
Salary paid to supervisors	1,26,000	
Expenses paid for pollution control	<u>26,600</u>	6,07,900
Gross Factory cost		10,83,33,100
Add: Opening WIP		9,20,000
Less: Closing WIP		(8,70,000)
Net Factory cost		10,80,83,100
Quality control cost:		
Expenses paid for quality control check	19,600	
Salary paid to quality control staff	<u>96,200</u>	1,15,800
Research and development cost paid		18,200
Administrative overheads related to production		
Expenses paid for administration	1,18,600	
Salary paid to production control manager	<u>9,60,000</u>	10,78,600
Less: Realisable value on sale of scrap		(86,000)
Add: Primary packaging cost		96,000
Cost of production		10,93,05,700
Add: Opening stock of finished goods		11,00,000
Less: Closing stock of finished goods		(18,000,000)
Cost of goods sold		10,86,05,700
Administrative overheads:		
Depreciation on office building	56,000	
Repairs & maintenance paid for vehicles for directors	19,600	
Salary paid to manager-finance and accounts	9,18,000	
Salary paid to general manager	12,56,000	
Fee paid to auditors	1,80,000	
Fee paid to legal advisors	1,20,000	
Fee paid to independent directors	<u>2,20,000</u>	27,69,600
Selling and distribution overheads		
Repairs & maintenance paid to sales office building	18,000	
Salary paid to manager – sales & marketing	10,12,000	
Performance bonus paid to sales staffs	1,80,000	
Depreciation on delivery vehicles	86,000	
Packaging cost paid for re-distribution	1,12,000	
Wages of employees engaged in distribution of goods	<u>7,20,000</u>	21,28,000
Cost of Sales		11,35,03,300

Question – 2

The following data relates to manufacturing of a standard product during the month of the March:

Particulars	Amount (in ₹)
Stock of Raw material as on 01-03 → RMC	80,000
Work in progress as on 01-03 → Op. WIP	50,000
Purchase of raw material → RMC	2,00,000
Carriage inwards → RMC	20,000
Direct wages → DW	1,20,000
Cost of special drawing → D. Exp.	30,000
Hire charges paid for Plant → D. Exp.	24,000
Return of Raw Material → Deduct from RMC	40,000
Carriage on return → Fac. OH	6,000
Expenses for participation in Industrial exhibition → S&D OH	8,000
Legal charges → A. OH	2,500
Salary to office staff → A. OH	25,000
Maintenance of office building → A. OH	2,000
Depreciation on Delivery Van → S&D OH	6,000
Warehousing charges → S&D OH	1,500
Stock of Raw material as on 31-03 → RMC	30,000
Stock of Work in Progress as on 31-03 → Cl. WIP	24,000

- Store overheads on material are 10% of material consumed.
- Factory overheads are 20% of the prime cost
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8,000 units during the month.

You are required to prepare a cost sheet for the above period showing the:

- Cost of raw material consumed
- Prime cost
- Work cost
- Cost of production
- Cost of sales

$$\begin{aligned} & \downarrow \\ & (DW \times 90\%) \times 10\% \times 20\% \\ & \text{Fu} \\ & \text{Def.} \\ & \text{Rect. Cost} \end{aligned}$$

Solution

Cost Sheet

Particulars	Amount (₹)
Opening stock of raw material	80,000
Add: Raw material purchases	2,00,000
Add: Carriage inward	20,000
Less: Return of raw material	(40,000)
Add: Carriage on return	6,000
Less: Closing stock of raw material	(30,000)
Raw Material consumed	2,30,000
Direct wages	1,20,000

Direct Expenses:	Cost of special drawing	30,000	
	Hire charges paid for plant	<u>24,000</u>	54,000
	Prime Cost		4,04,000
	Stores Overheads (10% × 2,30,000)		23,000
	Factory overheads (20% × 4,04,000)		80,800
	Rectification cost of defectives (<u>1,20,000</u> × <u>90%</u> × <u>10%</u> × <u>20%</u>)		→ 2,160
	Gross Factory Cost		5,17,760
	Add: Opening WIP		50,000
	Less: Closing WIP		(24,000)
	Net Factory Cost		5,43,760
	Less: Scrap sale		(5,000)
	Cost of Production/COGS		5,38,760
Administration Overheads:			
	Legal charges	2,500	
	Salary to office staff	25,000	
	Maintenance of office building	<u>2,000</u>	29,500
Selling & Distribution Overheads:			
	Expenses for participation in industrial exhibition	8,000	
	Warehousing charges	1,500	
	Depreciation on Delivery Van	<u>6,000</u>	15,500
	Cost of Sales		5,83,760

Question – 3

A Ltd. produces a single product X. During the month of July 2023, the company has produced 14,560 tonnes of X. The details for the month of July 2023 are as follows:

- Materials consumed ₹ 15,00,000 → RMC
- Power consumed in operating production machinery 13,000 Kwh @ ₹ 7 per Kwh → 91,000 – Δ. Exp.
- Diesels consumed in operating production machinery 1,000 litres @ ₹ 93 per litre → 93,000 – Δ. Exp.
- Wages & salary paid – ₹ 64,00,000 → DW
- Gratuity & leave encashment paid – ₹ 44,20,000 → DW
- Hiring charges paid for Heavy Earth Moving machines (HEMM) engaged in production – ₹ 13,00,000. Hiring charges are paid on the basis of production. → F.OH
- Hiring charges paid for cars used for official purpose – ₹ 80,000 → A.OH
- Reimbursement of diesel cost for the cars – ₹ 20,000 → A.OH
- The hiring of cars attracts GST under RCM @5% without credit. → 5% × (80,000 + 20,000) = 5,000 – A.OH
- Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹ 7,000 → S+D OH
- AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively. → F.OH
- TA/DA and hotel bill paid for sales manager – ₹ 16,000 → S+D OH
- The company has 180 employees works for 26 days in a month.

Required to prepare a Cost sheet for the month of July 2023.

Solution

Particulars	Amount (₹)
Material consumed	15,00,000
Direct Wages:	
Wages and salary	64,00,000
Gratuity & leave encashment	<u>44,20,000</u>
Direct Expenses:	
Power cost (13,000 kwh × ₹ 7)	91,000
Diesel cost (1,000 litre × ₹ 93)	<u>93,000</u>
Prime Cost	1,38,04,000
AMC cost of CCTV installed at factory premises	18,000
GFC/NFC/COP/COGS	1,38,22,000
Administration Overheads:	
Hiring charges of cars	80,000
Reimbursement of diesel cost	20,000
GST @5% on RCM Basis (1,00,000 × 5%)	<u>5,000</u>
Selling and distribution overheads:	
Maintenance cost for weighing bridge	7,000
AMC cost of CCTV installed at weigh bridge	6,000
TA/DA & hotel bill of sales manager	<u>16,000</u>
Cost of Sales	1,39,56,000

Question – 4

The following particulars relating to the year have been taken from the books of a company:

	<u>Kg</u>	<u>₹</u>
<u>Stock on 1st January:</u>		
Raw materials	2,000	2,000
Finished mixture	→ 500	1,750
Factory stores		✓ 7,250
<u>Purchases:</u>		
Raw materials	1,60,000	1,80,000
Factory stores		✓ 24,250
<u>Sales:</u>		
Finished mixture	→ 1,53,050	9,18,000
Factory Scrap		8,170
Factory wages → ΔW		1,78,650
Power → Δ. Exp.		30,400
Depreciation on machinery → F.OH		18,000
<u>Salaries:</u>		
Factory → F.OH		72,220
Office → A.OH		37,220
Selling → S&D OH		41,500
<u>Expenses:</u>		
Direct → Δ. Exp.		18,500

Fac. Stores Consumed = op. + Purch. - Cl.
 ↓
 F.OH = 7250 + 24250 - 5550
 =

$$\text{Units Prod.} = 153050 + 450 - 500 = 153000$$

$$450 \times \frac{\text{NFC}}{\text{units Prod.}}$$

$$\frac{1.80\text{l}}{1.60\text{l}} \times 1200 = 1350$$

Office → A.OH

Selling → S.D.OH

18,200

18,000

Stock on 31st December:

Raw materials

Finished mixture

Factory stores

1,200 ✓

→ 450

(NFC)

→ 5,550

The stock of finished mixture at the end of the year is to be valued at the factory cost of the mixture for that year. The purchase price of raw materials remained unchanged throughout the year. Prepare a statement giving the maximum possible information about cost and its break-up for the year.

Solution

Cost Sheet

Particulars	Amount (₹)
Opening stock of material	2,000
Add: Material purchases	1,80,000
Less: Closing stock of material	(1,350)
Raw material consumed	1,80,650
Add: Wages	1,78,650
Add: Direct expenses	
Direct expenses	18,500
Power	30,400
Prime Cost	4,08,200
Add: Factory overheads	
Depreciation	18,000
Factory salary	72,220
Factory stores consumed (7,250+24,250-5,550)	25,950
Factory cost	5,24,370
Less: Sales of factory scrap	(8,170)
Cost of production	5,16,200
Add: Opening stock of finished mixture	1,750
Less: Closing stock of finished mixture [(5,24,370 × 450) ÷ 1,53,000]	(1,542)
Cost of goods sold	5,16,408
Add: Administration overheads	
Office salaries	37,220
Office expenses	18,200
Add: Selling & distribution overheads	
Selling salary	41,500
Selling expenses	18,000
Cost of sales	6,31,328
Add: Profit (Balancing figure)	2,86,672
Sales	9,18,000

$$\text{Units Produced} = 1,53,050 + 450 - 500 = 1,53,000$$

Question – 5

The following data are available from the books and records of A Ltd. for the month of April 2022:

Particulars	Amount (₹)
Stock of raw materials on 1 st April 2022 → op. RM	10,000
Raw material purchased → RMC	2,80,000
Manufacturing wages → ΔW	70,000
Depreciation on plant → F.OH	15,000
Expenses paid for quality control check activities → QCC	4,000
Lease rent of production assets → D. Exp.	10,000
Administrative overheads (Production) → After NFC	15,000
Expenses paid for pollution control and engineering & maintenance → F.OH	1,000
Stock of raw materials on 30 th April 2022 → Cl. RM	40,000
Primary packing cost → After NFC	8,000
Research & development cost (Process related) → R&D	5,000
Packing cost for redistribution of finished goods → S&D	1,500
Advertisement expenses → S&D	1,300

Stock of finished goods as on 1st April 2022 was 200 units having a total cost of ₹ 28,000. The entire opening stock of finished goods has been sold during the month. Production during the month of April, 2022 was 3,000 units. Closing stock of finished goods as on 30th April, 2022 was 400 units.

You are required to:

(I) Prepare a cost sheet for the above period showing the:

- Cost of raw material consumed
- Prime cost
- Factory cost
- Cost of production
- Cost of goods sold
- Cost of sales

(II) Calculate selling price per unit, if sale is made at profit of 20% on sales.

$$\frac{\text{COP}}{3000} \times 400$$

Solution

(I) Cost Sheet

Particulars	Amount (₹)
Opening stock of raw material	10,000
Add: Raw material purchased	2,80,000
Less: Closing stock of raw material	(40,000)
Raw material consumed	2,50,000
Add: Manufacturing wages	70,000
Prime cost	3,20,000
Add: Factory overheads	
Depreciation on plant	15,000
Lease rent of production assets	10,000
Expenses for pollution control	1,000
	26,000
Gross Factory Cost/ Net Factory cost	3,46,000
Add: Expenses paid for quality control check activities	4,000
Add: Administrative overheads (Production)	15,000
Add: Primary packing cost	8,000
Add: Research & development cost (Process related)	5,000

Cost of production	3,78,000
Add: Opening stock of finished goods	28,000
Less: Closing stock of finished goods $\left[\frac{3,78,000}{3,000} \times 400 \right]$	(50,400)
Cost of goods sold	3,55,600
Add: Packing cost for redistribution of finished goods	1,500
Add: Advertisement expenses	1,300
Cost of sales	→ 3,58,400

(II) Statement of calculation of selling price

Particulars	Amount (₹)
Cost of sales	→ 3,58,400
Units sold (200 + 3,000 – 400)	→ 2,800
Cost per unit	→ 128
Add: Profit per unit $[128 \times (20/80)]$	32
Selling price per unit $[128 \div 80]$	160

Question – 6

The following figures are available from the books of SK Co. for the year 31st March:

	₹		₹
Materials:		Profit for the year	12,180
Stock on 1 st April	2,000	Selling overhead	10,500
Stock on 31 st March	4,000	Factory overhead	9,000
Purchases	20,000	Administration overhead	8,400
Wages	15,000		

- (a) Prepare a cost sheet showing prime cost, work cost, cost of production, cost of sales and sales.
- (b) In April, the factory receives an order for a job which will require materials ₹ 2,400 and wages ₹ 1,500. Ascertain the sale price of the job if the factory intends to earn a profit 10% higher than the percentage of profit earned in year ending on 31st March. Assume that the factory overhead has gone up by 16(2/3)% and selling overhead has gone down by 20% after 31st March. Further assume that factory overhead is recovered as a percentage of the wages and administration and selling overhead as a percentage of works cost.

Solution

Statement of Cost and Profit

Particulars	Amount (₹)
Opening stock of material	2,000
Add: Purchases	20,000
Less: Closing stock of material	(4,000)
Direct material consumed	18,000
Add: Direct wages	15,000 ✓
Prime cost	33,000
Add: Factory overhead	9,000 ✓
GFC/NFC/COP/COGS	42,000 ✓
Add: Administration overhead	8,400 ✓

Add: Selling overhead	10,500 ✓
Cost of Sales	→ 60,900
Add: Profit	12,180 ✓
Sales	73,080

Calculation of Recovery Rates ✓

Factory overheads as % of direct wages	$= \frac{(9,000 + 16.66666666\%)}{15,000} \times 100 = 70\% \text{ of direct wages}$ ✓
Administration overheads as % of NFC	$= \frac{8,400}{42,000} \times 100 = 20\% \text{ of NFC}$ ✓
Selling overheads as % of NFC	$= \frac{(10,500 - 20\%)}{42,000} \times 100 = 20\% \text{ of NFC}$ ✓
Profit as % of Cost of sales	$= \frac{(12,180 + 10\%)}{60,900} \times 100 = 22\% \text{ of Cost of sales}$ ✓

Statement of calculation of selling price of Job

Particulars	Amount (₹)
Direct Material	2,400 ✓
Direct wages	1,500 ✓
Prime Cost	→ 3,900
Add: Factory overheads (70% × 1,500)	1,050
GFC/NFC/COP/COGS	→ 4,950
Add: Administration overheads (20% × 4,950)	990 ✓
Add: Selling overheads (20% × 4,950)	990 ✓
Cost of sales	→ 6,930
Add: Profit (22% × 4,950)	→ 1,525
Sales	→ 8,455

Question – 7

A factory incurred the following expenditure during the year:

	₹
Direct material consumed	→ 12,00,000 ✓
Manufacturing wages	→ 7,00,000
Manufacturing overheads:	
Fixed	→ 3,60,000
Variable	→ 2,50,000
	6,10,000
	→ 25,10,000

In the next year, following changes are expected in production and cost of production.

- Production will increase due to recruitment of 60% more workers in the factory.
- Overall efficiency will decline by 10% on account of recruitment of new workers.
- There will be an increase of 20% in fixed overhead and 60% in variable overhead.
- The cost of direct material will be decreased by 6%.
- The company desire to earn a profit of 10% on selling price.

Ascertain the cost of production and selling price.

Let Exist. units = 100
 (+) New Rec. = 60
 160
 10%
 16
 New op = 144
 10%
 14.4
 158.4

Solution

Let existing production units	100	
Add: Increase due to recruitment of worker ($100 \times 60\%$)	60	
	160	
Less: Decline due to efficiency ($160 \times 10\%$)	16	
New Production units	144	Change = 44%

Statement of cost and sale

Particulars	Working	Amount (₹)
Direct material	$(12,00,000 \times \frac{144}{100} \times \frac{94}{100})$	→ 16,24,320
Direct wages	$(7,00,000 \times \frac{144}{100} \times \frac{100}{90})$	→ 11,20,000
Prime Cost		27,44,320
(+) Fixed manufacturing overheads	$(3,60,000 \times \frac{120}{100})$	→ 4,32,000
(+) Variable manufacturing overheads	$(2,50,000 \times \frac{144}{100} \times \frac{160}{100})$	→ 5,76,000
Cost of Sales		37,52,320
(+) Profit	(Bal. fig.)	→ 4,16,924
Sales	$(37,52,320 \div 90\%)$	41,69,244

Question – 8

A factory's normal capacity is 1,20,000 units per annum. The estimated costs of production are as under:

- Direct material ₹ 3 per unit; direct labour ₹ 2 per unit (Subject to a minimum of ₹ 12,000 p.m.)
- Indirect expenses—Fixed ₹ 1,60,000 per annum; Variable ₹ 2 per unit; Semi-variable ₹ 60,000 upto 50% capacity and additional ₹ 20,000 for every 20% increase in capacity.
- Each unit of raw material yields scrap which is sold at the rate of 20 paise per unit.

The factory worked at 50% capacity for the first three months but it was expected that it would work @ 80% capacity for the remaining 9 months. During the first three months, the selling price per unit was ₹ 12. What should be the price in the remaining nine months to produce a total profit of ₹ 2,18,000?

Solution

Statement of Cost

Particulars	First 3 months	Bal. 9 months
Level of operation	50%	80%
Units	$1,20,000 \times \frac{50}{100} \times \frac{3}{12} = 15,000$	$1,20,000 \times \frac{80}{100} \times \frac{9}{12} = 72,000$
Direct material @ ₹ 3 p.u.	45,000	2,16,000
Direct wages	$\left\{ \begin{array}{l} 15,000 \times 2 \\ \text{or} \\ 12,000 \times 3 \end{array} \right\} 36,000$	$\left\{ \begin{array}{l} 72,000 \times 2 \\ \text{or} \\ 12,000 \times 9 \end{array} \right\} 1,44,000$
Fixed expenses	$1,60,000 \times \frac{3}{12} = 40,000$	$1,60,000 \times \frac{9}{12} = 1,20,000$
Variable expenses @ ₹ 2 p.u.	30,000	1,44,000

Semi-variable expenses	$60,000 \times \frac{3}{12} = 15,000$	$(50\% + 20\% + 20\%) \times \frac{60,000}{12} = 75,000$
(-) Scrap @ ₹ 0.20 p.u.	(3,000)	(14,400)
Total Cost	→ 1,63,000	→ 6,84,600

Statement of Calculation of Selling Price for Remaining 9 Months

Sales for first 3 months ($15,000 \times 12$)	1,80,000 ✓
Less: Cost for first 3 months	1,63,000 ✓
Profit for first 3 months	→ 17,000 ✓
Annual Target profit	→ 2,18,000
Profit require from remaining 9 months	2,01,000
Add: Cost for remaining 9 months	6,84,600
Sales for remaining 9 months	8,85,600
Units for remaining 9 months	→ 72,000
Selling price for remaining 9 months	12.30

Question – 9

SK Engineering Company Limited manufactures two types of auto bearing – type ‘S’ and type ‘K’. The company’s records show the following particulars for the bearings for the month of May:

	₹
Direct Materials $[(2,700 \times 1.60) : (3,300 \times 1)]$	→ 38,10,000
Direct Labour $[(2,700 \times 1) : (3,300 \times 0.7)]$	→ 20,10,000
Production Overheads $[30\% \text{ of DL}]$	→ 6,03,000
Office Overheads $[10\% \text{ of NFC}]$	→ ✓ 6,42,300

There was no work-in-progress at the beginning or at the end of the month. It was ascertained that:

- Direct material cost per bearing for type ‘S’ was 160 percent of those for type ‘K’.
- Direct labour cost per bearing for type ‘K’ was 40 percent of those for type ‘S’.
- Production overheads were absorbed on the basis of direct labour cost. $\rightarrow \frac{6,03,000}{20,10,000} \times 100 = 30\% \text{ of DL}$
- Office overheads were absorbed on the basis of factory cost. $\rightarrow \frac{6,42,300}{64,23,000} \times 100 = 10\% \text{ of NFC}$
- Selling and distribution overheads were ₹ 2 per bearing sold for each type.
- Stock of finished bearing on 1st May was 15,000 bearings @ ₹ 15 of type ‘S’ and 20,000 bearings @ ₹ 8 of type ‘K’.
- Production during the month of May was 2,70,000 bearings of type ‘S’ and 3,30,000 bearings of type ‘K’ and out of May’s output 25,000 bearings of type ‘S’ and 40,000 bearings of type ‘K’ would remain in stock on 31st May which were valued at cost of production.

You are required to:

- Prepare a statement showing cost of production for each type of bearings.
- Prepare a statement showing the selling price at which the bearings would be marketed, if the company desires @ 20 percent profit on selling price.

$$\rightarrow (TC \div 80\%)$$

Solution

Statement of cost and calculation of selling price

Particulars	S	K	Total
Direct <u>Material</u> (2,70,000*1.6 :3,30,000*1)	21,60,000	16,50,000	38,10,000
Direct Wages (2,70,000*1 :3,30,000*0.40)	13,50,000	6,60,000	20,10,000
Prime Cost	35,10,000	23,10,000	58,20,000
Production Overheads (30% of wages)	4,05,000	1,98,000	6,03,000
Factory Cost/COP	39,15,000	25,08,000	64,23,000
Add: Opening Stock	2,25,000	1,60,000	3,85,000
Less: Closing Stock $\left(\frac{39,15,000}{2,70,000} \times 25,000\right) \left(\frac{25,08,000}{3,30,000} \times 40,000\right)$	(3,62,500)	(3,04,000)	(6,66,500)
Cost of goods sold	37,77,500	23,64,000	61,41,500
Administration Overheads (10% of Factory cost)	3,91,500	2,50,800	6,42,300
Add: Selling & Distribution OHs (2,60,000 × 2) (3,10,000 × 2)	5,20,000	6,20,000	11,40,000
Cost of Sales	46,89,000	32,34,800	79,23,800
Add: Profit	11,72,250	8,08,700	19,80,950
Sales	58,61,250	40,43,500	99,04,750
Units	2,60,000	3,10,000	-
SP per unit	22.54	13.04	-

Working Note – 1

Particulars	Product S ✓	Product K
Opening stock units	15,000	20,000
Add: Production units	2,70,000	3,30,000
Less: Closing Stock units	25,000	40,000
Sale units	2,60,000	3,10,000

Handwritten notes:

SPD OH $\times 2$ (underlined)

$\times 2$ (underlined)

Cost Sheet

MCQs

Q(1). Generally, for the purpose of cost sheet preparation, costs are classified on the basis of:

- ☒ A. Functions
- ☐ B. Variability
- ☐ C. Relevance
- ☐ D. Nature

Q(2). Which of the following does not form part of prime cost:

- ☒ A. Cost of packing -
- ☐ B. Cost of transportation paid to bring materials to factory
- ☐ C. GST paid on raw materials (input credit cannot be claimed)
- ☐ D. Overtime premium paid to workers

Q(3). SK Ltd. received an order, for which it purchased a special frame for manufacturing, it is a part of:

- ☐ A. Direct Materials
- ☒ B. Direct Expenses
- ☐ C. Factory Overheads
- ☐ D. Administration Overheads

Q(4). Salary paid to plant supervisor is a part of:

- ☐ A. Direct expenses
- ☒ B. Factory overheads
- ☐ C. Quality control cost
- ☐ D. Administration cost

Q(5). Depreciation of director's laptop is treated as a part of:

- ☒ A. Administration overheads
- ☐ B. Factory overheads
- ☐ C. Direct expenses
- ☐ D. Research & Development cost

Q(6). A manufacture has set-up a lab for testing of products for compliance with standards, salary of this lab staffs are part of:

- ☐ A. Work overheads
- ☒ B. Quality control cost
- ☐ C. Direct expenses
- ☐ D. Research & development costs

Q(7). Audit fees paid to auditors is part of:

- ☒ A. Administration cost
- ☐ B. Production cost
- ☐ C. Selling and distribution cost
- ☐ D. Not shown in cost sheet

Q(8). Salary paid to factory store staff is part of:

- ☒ A. Factory overheads
- ☐ B. Production cost
- ☐ C. Direct employee cost
- ☐ D. Direct material cost

Q(9). Canteen expenses for factory workers are part of:

- ☒ A. Factory overheads
- ☐ B. Administration cost
- ☐ C. Marketing cost
- ☐ D. None of the above

Q(10). A company pays royalty to State Government on the basis of production, it is treated as:

- ☐ A. Direct Material Cost
- ☐ B. Factory Overheads
- ☒ C. Direct Expenses
- ☐ D. Administration cost

MATERIAL COST - CONCEPTS

1. Material Cost

It is one of the major element of cost in a manufacturing organisation. Thus, proper care is to be taken for this cost.

2. Components of Material Cost [PC, OC & CC]

(A) Purchase Cost = No. of units purchased × Cost per unit

(B) Ordering Cost = No. of orders × Cost per order

$$\text{No. of orders} = \frac{\text{Annual requirement}}{\text{Order Size}}$$

$$\text{Frequency of order} = \frac{365 / 52 / 12}{\text{No. of orders}}$$

(C) Carrying cost = Average quantity of goods × Carrying cost per unit per annum

$$\text{Average quantity} = \frac{\text{Order size}}{2}$$

$$\text{Average quantity with safety stock} = \text{safety stock} + \frac{\text{Order size}}{2}$$

3. Determination of Order Size

It should be at the level where material cost is minimum.

4. Economic Order Quantity (EOQ)

It is that order size at which sum total of ordering cost and carrying cost is minimum.

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}}$$

Where, A = Annual requirement of raw material

O = Cost per order

C = Carrying cost per unit per annum

5. Levels of Inventory

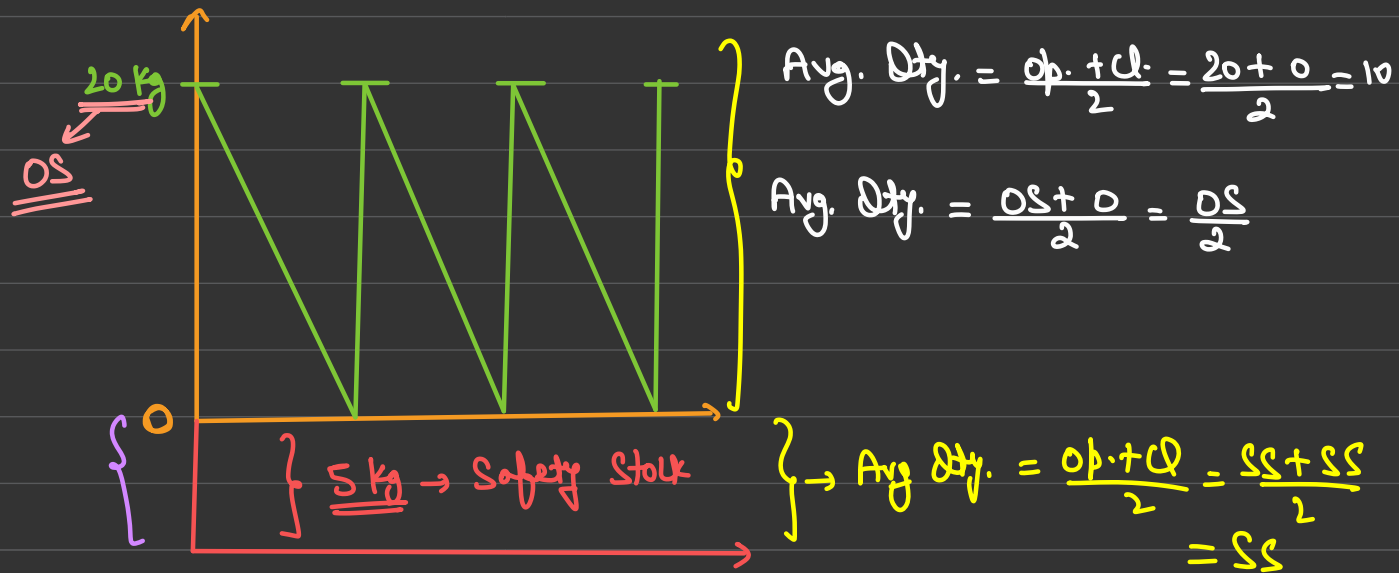
(A) Re-order level (ROL) = Maximum consumption × Maximum lead time
 = Safety stock + (Average consumption × Average lead time)
 = Minimum stock + (Average cons. × Average lead time)

Re-order Qty. / OS

(B) Maximum level = ROL + ROQ - (Minimum cons. × Minimum lead time)

(Cons.)

(C) Minimum level = ROL - (Average consumption × Average lead time)



$$\text{Total Avg. Qty.} = \text{SS} + \frac{\text{OS}}{2}$$

Mat. Cost - Min.

Using Formula

When No Discount

Objective $\rightarrow$ Min. - OC + CC

Using tabular format

When Discount Exist

Objective $\Rightarrow$ Min.
PC + OC + CC,

$$CC = OC$$

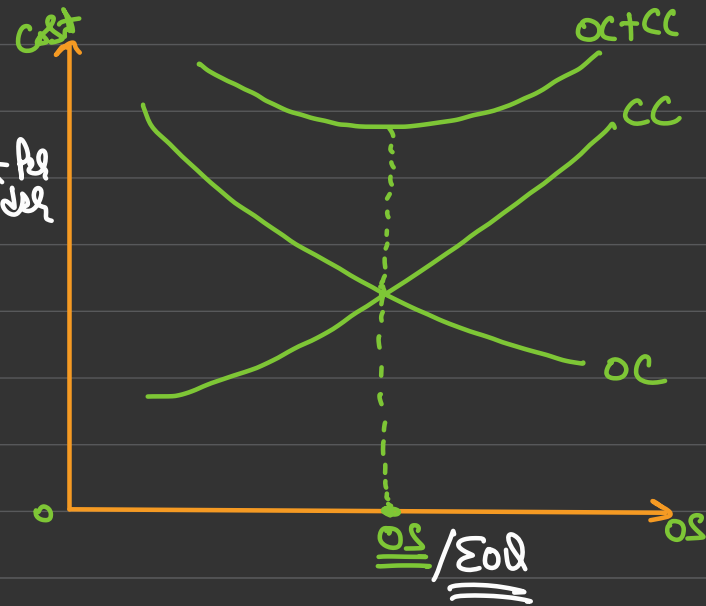
$$\frac{OS}{2} \times CC \text{ p.v. p.a.} = \frac{\text{Annual Req.}}{OS} \times \text{Cost Per order}$$

$$\frac{OS}{2} \times C = \frac{A}{OS} \times O$$

$$(OS)^2 = \frac{2 \times A \times O}{C}$$

$$OS = \sqrt{\frac{2 \times A \times O}{C}}$$

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} \quad \checkmark$$



1) If CC is given in %. Then such % is applied on purch. price p.v. of material.

2) No. of order if in decimal then take to the next round off number

3.6	→	4
3.2	→	4
3.01	→	4

3) $A = \text{RM } \overset{\text{(Prefer)}}{\text{purchase Qty.}} / \text{RM Consume Qty.}$

$$\Rightarrow \text{FG Sold}_{\text{units}} = \text{Op. St. FG}_{\text{units}} + \text{Production}_{\text{units}} - \text{Cl. St. FG}_{\text{units}}$$

$$\Downarrow$$

$$\text{Production}_{\text{units}} = \text{Sale units} + \text{Cl. St. FG} - \text{Op. St. FG}$$

$$\Rightarrow \text{RM Consumption} = \text{Prod. units} \times \text{RM Cons. P.u.}$$

$$\Rightarrow \text{RM Consume} = \text{Op. St.} + \text{RM Purch.} - \text{Cl. Stock}$$

$$\Downarrow$$

$$\text{RM Purchase} = \text{RM Cons.} + \text{Cl. Stock} - \text{Op. Stock}$$

FG Sold
 ↓
 FG Production
 ↓
 RM Consumption
 ↓
 RM Purchase

$$\begin{aligned} \text{(D) Average level} &= \frac{\text{Minimum level} + \text{Maximum level}}{2} \quad (\text{prefer}) \\ &= \text{Minimum level} + \frac{\text{Re-Order quantity}}{2} \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{(E) Danger level} &= \text{Average consumption} \times \text{Emergency lead time} \quad (\text{prefer}) \\ &= \text{Minimum consumption} \times \text{Emergency lead time} \end{aligned}$$

6. ABC Analysis

It stands for always better control analysis.

<u>Category</u>	<u>% Quantity</u>	<u>% Value</u>	<u>Control</u>
- A	→ 10% - Low	→ 70% - High	⇒ High
- B	20% - Avg.	20% - Avg.	⇒ Moderate
- C	70% - High	10% - Low	⇒ Low

7. Inventory Turnover Ratio (ITR)

$$\text{ITR for raw material} = \frac{\text{Raw material consumed}}{\text{Average raw material quantity}} = \text{--- times} \quad \checkmark$$

$$\text{ITR for finished goods} = \frac{\text{Cost of goods sold}}{\text{Average finished goods quantity}} = \text{--- times} \quad \checkmark$$

$$\text{Frequency or Inventory holding period (days)} = \frac{365 / 52 / 12}{\text{ITR}} \quad \checkmark$$

ITR - high
↓
Inventory is fast moving & vice-versa

8. Choice of Substitute Material

Select the material which has lowest cost per unit of finished goods

	<u>Material A</u>	<u>Material B</u> ✓
Cost per kg →	₹ 20 ✓	₹ 25 ✓
Input-output ratio →	200%	→ 120%
Cost per unit of output	20 × 200% = 40	25 × 120% = 30 (lowest)

9. Landing Cost of Material or Valuation of Material

<u>Items</u>	<u>Treatment</u>
Trade Discount	→ Deduct if not already deducted
Cash Discount	→ Ignore
Subsidy/Grant/Incentive	→ Deduct
Road tax/ Toll tax/	→ Add

<u>IGST/CGST/SGST</u>	
(A) If ITC available	→ Ignore
(B) If ITC not available	→ Add to Cost
Custom Duty	→ Add to Cost
Penalty / Fine / Demurrage	→ Ignore - Top. to P&L Ac
Insurance	→ Add
Commission	→ Add
Container Cost	→ Add
Return value of container	→ Deduct
Shortage	
(A) Normal	→ Deduct from Qty.
(B) Abnormal	→ Top. to P&L Ac

Distribution of Freight or similar items → on the basis of Quantity

Distribution of GST, Custom duty or similar items → on the basis of value

10. Safety Stock Determination

It is determined at the level where sum total of stock out cost and carrying cost of safety stock is minimum.

Carrying cost of safety stock = Safety stock unit × Carrying cost per unit per annum

Annual Stock out cost = Annual stock out units × Stock out cost per unit

11. Material Records

It can be done in two ways i.e. Perpetual system and Periodic system.

→ using Stores Ledger

12. Preparation of Stores Ledger

(A) Material return from factory or production to stores

- Show as receipt at the price at which originally issued
- To be issued first in FIFO or LIFO method

(B) Material return by stores to supplier or vendor

- Show as issued in stores ledger at the price at which originally purchased
- If original price not known than at recent issue rate.

(C) Transfer from one job to another

- No entry in stores ledger

(D) In case of normal loss, show as issue in quantity column only and thus price of balance quantity increases.

(E) In case of abnormal loss, show as issue as per the method prevailing and transfer the same to costing P&L account.

MATERIAL COST QUESTIONS

Question – 1

An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 50.

At present, the order size is 3,000 spare parts.

(Assume that number of days in a year = 360 days)

Find out:

- How much the company's cost would be saved by opting EOQ model?
- The Re-order point under EOQ model if lead time is 12 days.
- How frequently should orders for procurement be placed under EOQ model?

Solution

(i) Annual requirement (A) = 27,000

Cost per order (O) = ₹ 240

Carrying cost per unit p.a. (C) = $50 \times 12.5\% = ₹ 6.25$

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 27,000 \times 240}{6.25}} = 1,440 \text{ units}$$

Statement of Cost

Particulars	Order size = 3,000	Order size = 1,440
Purchase cost →	$27,000 \times 50 = 13,50,000$	$27,000 \times 50 = 13,50,000$
Ordering cost	$\frac{27,000}{3,000} \times 240 = 2,160$	$\frac{27,000}{1,440} \times 240 = 4,560$
Carrying cost	$\frac{3,000}{2} \times 6.25 = 9,375$	$\frac{1,440}{2} \times 6.25 = 4,500$
Total cost	13,61,535	13,59,060

Saving due to EOQ = ₹ 13,61,535 - ₹ 13,59,060 = ₹ 2,475

(ii) Re-order point = Maximum consumption × Maximum time = $\frac{27,000}{360} \times 12 = 900$ units

(iii) Number of orders under EOQ Model = $\frac{27,000}{1,440} = 18.75$ or 19

Frequency of order = $\frac{360}{19} = 18.94$ days

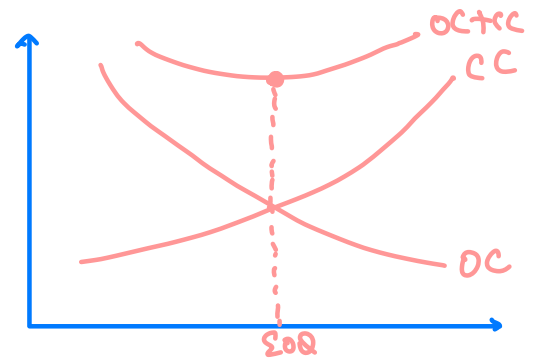
Question – 2

A company manufactures a product from a raw material which is purchased at ₹ 60 per kg. The company incurs a handling cost of ₹ 360 plus freight of ₹ 390 per order. The incremental carrying cost of inventory of raw material is ₹ 0.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 9 per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg of raw material.

Required:

- Calculate the economic order quantity of raw material
- Advise, how frequently should orders for procurement be placed. (Assuming 360 days in the year)
- If the company proposes to rationalize placement of orders on quarterly basis, what percentage of discount in the price of raw materials should be negotiated?

$O = 360 + 390 = 750$
 $C = (0.50 \times 12) + 9 = 15$
 $A = \frac{1,00,000}{2.5} = 40,000 \text{ kg}$
 $EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 40,000 \times 750}{15}} = 4,000 \text{ kg}$
 $\text{Frequency} = \frac{360}{4} = 90 \text{ days}$



Solution

(a) $A = 1,00,000 \div 2.5 = 40,000 \text{ kg}$ ✓

$O = 360 + 390 = ₹ 750$ ✓

$C = 9 + (0.5 \times 12) = ₹ 15$ ✓

$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 40,000 \times 750}{15}} = 2,000 \text{ kg}$

(b) Number of orders to be placed = $\frac{\text{Annual requirement of material}}{\text{Order size (EOQ)}} = \frac{40,000}{2,000} = 20 \text{ orders}$

Frequency of order = $\frac{360}{\text{No. of orders}} = \frac{360}{20} = 18 \text{ days}$

(c) Desired number of orders = 4

$\therefore$ desired order size = $\frac{40,000}{4} = 10,000 \text{ kg}$

Let new price = y

Statement of Cost

Costs	Order Size = 2,000	Order Size = 10,000
Purchase Cost ✓	$40,000 \times 60 = 24,00,000$	$40,000 \times y = 40,000y$
Ordering Cost ✓	$\frac{40,000}{2,000} \times 750 = 15,000$	$\frac{40,000}{10,000} \times 750 = 3,000$
Carrying Cost ✓	$\frac{2,000}{2} \times 15 = 15,000$	$\frac{10,000}{2} \times 15 = 75,000$
Total Cost	24,30,000	$40,000y + 78,000$

Now to rationalize cost of both options, total cost should be same under both options.

$\therefore 24,30,000 = 40,000y + 78,000$

$y = ₹ 58.80$

$\therefore$ Discount per unit = $₹ 60 - ₹ 58.80 = ₹ 1.20$

Discount % = $\frac{1.20}{60} \times 100 = 2\%$

$A = 4000 \quad O = 135 \quad C = 12$

Question – 3

The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be ₹ 90 per unit. The incremental cost of processing an order is ₹ 135 and the annual cost of storage is estimated to be ₹ 12 per unit. Compute the optimal order quantity and total relevant cost of this order quantity?

Suppose that ₹ 135 as estimated to be the incremental cost of processing an order is incorrect and should have been ₹ 80. All other estimates are correct. Estimate the difference in cost on account of this error?

Assume at the commencement of the period that a supplier offers 4,000 units at a price of ₹ 86. The materials will be delivered immediately and placed in the stores. Assume that the incremental cost of placing the order is zero and original estimate of ₹ 135 for placing an order for the economic batch is correct. Analyze, should the order be accepted?

Solution

$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 4,000 \times 135}{12}} = 300 \text{ units}$

Relevant cost of this order quantity: ✓

Ordering cost $[(4,000 \div 300) \times 135]$

$1,800$ ✓

13.11×14

$\frac{4000}{300} = 13.33 \times 14 \times 80 = 1120$
 $(300 \div 2) \times 12 = 1800$
 $\underline{2920}$

$$\Delta \text{Cost} = 2920 - 2526 = 394$$

Carrying cost $[(300 \div 2) \times 12] = 1,800$
 Relevant cost $\rightarrow 3,690$

$$\text{Revised EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 4,000 \times 80}{12}} = 231 \text{ units}$$

Relevant cost of this order quantity:

Ordering cost $[(4,000 \div 231) \times 80] = 1,385$

Carrying cost $[(231 \div 2) \times 12] = 1,386$

Relevant cost $\rightarrow 2,826$

$$4000 \div 231 = 17.32 \text{ or } 17 \times 80 = 1440$$

$$(231 \div 2) \times 12 = 1386$$

$$1440 + 1386 = 2826$$

Difference in cost on account of this error $= 3,690 - 2,826 = ₹ 864$

Statement of Evaluation of Offer

Costs	Order Size = 300	Order Size = 4,000
Purchase Cost	$4,000 \times 90 = 3,60,000$	$4,000 \times 86 = 3,44,000$
Ordering Cost	$\frac{4,000}{300} \times 135 = 1,800$	$\frac{4,000}{4,000} \times 0 = 0$
Carrying Cost	$\frac{300}{2} \times 12 = 1,800$	$\frac{4,000}{2} \times 12 = 24,000$
Total Cost	3,63,600	3,68,000

This special offer at ₹ 86 per unit should not be accepted as its total cost is higher as compared to original offer.

Question – 4

SK Ltd. manufactures a product S which requires two raw materials P and M in a ratio of 1:4. The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material P is required.

Stock position at the beginning of the year is as below:

Product SK 12,000 units
 Material P 24,000 units
 Material M 52,000 units

$$\text{Annual Prod. of S} = 500000 - 12000 = 488000$$

$$\text{RM Cons. of P} = (488000 \times 4) = 1952000$$

$$\text{RM Purch. of P} = 1952000 + 0 - 24000 = 1928000$$

$$\text{RM Cons. of M} = (488000 \times 16) = 7808000$$

$$\text{RM Purch. of M} = 7808000 + 52000 - 0 = 7860000$$

To place an order the company has to spend ₹ 15,000. The company is financing its working capital using a bank cash credit @ 13% p.a.

Product SK is sold at ₹ 1,040 per unit. Material P and M are purchased at ₹ 150 and ₹ 200 respectively.

Required: Compute economic order quantity (EOQ):

- If purchase order for both materials is placed separately
- If purchase order for both materials is not placed separately

Solution

Annual production of Product SK = Annual demand – Opening stock = 5,00,000 – 12,000 = 4,88,000 units

Annual requirement of raw material = (Annual Production × Material per unit) – Opening stock

Material P = $(4,88,000 \times 4) - 24,000 = 19,28,000$ units

Material M = $(4,88,000 \times 16) - 52,000 = 77,56,000$ units

$$(a) \text{ EOQ of Material P} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 19,28,000 \times 15,000}{13\% \times 150}} = 54,462 \text{ units}$$

$$\text{EOQ of Material M} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 77,56,000 \times 15,000}{13\% \times 200}} = 94,600 \text{ units}$$

$$(b) \text{ EOQ of Material P \& M Combined} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times (19,28,000 + 77,56,000) \times 15,000}{13\% \times 190^*}} = 1,08,452 \text{ units}$$

$$\text{Material P quantity} = \frac{1,08,452 \times 19,28,000}{96,84,000} = 21,592 \text{ units}$$

$$\text{Material M quantity} = \frac{1,08,452 \times 77,56,000}{96,84,000} = 86,860 \text{ units}$$

$$* \text{Price} = \frac{(150 \times 19,28,000) + (200 \times 77,56,000)}{(19,28,000 + 77,56,000)} = ₹ 190$$

Question – 5

SK Ltd. has received an offer of quantity discounts on its order of materials as under:

Tons (No.)	Price per tons (₹)
0 – 249 Less than 250	6.00
250 250 and less than 800	5.90
800 800 and less than 2,000	5.80
2000 2,000 and less than 4,000	5.70
4000 4,000 and above	5.60

$$\text{EOQ} = \sqrt{\frac{2 \times 4000 \times 6}{20\% \times 6}} = 200$$

The annual requirement for the materials is 4,000 tons. The ordering cost per order is ₹ 6 and the carrying cost is estimated at 20% per annum. You are required to compute the most Economic Order Quantity presenting the relevant information in a tabular form.

Solution

Tons	Price	Order Size	Purchase Cost	Ordering Cost	Carrying Cost	Total Cost
Less than 250	6	200	$4,000 \times 6 = 24,000$	$\frac{4000}{200} \times 6 = 120$	$\frac{200}{2} \times 20\% \times 6 = 120$	24,240
250 to 800	5.90	250	$4,000 \times 5.90 = 23,600$	$\frac{4000}{250} \times 6 = 96$	$\frac{250}{2} \times 20\% \times 5.9 = 148$	23,844
800 to 2,000	5.80	800	$4,000 \times 5.80 = 23,200$	$\frac{4000}{800} \times 6 = 30$	$\frac{800}{2} \times 20\% \times 5.8 = 464$	23,694
2,000 to 4,000	5.70	2,000	$4,000 \times 5.70 = 22,800$	$\frac{4000}{2000} \times 6 = 12$	$\frac{2000}{2} \times 20\% \times 5.7 = 1,140$	23,952
4,000 & above	5.60	4,000	$4,000 \times 5.60 = 22,400$	$\frac{4000}{4000} \times 6 = 6$	$\frac{4000}{2} \times 20\% \times 5.6 = 2,240$	24,646

Total cost is lowest at order size of 800. So, economic order quantity is 800 units.

Question – 6

A company uses three raw materials A, B and C for a particular product for which the following data apply:

Raw material	Usage per unit (Kg)	Reorder Quantity (Kg)	Price per Kg (₹)	Delivery period			Reorder level (Kg)	Minimum level (Kg)
				Min	Average	Max		
A	10	10,000	0.10	1	2	3	8,000	
B	4	5,000	0.30	3	4	5	4,750	
C	6	10,000	0.15	2	3	4		2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities:

- (a) Minimum stock of A?
 (b) Maximum stock of B?
 (c) Re-order level C?
 (d) Average stock level of A?

Min. 175
 Max. 225
 Avg. 200

Solution

- (a) Minimum stock of A = $ROL - (Average\ lead\ time \times Average\ consumption)$
 $= 8,000 - (2 \times 200 \times 10) = 4,000\ kg$ ✓
- (b) Maximum stock of B = $ROL + ROQ - (Min.\ lead\ time \times Min.\ consumption)$
 $= 4,750 + 5,000 - (3 \times 175 \times 4) = 7,650\ kg$
- (c) Re-order level of C = $Max.\ lead\ time \times Max.\ consumption$
 $= 4 \times 225 \times 6 = 5,400\ kg$
- (d) Average level of A = $Minimum\ level + \frac{ROQ}{2} = 4,000 + \frac{10,000}{2} = 9,000\ kg$ ✓

Question – 7

M/s SK Ltd. are the manufacturers of picture tubes for T.V. The following are the details of their operation during the year:

Average monthly market demand → 2,000 tubes

Ordering cost → ₹ 100 per order

Inventory carrying cost → 20% per annum $\times 500 = 100$

Cost of tubes → ₹ 500 per tube

Normal usage (Avg.) → 100 tubes per week

Minimum usage → 50 tubes per week

Maximum usage → 200 tubes per week

Lead time to supply → 6-8 weeks

Compute the following from the above information:

- (a) Economic order quantity. If the supplier is willing to supply quarterly 1,500 units at a discount of 5%, is it worth accepting?
- (b) Maximum level of stock $A = 100 \times 52 = 5200$
- (c) Minimum level of stock $O = 100$
- (d) Reorder level $C = 20\% \times 500 = 100$

Solution

(a) $A = 100 \times 52 = 5,200$ (We have to consider only consumption and not monthly demand)

$$O = ₹ 100$$

$$C = 20\% \times 500 = ₹ 100$$

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5,200 \times 100}{100}} = 102 \text{ tubes}$$

Statement of Evaluation of Offer

Costs	Order Size = 102	Order Size = 1,500
Purchase Cost	$5,200 \times 500 = 26,00,000$	$5,200 \times (500 - 5\%) = 24,70,000$
Ordering Cost	$\frac{5,200}{102} = 50.98$ or $51 \times 100 = 5,100$	$\frac{5,200}{1,500} = 3.47$ or $4 \times 100 = 400$
Carrying Cost	$\frac{102}{2} \times 20\% \times 500 = 5,100$	$\frac{1,500}{2} \times 20\% \times 475 = 71,250$
Total Cost	26,10,200	25,41,650

Since the total cost is lower at order size of 1,500, thus it is recommended to accept the offer.

(b) Re-order level = Max. consumption $\times$ Max. lead time

$$= 200 \times 8 = 1,600 \text{ tubes}$$

(c) Minimum level = ROL - (Avg. lead time $\times$ Avg. Consumption)

$$= 1,600 - (100 \times 7) = 900 \text{ tubes}$$

(d) Maximum level = ROL + ROQ - (Minimum consumption $\times$ Minimum lead time)

$$= 1,600 + 102 - (50 \times 6) = 1,402 \text{ tubes}$$

Question – 8

A company buys in lots of 6,250 units which is a 3 month's supply. The cost per unit is ₹ 2.40. Each order costs ₹ 45 and inventory carrying cost is 15% of average inventory value.

Required:

(a) What is the total annual cost of existing inventory policy?

(b) How much money could be saved by employing the economic order quantity?

(c) If the company operates 250 days a year, the procurement time is 10 days and safety stock is 500 units. Find the reorder level, maximum level, minimum level and average inventory level.

Solution

$$A = 6,250 \times 4 = 25,000$$

$$O = ₹ 45$$

$$C = 15\% \times 2.40 = ₹ 0.36$$

(a) At present, order size of company is equal to 6,250.

Total annual cost = Purchase cost + Ordering cost + Carrying cost

$$= (25,000 \times 2.40) + \left(\frac{25,000}{6,250} \times 45\right) + \left(\frac{6,250}{2} \times 0.36\right) = ₹ 61,305$$

$$(b) EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 25,000 \times 45}{0.36}} = 2,500 \text{ units}$$

Total annual cost = Purchase cost + Ordering cost + Carrying cost

$$= (25,000 \times 2.40) + \left(\frac{25,000}{2,500} \times 45\right) + \left(\frac{2,500}{2} \times 0.36\right) = ₹ 60,900$$

$$\text{Saving due to EOQ} = ₹ 61,305 - ₹ 60,900 = ₹ 405$$

(c) Re-order level = (Avg. consumption × Avg. lead time) + Safety stock

$$= \left(\frac{25,000}{250} \times 10 \right) + 500 = 1,500 \text{ units}$$

Maximum level = ROL + ROQ - (Min. consumption × Min. lead time)

$$= 1,500 + 2,500 - \left(\frac{25,000}{250} \times 10 \right) = 3,000 \text{ units}$$

Minimum level = ROL - (Avg. consumption × Avg. lead time)

$$= 1,500 - \left(\frac{25,000}{250} \times 10 \right) = 500 \text{ units}$$

$$\text{Average level} = \frac{\text{Min. level} + \text{Max. level}}{2} = \frac{500 + 3,000}{2} = 1,750 \text{ units}$$

Question – 9

A company produces a product 'AB' by using two raw materials – 'Material Ae' and 'Material Be' in the ratio of 5:3.

A sales volume of 50,000 kgs is estimated for the month of December by the managers expecting the trend will continue for the entire year. The ratio of input and output is 8:5.

Other information about raw material Ae is as follows:

Purchase price → ₹ 150 per kg

Re-order period → 2 to 3 days

Carrying cost → 12%

$$\begin{aligned} \text{Annual Sales} &= 50,000 \times 12 = 6l \\ \text{Annual RM} &= 6l \times \frac{8}{5} = 9.60l \\ \text{Ae} &= 6l \\ \text{Be} &= 3.60l \\ \text{Ratio} &= 5 : 3 \end{aligned}$$

Note: Material Ae is perishable in nature and if not used within 3.5 days of purchase it becomes obsolete.

To place an order for material 'Ae' the company has to incur an administrative cost of ₹ 375 per order. At present, material 'Ae' is purchased in a lot of 7,500 kgs to avail the discount on purchase. Company works for 25 days in a month and production is carried out evenly. *Present os*

You are required to calculate:

(a) Economic order quantity (EOQ) for material Ae

(b) Maximum stock level for Material Ae

Solution

(a) Annual raw material requirement = 50,000 12 (8 5) = 9,60,000 kg ✓

Material requirement of Ae = 9,60,000 (5 8) = 6,00,000 kg ✓

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 6,00,000 \times 375}{12\% \times 150}} = 5,000 \text{ kg}$$

(b) Maximum level for material Ae = ROL + ROQ - (Min. consumption × Min. lead time)

$$= (\text{Max. consumption} \times \text{Max. time}) + \text{ROQ} - (\text{Avg. consumption} \times \text{Avg. time})$$

$$= \left(\frac{6,00,000}{25 \times 12} \times 3 \right) + 7,500 - \left(\frac{6,00,000}{25 \times 12} \times 2 \right) = 9,500 \text{ kg} \checkmark$$

Also, since material Ae is perishable in nature and will become obsolete after 3.5 days,

$$\therefore \text{Maximum level} = \left(\frac{6,00,000}{25 \times 12} \times 3.5 \right) = 7,000 \text{ kg} \checkmark$$

Min.

So maximum level will be minimum of the two values i.e. 7,000 kg and 9,500 kg.

∴ Maximum level for material Ae = 7,000 kg



Question – 10

SK Ltd. produces a product 'SK' using a raw material P. To produce one unit of SK, 2 kg of P is required. As per the sales forecast conducted by the company, it will be able to sell 10,000 units of SK in the coming year. The following is the information regarding the raw material P:

- The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
- Maximum consumption per day is 20 kg. more than the average consumption per day.
- There is an opening stock of 1,000 kg. ✓
- Time required to get the raw materials from the suppliers is 4 to 8 days.
- The purchase price is ₹ 125 per kg. ✓

There is an opening stock of 900 units of the finished product SK.

The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur ₹ 720 on paper and documentation work.

From the above information find out the followings in relation to raw material P:

- Re-order Quantity
- Maximum Stock level
- Minimum Stock level
- Calculate the impact on the profitability of the company by not ordering the EOQ.

[Take 364 days for a year]

$$\text{Annual Prod.} = 10000 + 0 - 900 = 9100$$

$$\text{RM Cons.} = 9100 \times 2 = 18200$$

$$\text{RM Purch.} = 18200 + 0 - 1000 = 17200$$

$$O = 720$$

$$C = \frac{13.76}{100} \times 125 =$$

Solution

Working Notes:

- Computation of Annual consumption & Annual Demand for raw material 'P':

Sales forecast of the product 'SK'	10,000 units
Less: Opening stock of 'SK'	900 units
Fresh units of 'SK' to be produced	9,100 units
Raw material required to produce 9,100 units of 'SK' (9,100 units × 2 kg)	18,200 kg. ✓
Less: Opening Stock of 'P'	1,000 kg.
Annual demand for raw material 'P'	17,200 kg. ✓

$$(ii) \quad EOQ = \sqrt{\frac{2 \times 17,200 \times 1720}{13.76\% \text{ of } 125}} = 1,200 \text{ kg}$$

$$(iii) \quad \text{Re- Order level} = (\text{Maximum consumption per day} \times \text{Maximum lead time}) \\ = \left(\frac{\text{Annual Consumption of S}}{364} + 20\text{kg} \right) \times 8 \text{ days} = \left(\frac{18,200}{364} + 20\text{kg} \right) \times 8 \text{ days} = 560 \text{ kg}$$

- Minimum consumption per day of raw material 'P':

$$\text{Average Consumption per day} = 50 \text{ Kg.} \quad \rightarrow \quad \frac{18200}{364} = 50$$

$$\text{Hence, Maximum Consumption per day} = 50 \text{ kg.} + 20 \text{ kg.} = 70 \text{ kg.} \quad \checkmark$$

So, minimum consumption per day will be

$$\text{Average Consumption} = \frac{\text{Min. Consumption} + \text{Max. Consumption}}{2}$$

$$50 \text{ kg} = \frac{\text{Min. Consumption} + 70 \text{ kg}}{2}$$

$$\text{Min. consumption} = 100 \text{ kg} - 70 \text{ kg} = 30 \text{ kg.}$$

- (a) Re-order Quantity = EOQ – 200 kg = 1,200 kg – 200 kg = 1,000 kg
- (b) Maximum Stock level = ROL + Re-order Quantity – (Min. consumption × Min. lead time)
= 560 kg. + 1,000 kg. – (30 kg. × 4 days) = 1,440 kg.
- (c) Minimum Stock level = ROL – (Average consumption per day × Average lead time)
= 560 kg. – (50 kg. × 6 days) = 260 kg.
- (d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,000kg	1,200kg
II	No. of orders a year	$\frac{17,200}{1,000} = 17.2$ or 18 orders	$\frac{17,200}{1,200} = 14.33$ or 15 orders
III	Ordering cost	18 orders x ₹ 720 = ₹ 12,960 ✓	15 orders x ₹ 720 = ₹ 10,800
IV	Average inventory	$\frac{1,000}{2} = 500$ kg	$\frac{1,200}{2} = 600$ kg
V	Carrying cost	500kg x ₹ 17.2 = ₹ 8,600 ✓	600kg x ₹ 17.2 = 10,320
VI	Total cost	₹ 21,560	₹ 21,120

Extra Cost incurred due to not ordering EOQ = ₹ 21,560 – ₹ 21,120 = ₹ 440

Question – 11

XYZ Ltd uses two types of raw materials – ‘Material A’ and ‘Material B’ in the production process and has provided the following data for the year ended on 31st March, 2021:

Particulars	Material A (₹)	Material B (₹)
Opening stock as on 1.04.2020 →	30,000	32,000
Purchases during the year →	90,000	51,000
Closing stock as on 31.02.2021 →	20,000	14,000

- (i) You are required to calculate:
- The inventory turnover ratio of ‘Material A’ and ‘Material B’
 - The number of days for which the average inventory is held for both materials ‘A’ and ‘B’.
- (ii) Based on above calculations, give your comments.
(Assume 360 days in a year)

Solution

- (i) Calculation of Inventory Turnover Ratio

Particulars	Material A	Material B
Opening stock	30,000	32,000
Add: Purchases	90,000	51,000
Less: Closing Stock	20,000	14,000
Raw Material Consumed (A) →	1,00,000	69,000
Average Stock $\left(\frac{\text{Opening} + \text{Closing}}{2}\right)$ (B) →	$\frac{30,000 + 20,000}{2} = 25,000$	$\frac{32,000 + 14,000}{2} = 23,000$
Inventory Turnover Ratio (ITR) $[A \div B]$	$\frac{1,00,000}{25,000} = 4$ times ✓	$\frac{69,000}{23,000} = 3$ times
Number of days $(360 \div \text{ITR})$	$\frac{360}{4} = 90$ days ✓	$\frac{360}{3} = 120$ days

∴ A is fast moving

Question – 12

MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

TC %

MM Ltd. has adopted the policy of classifying the items constituting 15% or above to Total Inventory Cost as "A" category, items constituting 6% or less of Total Inventory Cost as "C" category and the remaining items as "B" category.

You are required to:

- Rank the items on the basis of % of Total Inventory Cost.
- Classify the items into A, B and C categories as per ABC analysis of Inventory Control adopted by MM Ltd.

Solution

Statement of Cost						
Item Code Number	Units	Unit Cost (₹)	Total Cost (A × B = C)	% of Total Cost $\left[\frac{C}{7500} \times 100\right]$	Rank	Category
101	25	50	1,250	16.67%	II	A
102	300	01	300	4%	VI	C
103	50	80	4,000	53.33%	I	A
104	75	08	600	8%	IV	B
105	225	02	450	6%	V	C
106	75	12	900	12%	III	B
	Total		7,500	100%		

Question – 13

SK & Co., an unregistered supplier under GST, purchased material from PK Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

- ✓ Listed price of one lot → ₹ 2,50,000
- (-) Trade discount → @ 10% on listed price
- (+) CGST and SGST (Credit Not available) 12% (6% CGST + 6% SGST)
- Cash discount (X) @ 10%
(Will be given only if payment is made within 30 days.)
- (+) Toll Tax paid ₹ 5,000
- (+) Freight and Insurance ₹ 17,000
- Demurrage paid to transporter (X) ₹ 5,000
- (+) Commission and brokerage on purchases ₹ 10,000
- (+) Amount deposited for returnable containers ₹ 30,000
- (-) Amount of refund on returning the container ₹ 20,000
- (+) Other Expenses @ 2% of total cost

20% of material shortage is due to normal reasons. The payment to the supplier was made within 21 days of the purchases. You are required to calculate cost per unit of material purchased by SK & Co.

Solution

Statement of calculation of cost per unit

Particulars	Amount (₹)
Listed price of materials (on lot)	✓ 2,50,000
Less: Trade discount @ 10% on listed price	✓ (25,000)
	2,25,000
Add: CGST @ 6% of 2,25,000	13,500
Add: SGST @ 6% of 2,25,000	13,500
	2,52,000
Add: toll tax	✓ 5,000
Add: Freight and insurance	✓ 17,000
Add: Commission and brokerage paid	✓ 10,000
Add: Cost of refundable containers (30,000 – 20,000)	✓ 10,000
	→ 2,94,000
(2) Add: Other expenses (2,94,000 ÷ 98%)	6,000
(100) Total cost of material (A)	→ 3,00,000
Total quantity of material in one lot	→ 5,000 units
Less: Normal loss @ 20% of 5,000	→ 1,000 units
Net quantity of material (B)	→ 4,000 units
Material cost per unit (A ÷ B)	75

Note:

- GST is payable on net price i.e. listed price less trade discount
- Cash discounts is treated as interest and finance cost, hence it is ignored.
- Demurrage is penalty imposed by the transporter for delay in uploading or off-loading of materials. It is an abnormal cost and thus, not included.

Question – 14

M/s SK Ltd trades in chairs. It stocks sufficient quantity of chairs of almost every variety. In year end, the report of sales manager revealed that M/s SK experienced stock-out of chairs. The stock-out data is as follows:

Stock-out of chairs	No. of times
80 → 100	2
60 → 80	5
50 → 50	10
30 → 20	20
10	30
0	33

Prob.
0.02 ✓
0.05 ✓
0.10 ✓
0.20
0.30
0.33
1

M/s SK loses ₹ 150 per unit due to stock-out and spends ₹ 50 per unit on carrying of inventory. Determine optimum safest stock level.

Solution

Computation of probability of stock out

Stock-out (units)	100	80	50	20	10	0	Total
No. of times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

Statement showing determination of Optimal Stock (SS x 50)

Safety Stock Units	Stock-out units	Prob.	Expected annual stock out units	Expected annual stock out costs	Annual holding cost	Total annual expected cost
100	→ 0	0	0	0	5,000	5,000
→ 80	→ 20	0.02	→ 0.4	→ 60	4,000	4,060
50	→ 50	0.02	1.0	150		
	→ 30	0.05	1.5	225	2,500	2,875
			2.5	375		
20	80	0.02	1.6	240		
	60	0.05	3	450	1,000	2,140
	30	0.10	3	450		
			7.6	1,140		
10	90	0.02	1.8	270		
	70	0.05	3.5	525	500	2,195
	40	0.10	4.0	600		
	10	0.20	2.0	300		
			11.3	1,695		
0	100	0.02	2	300		
	80	0.05	4	600		
	50	0.10	5	750	0	2,700
	20	0.20	4	600		
	10	0.30	3	450		
			18	2,700		

It is recommended to maintain safety stock level of 20 units at which total cost is least i.e. ₹ 2,140.

Question – 15

SK Ltd. uses a small casting in one of its finished products. The castings are purchased from a foundry. SK limited purchases 54,000 castings per year at a cost of ₹ 800 per casting. The castings are used evenly throughout the year in the production process on a 360 day per year basis. The company estimates that it costs ₹ 9,000 to place a single purchase order and about ₹ 300 to carry one casting in inventory for a year. The high carrying costs results from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance.

Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation.

Delivery time (days):	6	7	8	9	10
Percentage of occurrence:	75	10	5	5	5

$$\begin{aligned}
 \frac{54000}{360} \times 1 &= 150 \text{ unit} \\
 \text{ROL} &= \text{SS} + (\text{Avg.} \times \text{Avg.}) \\
 &= 150 + \left(\frac{54000}{360} \times 6 \right) = 1050
 \end{aligned}$$

$$\begin{aligned}
 95\% \downarrow \\
 3 \text{ days SS} &= \frac{54000}{360} \times 3 = 450 \\
 \text{ROL} &= 450 + \left(\frac{54000}{360} \times 6 \right) = 1350
 \end{aligned}$$

$$A = 54000$$

$$O = 9000$$

$$C = 300$$

$$EOQ = \sqrt{\frac{2 \times 54000 \times 9000}{300}} = 1800$$

Required:

- Compute the economic order quantity (EOQ)
- Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The re-order point?
- Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? The re-order point?
- Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year?
- Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only ₹ 600. In addition, company estimates that when the waste and inefficiency caused by inventories are considered, the true costs of carrying a unit in stock is ₹ 720 per year.
 - Compute the new EOQ
 - How frequently would the company be placing an order, as compared to the old purchasing policy?

Solution

$$A = 54,000$$

$$O = ₹ 9,000$$

$$C = ₹ 300$$

$$(a) EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 54,000 \times 9,000}{300}} = 1,800 \text{ units}$$

- (b) For 15% risk of being out of stock, the company needs to maintain stock for 7 days.

$$\text{Average days} = 6 \text{ days}$$

$$\therefore \text{Safety stock} = 7 - 6 = 1 \text{ day}$$

$$\text{Safety stock} = \frac{54,000}{3600} \times 1 = 150 \text{ units}$$

$$\text{Re-order level} = \text{Safety stock} + (\text{Avg. consumption} \times \text{Avg. time}) = 150 + \left(\frac{54,000}{3600} \times 6\right) = 1,050 \text{ units}$$

- (c) For 5% risk of being out of stock, the company needs to maintain stock for 9 days.

$$\text{Average days} = 6 \text{ days}$$

$$\therefore \text{Safety stock} = 9 - 6 = 3 \text{ day}$$

$$\text{Safety stock} = \frac{54,000}{3600} \times 3 = 450 \text{ units}$$

$$\text{Re-order level} = \text{Safety stock} + (\text{Avg. consumption} \times \text{Avg. time}) = 450 + \left(\frac{54,000}{3600} \times 6\right) = 1,350 \text{ units}$$

$$(d) \text{ Ordering cost} = \frac{54,000}{1,800} \times 9,000 = ₹ 2,70,000$$

$$\text{Carrying cost} = \left(\frac{1,800}{2} + 450\right) \times 300 = ₹ 4,05,000$$

$$\text{Total Cost} = ₹ 6,75,000$$

$$(e) A = 54,000$$

$$O = ₹ 600$$

$$C = ₹ 720$$

(i) $EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 54,000 \times 600}{720}} = 300 \text{ units}$

(ii) Old policy frequency days = $\frac{360}{\text{No. of orders}} = \frac{360}{30} = 12 \text{ days}$

New policy frequency days = $\frac{360}{\text{No. of orders}} = \frac{360}{180} = 2 \text{ days}$

Material Cost

MCQs

Q(1). Direct material can be classified as:

- A. Fixed cost
- ☒ B. Variable cost
- C. Semi-variable cost
- D. Prime cost

Q(2). In most of the industries, the most important element of cost is

- ☒ A. Material
- B. Labour
- C. Overheads
- D. Administration cost

Q(3). Which of the following is considered to be the normal loss of materials?

- A. loss due to accidents
- ☒ B. Pilferage
- ☒ C. Loss due to breaking the bulk
- D. Loss due to careless handling of materials

Q(4). In which of the following methods of pricing, costs lag behind the current economic values?

- A. Last-in-first out price
- ☒ B. First-in-first out price
- C. Replacement price
- D. Weighted average price

Q(5). Continuous stock taking is a part of

- A. Annual stock taking
- ☒ B. Perpetual inventory
- C. ABC Analysis
- D. Bin cards

Q(6). In which of the following methods, issues of materials are priced at pre-determined rate?

- A. Inflated price method
- ☒ B. Standard price method
- C. Replacement price method
- D. Market price method

Q(7). When prices fluctuate widely, the method that will smooth out the effect of fluctuations is:

- A. Simple average price
- ☒ B. Weighted average price
- C. Moving average price
- D. Inflated price

Q(8). When prices fluctuate widely, the method that will smooth out the effect of fluctuations is

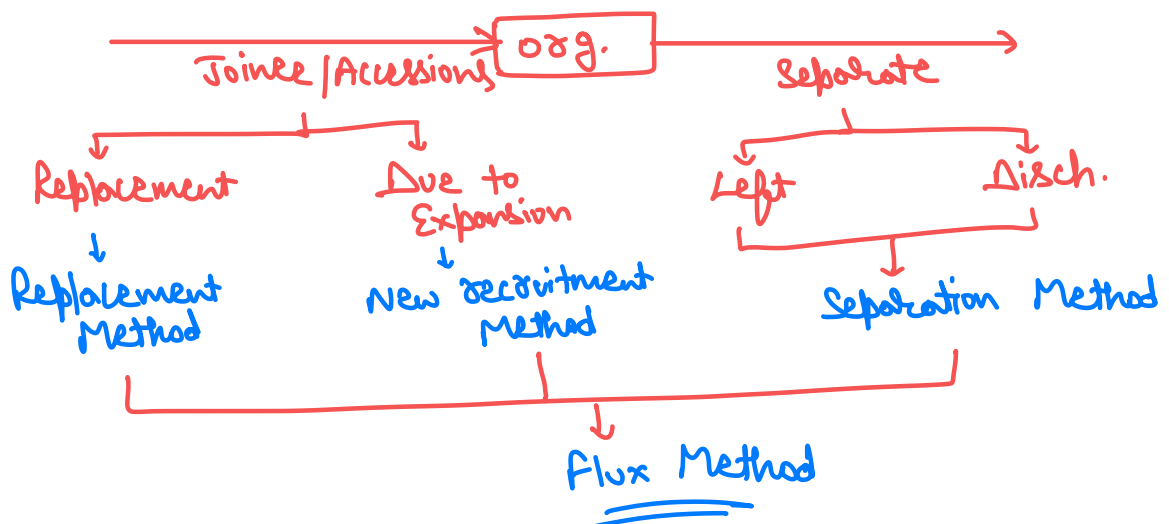
- A. simple average
- ☒ B. weighted average
- C. FIFO
- D. LIFO

Q(9). Under the FSN system of inventory control, inventory is classified on the basis of:

- A. volume of material consumption
- ☒ B. frequency of usage of items of inventory
- C. criticality of the item of inventory for production
- D. value of items of inventory

Q(10). Form used for making a formal request to the purchasing department to purchase materials is a:-

- A. Material transfer note
- ☒ B. Purchase requisition note
- C. Bill of materials
- D. Material requisition note



Labour turnover

Wage Rate Calculation

Incentive Plan

EMPLOYEE COST - CONCEPTS

1. Labour Turnover

It is the rate of change in labour force of an organisation. It can be calculated by following ways:

$$(A) \text{ Separation Method} = \frac{\text{Number of Separation}}{\text{Average No. of Workers}} \times 100$$

$$(B) \text{ Replacement Method} = \frac{\text{Number of Replacement}}{\text{Average No. of Workers}} \times 100$$

$$(C) \text{ New Recruitment Method} = \frac{\text{Number of Expansion}}{\text{Average No. of Workers}} \times 100$$

$$(D) \text{ Flux Method} = \frac{(\text{No. of Separation} + \text{No. of accessions})}{\text{Average No. of Workers}} \times 100 \Rightarrow \text{Sep.} + \text{Rep.} + \text{New Rec.} = \text{Flux}$$

$$(E) \text{ Flux Method} = \frac{(\text{No. of Separation} + \text{No. of replacement})}{\text{Average No. of Workers}} \times 100 \Rightarrow \text{Sep.} + \text{Rep.} = \text{Flux}$$

$$(F) \text{ Average worker} = \frac{\text{Opening} + \text{Closing}}{2}$$

$$(G) \text{ Equivalent Annual LTR} = \frac{\text{Labour Turnover Rate}}{\text{No. of days in the period}} \times 365$$

2. Idle Time

Total Hours Paid

Idle Hours

Working Hours

Normal idle time

unavoidable in nature
e.g. lunch, tea etc.

Burden Pass to Consumer

By deducting these hours
from total hours
thereby Rate per Hr. inc.

Abnormal idle time

Avoidable in nature
e.g. Power cut, Strike etc.

Burden Pass to owner

Trf. it to C. P & L A/c

Ab. loss = Ab. idle x Rate per
Hours Hour

3. Statement of Wage Rate Calculation

Particulars	Amount (₹)
✓ Basic Wages	--
✓ Dearness Allowance	--
✓ Bonus	--
✓ Commission	--
✓ Perquisite	--
✓ Overtime	--
✓ Any other allowances	--
✓ Employer contribution to PF/ESI etc.	--
Gross Wages [CTC]	--
Effective Working Hours (Total hours – Normal Idle Hours)	--
Wage rate per hour	-- ✓

4. Net Wages or In-hand wages calculation

Particulars	Amount (₹)
Gross Wages →	--
(-) Employee contribution to PF/ESI etc.	--
(-) Employer contribution to PF/ESI etc.	--
(-) Tax deducted at source (TDS)	--
(-) Professional Tax	--
(-) Any other deduction	--
Net Wages Payable	--

5. Overtime

It is hours worked over and above the normal working hours.

6. Overtime Premium

- It is the extra amount of wages paid over the normal rate.
- According to Factories Act of 1948, a worker is entitled for overtime at double the rate of his wages if he works more than 9 hours in a day or more than 48 hours in a week.

7. Treatment of Overtime Premium

- If it is restored at the desire of the customer, then the entire amount of overtime should be charged to the job directly.

- If it is due to a **general pressure of work** to increase the output, the premium as well as overtime wages may be **charged general overheads**.
- If it is due to the **negligence or delay of workers** of a particular department, it may be **charged to the concerned department**.
- If it is **due to abnormal reasons**, it may be charged to **costing profit and loss account**.

8. Wage Payment System

(A) **Time Rate System**

$$\text{Wages} = \text{No. of hours worked} \times \text{Rate per hour}$$

(B) **Piece Rate system**

$$\text{Wages} = \text{No. of units produced} \times \text{Rate per unit (or Piece rate)}$$

9. Incentive Plans

(A) **Halsey Plan**

$$\text{Total Earnings} = (H \times R) + [50\% \times (S - H) \times R]$$

(B) **Halsey-wier Plan**

$$\text{Total Earnings} = (H \times R) + [33.33\% \times (S - H) \times R]$$

(C) **Rowan Plan**

$$\text{Total Earnings} = (H \times R) + \left[\left(\frac{S-H}{S} \right) \times H \times R \right]$$

Where, H = Actual hours worked

R = Rate per hour

S = Standard hours or time allowed

(S - H) = Time saved

$\left[\frac{1}{3} \text{ or } 33\% \right]$

10. Effective Hourly Rate of Earning

$$\text{Effective hourly rate of earning} = \frac{\text{Total Wages}}{\text{Actual hours worked}}$$

$$\begin{aligned} \text{Asst. Mgr.} &= \frac{2}{8} \times (\text{Total}) \\ 20 &= \frac{2}{8} \times \text{Total} \\ \text{Total} &= 20 \times \frac{8}{2} = 80 \end{aligned}$$

EMPLOYEE COST QUESTIONS

Question – 1

SK Ltd. is engaged in BPO industry. One of its trainee executives in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

$$\text{Op.} + \text{Join} - \text{left} = \text{Cl.}$$

Following is the data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end	Rep.
Data processor	540	1,080	60	1,560	60
Payroll Processors	$40 + 60 - 20 = 80$	20	60	40	20
Supervisors	$80 \times \frac{3}{8} = 30$	60	—	$30 + 60 - 0 = 90$	0
Voice Agents	$80 \times \frac{3}{8} = 30$	20	20	$30 + 20 - 20 = 30$	20
Assistant Managers	$30 + 10 - 20 = 20$	20	10	30	10
Senior Voice Agents	4	8	—	12	0
Senior Data	8	26	—	34	0
Processors Team Leaders	60	—	60	—	0
Employees transferred from the Subsidiary Company					110
Senior Voice Agents	—	8	—	—	
Senior Data Processors	—	26	—	—	
Employees transferred to the Subsidiary Company					
Team Leaders	—	—	60	—	
Assistant Managers	—	—	10	—	

At the beginning of the year there were total 772 employees on the payroll of the company. The opening strength of the Supervisors, Voice Agents and Assistant Managers were in the ratio of 3 : 3 : 2.

The company has decided to abandon the post of Team Leaders and consequently all the Team Leaders were transferred to the subsidiary company. The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to calculate:

- Labour Turnover rate using Replacement method and Separation method.
- Verify the Labour turnover rate calculated under Flux method by the trainee executive of the SK Ltd.

Solution

Working Notes:

- Calculation of no. of employees at the beginning and end of the year

	At the beginning of the year	At the end of the year
Data Processors	540	1,560
Payroll Processors	80	40
[Left- 60 + Closing- 40 – Joined- 20]		
Supervisors*	30	90

Voice Agents*	30	30
Assistant Managers*	20	30
Senior Voice Agents	4	12
Senior Data Processors	8	34
Team Leaders	60	0
Total	772	1,796

(*) At the beginning of the year:

Strength of Supervisors, Voice Agents and Asst. Managers =

[772 – {540 + 80 + 4 + 8 + 60} employees] or [772 – 692 = 80 employees]

[{Supervisors- $80 \times \frac{3}{8} = 30$, Voice Agents- $80 \times \frac{3}{8} = 30$ & Asst. Managers- $80 \times \frac{2}{8} = 20$ } employees]

At the end of the year:

[Supervisor-(Opening- 30 + 60 Joining) = 90; Voice Agents- (Opening- 30 + 20 Joined – 20 Left) = 30]

(ii) No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Data Processor	60	1,020	60	1,080
Payroll Processors	60	--	20	20
Supervisors	--	60	--	60
Voice Agents	20	--	20	20
Assistant Managers	10	10	10	20
Sr. Voice Agents	--	8	--	8
Sr. Data Processors	--	26	--	26
Team Leaders	60	--	--	--
Total	210 ✓	1,124 ✓	110 ✓	1,234 ✓

(Since, SK Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover:

Replacement Method = $\frac{\text{No. of employees replaced during the year}}{\text{Average no. of employees on roll}} \times 100$

$$= \frac{110}{(772+1,796)/2} \times 100 = 8.57\%$$

Separation Method = $\frac{\text{No. of employees separated during the year}}{\text{Average no. of employees on roll}} \times 100$

$$= \frac{210}{(772+1,796)/2} \times 100 = 16.36\%$$

24.93%

(b) Labour Turnover under Flux Method

Flux Method = $\frac{\text{No. of employees (joined + separated) during the year}}{\text{Average no. of employees on roll}} \times 100$

$$= \frac{1,234+210}{(772+1,796)/2} \times 100 = 112.46\%$$

Labour Turnover calculated by the executive trainee of the Personnel department is incorrect as it has not taken the No. of new recruitment while calculating the labour turnover under Flux method.

Question – 2

PQR Limited has replaced 72 workers during the quarter ended 31st March, 2022. The labour rates for the quarter are as follows:

Flux Method	→	16%
Replacement Method	→	8%
Separation Method	→	5%

You are required to ascertain:

- Average number of workers on roll (for the quarter),
- Number of workers left and discharged during the quarter,
- Number of workers recruited and joined during the quarter,
- Equivalent employee turnover rates for the year.

Solution

(i) Replacement Method - Labour turnover rate = $\frac{\text{No. of replacements}}{\text{Average number of workers}} \times 100$

$$8 = \frac{72}{\text{Average number of workers}} \times 100$$

$$\text{Average number of workers} = 900$$

(ii) Separation Method - Labour turnover rate = $\frac{\text{No. of separations}}{\text{Average number of workers}} \times 100$

$$5 = \frac{\text{No. of separations}}{900} \times 100$$

$$\text{Number of separations (left and discharged)} = 45$$

(iii) Flux Method - Labour turnover rate = $\frac{\text{No. of separations} + \text{No. of recruitments \& joinee}}{\text{Average number of workers}} \times 100$

$$16 = \frac{45 + \text{No. of recruitments \& joinee}}{900} \times 100$$

$$\text{Number of workers recruited \& joined} = 99$$

(iv) Equivalent Employee turnover rate

$$\text{Flux Method - Labour turnover rate} = \frac{16}{3} \times 12 = 64\%$$

$$\text{Replacement Method - Labour turnover rate} = \frac{8}{3} \times 12 = 32\%$$

$$\text{Separation Method - Labour turnover rate} = \frac{5}{3} \times 12 = 20\%$$

Question – 3

SK Ltd. wants to ascertain the profit lost during the year 2020-21 due to increased labour turnover. For this purpose, they have given you the following information:

- Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.
- 20% of the output during training period was defective. Cost of rectification of a defective unit was ₹ 25.
- Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
- Selling price per unit is ₹ 180 and P/V ratio is 20%. → Cont. P.V. = $180 \times 20\% = ₹ 36$
- Settlement cost of the workers leaving the organization was ₹ 1,83,480.

$$\text{Op} = 50000 \text{ hrs.} \times 60\% \times \frac{1}{10} = 3000 \text{ units}$$

$$\begin{aligned} \text{Rect. Cost} &= 3000 \times 20\% \times ₹ 25 \\ &= ₹ 15000 \end{aligned}$$

$$\text{Lost} = 50000 \times 40\% \times \frac{1}{10} = 2000 \text{ units}$$

$$\begin{aligned} \text{Prod. Lost} &= 12 \times \frac{1}{10} = 10000 \text{ units} \\ &= 12000 \text{ units} \end{aligned}$$

(6) Recruitment cost was ₹ 1,56,340

(7) Training cost was ₹ 1,13,180

You are required to calculate the profit lost by the company due to increased labour turnover during the year 2020-21.

Solution

Output by experienced workers in 50,000 hours = $\frac{50,000}{10} = 5,000$ units

∴ Output by new recruits = 60% of 5,000 = 3,000 units

Loss of output = 5,000 – 3,000 = 2,000 units

Total loss of output = Due to delay recruitment + Due to inexperience
= 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of ₹ 180 = ₹ 36

Total contribution lost = ₹ 36 × 12,000 units = ₹ 4,32,000

Cost of repairing defective units = 3,000 units × 0.2 × ₹ 25 = ₹ 15,000 ✓

Profit forgone due to labour turnover

Particulars	Amount (₹)
Loss of Contribution	→ 4,32,000
Cost of repairing defective units	→ 15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2020-21	9,00,000

Question – 4

Following data have been extracted from the books of M/s ABC Private Limited:

Salary (each employee, per month)	→ ₹ 30,000	3,60,000
Bonus	→ 25% of salary	90,000
Employer's contribution to PF, ESI etc.	15% of salary	54,000
Total cost at employees' welfare activities	₹ 6,61,500 per annum	3,780
Total leave permitted during the year	→ 30 days ✓	507,780
Number of employees	(175)	
Normal idle time	→ 70 hours per annum	
Abnormal idle time (due to failure of power supply)	→ 50 hours	
Working days per annum	→ 310 days of 8 hours	

You are required to calculate:

1) Annual cost of each employee

2) Employee cost per hour → $\frac{507,780}{2,170} = 234$

3) Cost of abnormal idle time, per employee

Solution → $50 \times 234 = 11,700$

Calculation of effective hours

Total working hours (310 × 8)	2,480
Less: Leave days (30 × 8)	240
Available working hours	2,240

$$(310 \times 8) - (30 \times 8) - 70 = 2,170 \text{ hrs}$$

Less: Normal loss 70
 Effective working hours 2,170

Statement of employee cost per hour

Particulars	Amount (₹)
Salary (30,000 × 12)	3,60,000
Bonus (25% × 3,60,000)	90,000
Employees contribution to PF (15% × 3,60,000)	54,000
Employee welfare (6,61,500 ÷ 175)	3,780
Total Annual Cost (A)	5,07,780
Effective working hours (B)	2,170
Employee cost per hour (A ÷ B)	234

Cost of abnormal idle time per employee = ₹ 234 × 50 hours = ₹ 11,700

Question – 5

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively).

The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked).

Semi-skilled and skilled worker is paid ordinary wage @₹ 400 and ₹ 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @20%. Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day and 48 hours in a week.

You are required to compute the wages payable to Mr. Deep (semi-skilled) and Mr. Sam (skilled).

Solution

Calculation of total normal hours to be paid for Mr. Deep (Semi-skilled)

Day	Actual hours	Normal hours	Extra Hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours payable
	A	B	C	D = A – B	E = D × 2	F = B + C + E
Monday	10.5	8	1	1.5	3	12
Tuesday	8	8	-	-	-	8
Wednesday	10.5	8	1	1.5	3	12
Thursday	9.5	8	1	0.5	1	10

Worker S

Worker K

Overtime was done on Job B.

Solution

Statement of wages

Particulars	Worker S	Worker K
Basic Wages	100 ✓	160 ✓
Dearness Allowance @ 50%	50 ✓	80 ✓
Employer contribution to PF @ 8%	8 ✓	12.80 ✓
Employer contribution to state insurance @ 2%	2 ✓	3.20 ✓
Overtime $\left[\frac{(100+50) \times 2 \times 10}{200} \right]$ Per hour	15	-
Total	175	256

Statement of cost of Jobs

Particulars	A	B	C
Overtime -	-	15	-
Bal. of Worker S's wages $(175 - 15 = 160)$ (160 in 40:30:30)	64	48	48
Worker K's Wages (256 in 50:20:30)	128	51.20	76.80
Total	192	114.20	124.80

Question – 7

A skilled worker in SK Ltd. is paid a guaranteed wage rate of ₹ 30 per hour. The standard time per unit for a particular product is 4 hours. S, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹ 37.50 on the manufacture of that particular product. What could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

Solution

Let actual time taken by the worker S = H

$$\text{Total wages in Rowan plan} = (H \times 30) + \left(\frac{H}{4} \right) \times (4 - H) \times 30$$

$$(H \times 37.50) = 30H + 30H - 7.5H^2$$

$$22.5H = 7.5H^2$$

$$H = 3 \text{ hours}$$

$$\text{Total wages of workman in Halsey scheme} = (3 \times 30) + \left[\frac{50}{100} \times (4 - 3) \times 30 \right] = ₹ 105$$

$$\text{Effective hourly rate of earnings under Halsey Plan} = \frac{105}{3 \text{ hours}} = ₹ 35$$

$$\text{Eff Hourly Rate} = \frac{\text{Edu.}}{\text{Actual Hrs.}}$$

$$37.5 \times \text{Act. Hrs.} = \text{Edu.}$$

Question – 8

Two workers 'S' and 'K' produce the same product using the same material. Their normal wage rate is also the same. 'S' is paid bonus according to Rowan scheme while 'K' is paid bonus according to Halsey scheme. The

time allowed to make the product is 50 hours. 'S' takes 30 hours while 'K' takes 40 hours to complete the product. The factory overhead rate is ₹ 5 per person-hour actually worked. The factory cost of product manufactured by 'S' is ₹ 3,490 and for product manufactured by 'K' is ₹ 3,600.

Required:

- Compute the normal rate of wages
- Compute the material cost
- Prepare a statement comparing the factory cost of the product as made by two workers.

Solution

Let x be the cost of material and y be the normal rate of wages per hour

Statement of Factory Cost

Particulars	Worker S	Worker K
Material	₹ x	₹ x
Wages	30y	40y
Bonus (A = $30y \times 20/50$) (B = $10y \times 50\%$)	$(50-30) \times y \times \frac{30}{50} = 12y$	$(50-40) \times y \times \frac{50}{50} = 10y$
Overheads @ ₹ 5 per person hour worked	$30 \times 5 = 150$	$40 \times 5 = 200$
	$x + 42y + 150$	$x + 45y + 200$

The following two equations can be made

$$x + 42y + 150 = ₹ 3,490 \quad \dots(i)$$

$$x + 45y + 200 = ₹ 3,600 \quad \dots(ii)$$

On subtracting equation (i) from equation (ii)

$$3y + 50 = 110$$

$$\text{or } 3y = 110 - 50$$

$$y = 60/3 = 20$$

On substituting the value of y in equation (i)

$$x + 840 + 150 = 3,490$$

$$\text{or } x = 3,490 - 990$$

$$\text{or } x = 2,500$$

Thus:

(a) Normal Wage Rate is ₹ 20 per hour

(b) Cost of material used for the product is ₹ 2,500

(c) Statement of Cost

Particulars	Worker S	Worker K
Material	2,500	2,500
Wages	600	800
Bonus	240	100
Overheads @ ₹ 5 per person hour worked	150	200
	3,490	3,600

Question – 9

Mr. S is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of this assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

Hourly rate of wages (guaranteed)	₹ 2.00 ✓
Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours ✓
No. of working day in the month	25
No. of working hours per day for each worker	8
Actual production during the month	1,250 units

Required:

- Calculate effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.
- Calculate the savings to Mr. S in terms of direct labour cost per piece under the above schemes.
- Advise Mr. S about the selection of the scheme to fulfill his assurance.

Solution

Actual hours = $25 \times 8 \times 10 = 2000$; Standard hours = $1,250 \times 2 = 2,500$; Wage rate = 2

$$(a) \text{ Earning under Halsey scheme} = (2,000 \times 2) + \left\{ \frac{50}{100} \times (2,500 - 2,000) \times 2 \right\} = ₹ 4,500 \checkmark$$

$$\text{Effective hourly rate of earnings under Halsey Plan} = \frac{4,500}{2,000 \text{ hours}} = ₹ 2.25$$

$$\text{Earnings under Rowan plan} = (2,000 \times 2) + \left\{ \left(\frac{2,000}{2,500} \right) \times (2,500 - 2,000) \times 2 \right\} = ₹ 4,800$$

$$\text{Effective hourly rate of earnings under Rowan Plan} = \frac{4,800}{2,000 \text{ hours}} = ₹ 2.40$$

$$(b) \text{ Labour cost per piece under time wage system} = 2 \times 2 = ₹ 4 \checkmark$$

$$\text{Labour cost per piece under Halsey} = \frac{4,500}{1,250} = ₹ 3.60 \checkmark$$

$$\text{Savings per piece under Halsey Scheme} = 4 - 3.60 = ₹ 0.40$$

$$\text{Labour cost per piece under Rowan} = \frac{4,800}{1,250} = ₹ 3.84 \checkmark$$

$$\text{Savings per piece under Rowan Scheme} = 4 - 3.84 = ₹ 0.16$$

- (c) As per above, it is better for Mr. S to adopt Halsey Scheme but since he has assured workers of an average 20% increase over the present earnings, he will have to select Rowan Scheme as is evident from the following:

$$\text{Increase in earning under Halsey Scheme} = \frac{4,500 - 4,000}{4,000} \times 100 = 12.5\% \checkmark$$

$$\text{Increase in earning under Rowan Scheme} = \frac{4,800 - 4,000}{4,000} \times 100 = 20\% \rightarrow \text{select}$$

Question – 10

A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Production in units:			
- Product S	210	-	600
- Product K	360	-	1350
- Product M	460	250	-
Standard time allowed per unit of each product is:			
Minutes	S (Rs. 15) 15	K (Rs. 20) 20	M (Rs. 30) 30

For the purpose of piece rate, each minute is valued at ₹ 1/-

You are required to calculate the wages of each worker under:

- Guaranteed hourly rate basis
- Piece rate earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay).
- Premium bonus basis where the worker received bonus based on Rowan scheme.

Solution

(a) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked	Hourly wage rate	Wages (₹)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(b) Computation of wages of each worker under piece work earning basis

Product	Piece rate per unit	Worker-I		Worker-II		Worker-III	
		Units	Wages	Units	Wages	Units	Wages
S	15	210	3,150	-	-	600	9,000
K	20	360	7,200	-	-	1,350	27,000
M	30	460	13,800	250	7,500	-	-
Total			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. ₹ 24,150, ₹ 7,500 and ₹ 36,000 respectively.

(c) Computation of wages of each worker under Rowan scheme

$$[(S-H) \times R \times \frac{H}{S}]$$

Worker	Time Allowed (S)	Time Taken (H)	Time Saved (S-H)	Wage rate per hour (P)	Earnings (H × P)	Bonus	Total Earning (Earnings + Bonus)
I	402.5	380	22.5	40	15,00	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

Working Notes:

(1) Piece rate per unit

Product	Standard time per unit in minute	Piece rate per minute	Piece rate per unit
S	15	1	15
K	20	1	20
M	30	1	30

(2) Time allowed to each worker

Worker	Product S	Product K	Product M	Total hours
I	$210 \times 15 = 3,150$	$360 \times 20 = 7,200$	$460 \times 30 = 13,800$	$24,150 \div 60 = 402.5$
II	-	-	$250 \times 30 = 7,500$	$7,500 \div 60 = 125$
III	$600 \times 15 = 9,000$	$1,350 \times 20 = 27,000$	-	$36,000 \div 60 = 600$

- (3) Bonus of worker -I under Rowan = $\frac{380}{402.50} \times 22.5 \times 40 = 850$
 Bonus of worker -II under Rowan = $\frac{100}{125} \times 25 \times 50 = 1,000$
 Bonus of worker -III under Rowan = $\frac{540}{600} \times 60 \times 60 = 3,240$

Employee Cost & Direct Expenses

MCQs

- Q(1). Idle time is the time under which-
A. Full wages are paid to workers
☒ C. Both (a) & (b) Ab.
B. No productivity is given by the workers
D. None of the above
- Q(2). Cost of idle time due to non-availability of raw material is-
A. charged to overhead costs -
☒ C. charged to costing profit & loss account
B. charged to respective jobs -
D. None of the above
- Q(3). Time and motion study is conducted by-
A. Time keeping department -
C. Payroll department -
B. Personnel department -
☒ D. Engineering department
- Q(4). Identify, which one of the following, does not account for increasing labour productivity:
A. Job satisfaction
☒ C. High labour turnover
B. Motivating workers
D. Proper supervision and control
- Q(5). Labour turnover is measured by-
☒ A. Number of persons replaced ÷ average number of workers
B. Number of persons separated ÷ number of workers at the beginning of the year
C. (Number of persons replaced + number of persons separated) ÷ number of persons at the beginning + number of persons at the end of the year
D. None of the above
- Q(6). Time booking refers to a method wherein _____ of an employee is recorded
A. Attendance
C. Health status
B. Food expenses
☒ D. Time spent on a particular job
- Q(7). Employee cost includes:
A. Wages and salaries
C. Payment for overtime
B. Allowance and incentives
☒ D. All of the above
- Q(8). If the time saved is less than 50% of the standard time, then the wages under Rowan and Halsey premium plan on comparison gives-
☒ A. More wages to workers under Rowan plan than Halsey plan
B. More wages to workers under Halsey plan than Rowan plan
C. Equal wages under two options
D. None of the above
- Q(9). Important factors for control of employee cost can be-
A. Time and motion study ✓
C. Control over employee turnover ✓
B. Control over idle time and overtime ✓
☒ D. All of the above
- Q(10). Out of the following methods attendance is marked by recognizing an employee based on physical and behavioral traits-
A. Punch-card attendance method
C. Attendance register method
☒ B. Bio-metric attendance system
D. Token method
- Q(11). If overtime is required for meeting urgent orders, the overtime premium should be charged as:
☒ A. Respective job
C. Costing P&L A/c
B. Overhead cost
D. None of the above
- Q(12). Standard time of a job is 60 hours, and guaranteed time rate is ₹ 0.30 per hour. What is the amount of wages under Rowan plan if jobs is completed in 48 hours?
A. ₹ 16.20
C. ₹ 18.00
☒ B. ₹ 17.28
D. ₹ 14.40

$$(48 \times 0.30) + (60 - 48)(0.30)\left(\frac{48}{60}\right) = 17.28$$

OVERHEADS - CONCEPTS

1. Overheads = Ind. Mat. + Ind. Labour + Ind. Exp.

It is the total of indirect material, indirect labour and indirect expenses.

2. Steps for Overheads

(A) Estimation and Distribution ✓

(B) Recovery Rate

(C) Under or Over Recovery

3. Types of Department

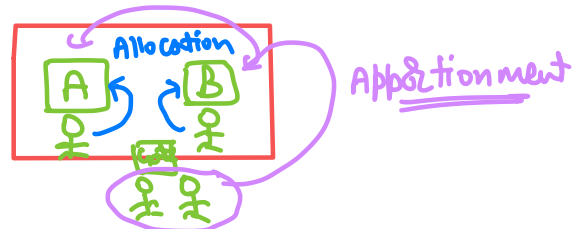
(A) Production Department – Involved in manufacturing of goods or services

(B) Service Department – Help production department in performing their services

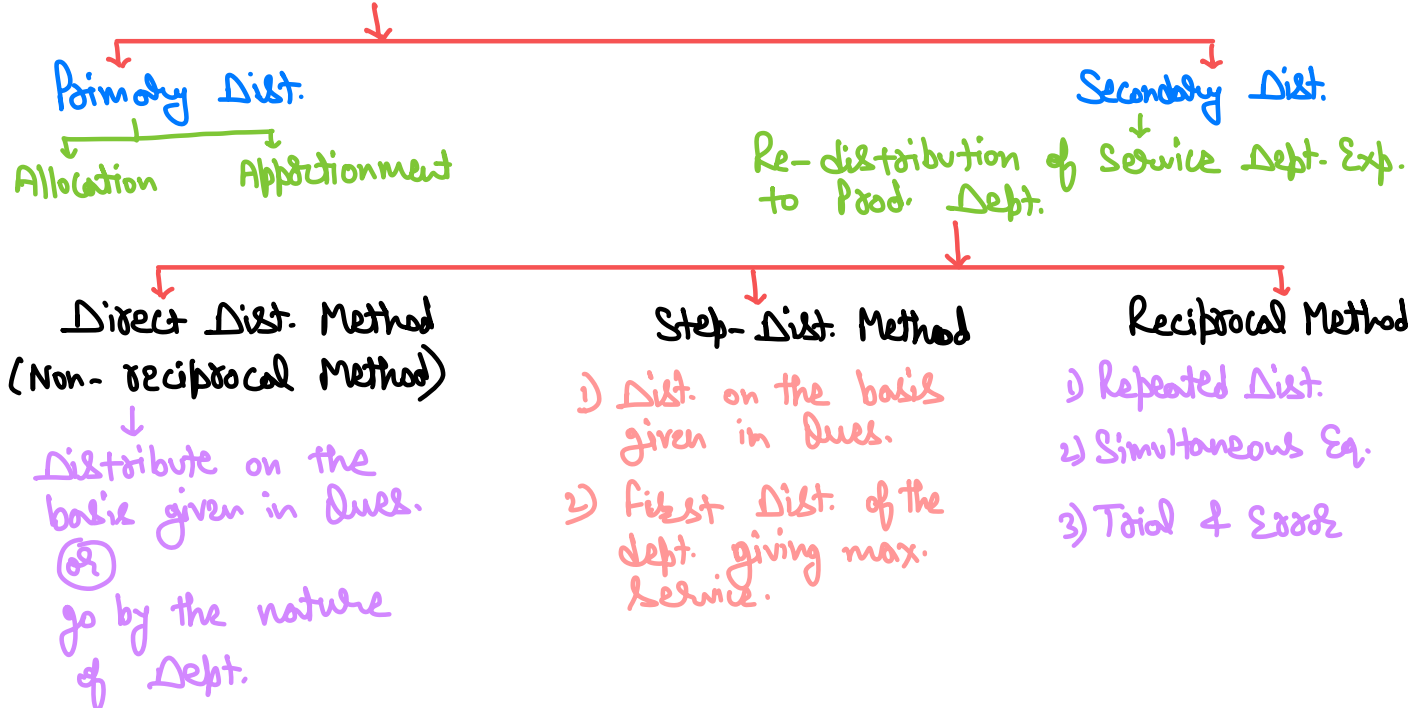
4. Distribution

→ (A) Allocation ✓

→ (B) Apportionment



5. Overheads Distribution



6. Overheads Distribution Statement

<u>Particulars</u>	<u>Basis</u>	<u>Prod. Dept</u>			<u>Service Dept</u>	
		<u>A</u>	<u>B</u>	<u>C</u>	<u>X</u>	<u>Y</u>
* <u>Direct Cost</u>	<u>Allocation</u>	x	x	x	✓	✓
<u>Identified Exp.</u>	<u>Allocation</u>	✓	✓	✓	✓	✓
<u>Common Exp.</u>	<u>Apportion</u>	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
<u>Cost of Dept. X</u>	<u>Apportion</u>	✓	✓	✓	(✓)	✓
<u>Cost of Dept. Y</u>	<u>Apportion</u>	✓	✓	✓	✓	(✓)
<u>Total</u>		✓	✓	✓	NIL	NIL

7. Recovery Rate

Rate at which overheads are recovered/absorbed/charged

$$\text{Recovery Rate} = \text{Pre-determined absorption rate} = \frac{\text{Budgeted overheads}}{\text{Budgeted recovery base}}$$

8. Type of Recovery Rate

$$(A) \text{ Direct Material Cost \% Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Material Cost}} \times 100$$

$$(B) \text{ Direct Labour Cost \% Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Labour Cost}} \times 100$$

$$(C) \text{ Direct Prime Cost \% Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Prime Cost}} \times 100$$

$$(D) \text{ Unit Cost Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Production Units}}$$

$$(E) \text{ Labour Hour Rate Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Labour Hours}}$$

$$\Rightarrow (F) \text{ Machine Hour Rate Method} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Machine Hours}}$$

9. Machine Hour Rate

It is applied in case of capital intensive units.

All overheads are divided into Fixed/Standing Charges and Variable/Running Charges

<u>Particulars</u>	<u>St. of Mach. Hour Rate</u>	<u>Amount</u>
<u>Fixed/Standing</u>	Rent ✓	✓
	Insurance ✓	✓
	Salary ✓	✓
	Electricity [If Power in var.] ✓	✓
	Dep. [If fixed] (A) _____	_____
<u>Variable/Running</u>	Power / Electricity ✓	✓
	Depreciation [If var.] (B) _____	_____
	TC (A+B) ✓	✓
	Effective Mach. Hrs. ✓	✓
	Mach. Hr. Rate _____	_____

10. Points to Remember (PTR)

(A) Depreciation
 → If Life is given in Years → Fixed
 → If Life is given in hours → variable

(B) Effective Machine Hours = Total Hours - Normal idle hours

(C) Normal Idle Time - Hours during which work is not done e.g. maintenance, setup, lunch etc.

(D) Unless otherwise provided, following points are to be assumed for setup hours:

- No electricity/Power is consumed these hours
- These hours are considered to be un-productive

	<u>Productive</u>	<u>Power Usage</u>	<u>Effective Hrs.</u>	<u>Power Hrs.</u>
→	Yes	Yes	Include	Include
→	Yes	No	Include	Exclude
→	No	Yes	Exclude	Include
→	No	No	Exclude	Exclude

11. Dual Recovery Rate/ Two-tier Machine Hour Rate

It is to be used in following situation:

- (A) When question mention to use
- (B) Job charge is for separation and operation separately

In this case set-up hours are considered to be productive

For FC per machine hour – Use total hours (Production + Set-up)

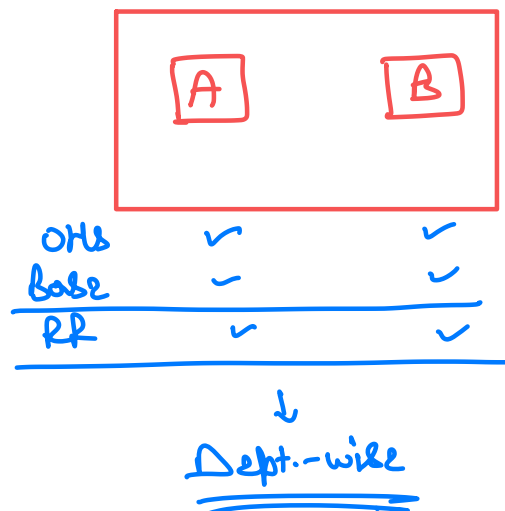
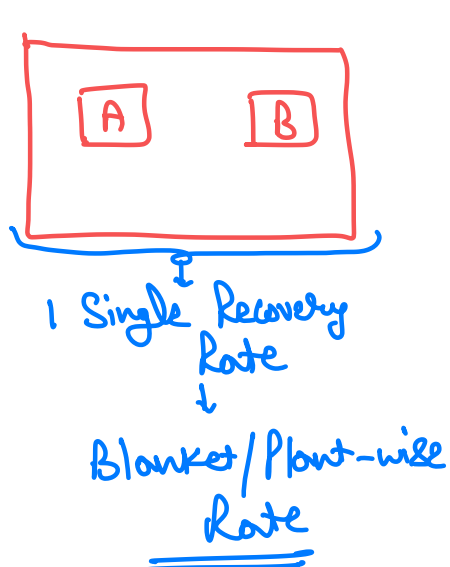
FC per machine hour will remain same for both i.e. operation and set-up

VC will be computed separately for both production and set-up.

12. Type of Recovery Rate

(A) Departmental recovery rate = $\frac{\text{Overheads of department}}{\text{Base value of department}}$

(B) Blanket or plant-wise recovery rate = $\frac{\text{Overheads of Factory}}{\text{Base value of Factory}}$



13. Under or Over Recovery of Overheads

$$\text{Recovered OHs} = \text{Actual Base Value} \times \text{RR}$$

$$\text{Actual OHs} = \checkmark$$

↓
Compare

Actual OH > Recovered OH

Under Recovered OH (Loss)

$$= \text{Actual OH} - \text{Rec. OH}$$

Actual OH < Recovered OH

Over Recovered OH (Pft.)

$$= \text{Rec. OH} - \text{Actual OH}$$

↓
Treatment

Due to def. Plan.
& foc. ineffy.

(Under)

Costing P&L A/c Dr.
To OH Control A/c

(Over)

OH Control A/c Dr.
To C. P&L A/c

Due to seasonal
nature of bus.

↓
No Entry is req.

↓
Balances are
c/f to the next
Period

Due to change in price
level

(Under)

Cost of Sales A/c Dr.
By Ledger Cont. A/c Dr.
WIP Led. Cont. A/c Dr.
To OH Control A/c

(Over)

vice-versa

↓

$$\text{Supplementary Rate} = \frac{\text{Under/over Recovery}}{\text{Equivalent units of FG}}$$

OVERHEADS QUESTIONS

Question – 1

From the following information work out the production hour rate of recovery of overheads in Departments A, B and C by using (1) Simultaneous equation method; (2) Repeated distribution method; (3) Trial & Error Method

Item	Total	Production Department			Service Department	
		A	B	C	D	E
Rent	1,000	200	400	150	150	100
Electricity	200	50	80	30	20	20
Fire Insurance	400	80	160	60	60	40
Plant Depreciation	4,000	1,000	1,500	1,000	300	200
Transport	400	50	50	50	100	150
Estimated Working Hours		1,000	2,500	1,800		

Expenses of the Service departments D and E are apportioned as under:

	A	B	C	D	E
D	30%	40%	20%	-	10%
E	10%	20%	50%	20%	-

Solution

1. Simultaneous Equation Method

Statement of Overhead Distribution

Particulars	Basis	Production Departments			Service Departments	
		A	B	C	D	E
Rent	Allocation	200	400	150	150	100
Electricity	Allocation	50	80	30	20	20
Fire Insurance	Allocation	80	160	60	60	40
Plant Depreciation	Allocation	1,000	1,500	1,000	300	200
Transport	Allocation	50	50	50	100	150
Total		1,380	2,190	1,290	630	510
Cost of department D (w.n.-1)	Appportionment	224	299	149	(747)	75
Cost of department E (w.n.-1)	Appportionment	- 59	- 117	- 292	- 117	(585)
Total (A)		1,663	2,606	1,731	-	-
Estimated working hours (B)		1,000	2,500	1,800	-	-
Overheads rate per hour (A ÷ B)		1.663	1.0424	0.9617	-	-

Working note – 1

Let D = Total expenses of service department 'D' to be apportioned

Let E = Total expenses of service department 'E' to be apportioned

Thus,

$$\begin{cases} D = 630 + (0.2)E \\ E = 510 + (0.1)D \end{cases}$$

Solving above equations, we get, D = 747 (approx.) and E = 585 (approx.)

2. Repeated Distribution Method

Statement of Overhead Distribution

Particulars	Basis	Production Departments			Service Departments	
		A	B	C	D	E
Rent	Allocation	200	400	150	150	100
Electricity	Allocation	50	80	30	20	20
Fire Insurance	Allocation	80	160	60	60	40
Plant Depreciation	Allocation	1,000	1,500	1,000	300	200
Transport	Allocation	50	50	50	100	150
Total		1,380	2,190	1,290	630	510
Cost of department D	30:40:20:10	189	252	126	(630)	63
		1569	2442	1416	-	573
Cost of department E	10:20:50:20	57	114	287	115	(573)
		1626	2556	1703	115	-
Cost of department D	30:40:20:10	35	45	23	(115)	12
		1661	2601	1726	-	12
Cost of department E	10:20:50:20	1	3	6	2	(12)
		1662	2604	1732	2	-
Cost of department D	30:40:20:10	1	1	-	(2)	-
Total (A)		1,663	2,605	1,732	-	-
Estimated working hours (B)		1,000	2,500	1,800	-	-
Overheads rate per hour (A ÷ B)		1.633	1.0424	0.9617	-	-

3. Trial & Error Method

Statement of Overhead Distribution

Particulars	Basis	Production Departments			Service Departments	
		A	B	C	D	E
Rent	Allocation	200	400	150	150	100
Electricity	Allocation	50	80	30	20	20
Fire Insurance	Allocation	80	160	60	60	40
Plant Depreciation	Allocation	1,000	1,500	1,000	300	200
Transport	Allocation	50	50	50	100	150
Total		1,380	2,190	1,290	630	510

Re-distribution of Service department expenses

Particulars	Department D	Department E
Overhead as per primary distribution	630	510
Apportionment of Dept-D expenses to Dept-E (10% of 630)	-	63
Apportionment of Dept-E expenses to Dept-D [20% of (510+63)]	115	-
Apportionment of Dept-D expenses to Dept-E (10% of 115)	-	12
Apportionment of Dept-E expenses to Dept-D (20% of 12)	2	-
Total	747	585

Distribution of Service department's overheads to production department

Particulars	Production Departments		
	A	B	C
Overheads as per primary distribution	1,380	2,190	1,290
Dept-D (90% of 747)	224	299	149
Dept-E (80% of 585)	59	117	292
Total (A)	1,663	2,606	1,731
Estimated working hours (B)	1,000	2,500	1,800
Overheads rate per hour (A ÷ B)	1.663	1.042	0.962

Question – 2

M/s NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the month of May	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to ₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

(Needed Cap) ← Fix 4.20
 Var. (Actual) 8.40

Service Dept. X renders service to A, B and Y in the ratio of 6:4:2 whereas department Y renders service to A and B in the ratio 4:1. The direct labour hours of Department A and B are 67,500 hours and 48,750 hours respectively. Required:

- 1) Prepare overheads distribution sheet
- 2) Calculate factory overhead per labour hour for the department A and B

Solution

Overheads Distribution Sheet

Particulars	Basis	Total Amount	Production Department		Service Department	
			A	B	X	Y
Fixed Overheads	Needed cap. (20:25:15:10)	4,20,000	1,20,000	1,50,000	90,000	60,000
Variable Overheads	Used capacity (16:20:12:8)	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Total		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Cost of Dept. X	6 : 4 : 2		1,35,000	90,000	-(2,70,000)	45,000
Cost of Dept. Y	4: 1		1,80,000	45,000	-	(2,25,000)
Total			6,75,000	5,85,000	-	-
Labour hours			67,500	48,750		
Fact. OH per hr.			₹ 10	₹ 12		

2.25

Question – 3

SK Ltd. manufactures luggage trolleys for airports. The factory, in which the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'. The following information have been extracted from the company's budget for the financial year ended 31st March:

Allocated Overhead Costs	₹
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	₹
Factory rent → Floor Area	15,28,000
Factory building insurance → Floor Area	1,72,000
Plant & machinery insurance →	1,96,000
Plant & Machinery Depreciation →	2,65,000
Subsidy for staffs' canteen →	4,48,000

Direct Costs	₹	₹
Fabrication Department:		
Material	63,26,000	71,88,000
Labour	8,62,000	
Assembly Department:		
Material	1,42,000	14,48,000
Labour	13,06,000	

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department
Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (₹)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	---	---
Maintenance hours required	2,800	2,300	400	---
No. of employees	120	80	38	12
Machine hours	30,00,000	60,000		
Labour hours	70,000	26,00,000		

Required:

- Prepare a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and
- Calculate the most appropriate overhead recovery rate for each department.
- Using the rates calculated in part (b) above, calculate the full production costs of the following job order:

Job number IGI2019

Direct Materials	₹ 2,30,400 ✓
Direct Labour:	
Fabrication Department	240 hours @ ₹ 50 per hour = 12000
Assembly Department	180 hours @ ₹ 50 per hour = 9000
Machine hours required:	
Fabrication Department	210 hours × 1.20 = 252
Assembly Department	180 hours × 0.67 = 120.6

251772.6

Solution

(a) Table of Primary Distribution of Overheads

Particulars	Basis of Apportionment	Total Amount	Production Dept.		Service Dept.	
			Fabrication	Assembly	Stores	Maintenance
OHs Allocated →	Allocation	27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Direct Costs →	Actual	-	-	-	---	---
Other OHs:						
Factory rent	Floor Area ✓ (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory bldg. insurance	Floor Area ✓ (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
P&M insurance	Value of P&M ✓ (66:30:3:7)	1,96,000	1,22,038	55,472	5,547	12,943
P&M Dep.	Value of P&M ✓ (66:30:3:7)	2,65,000	1,65,000	75,000	7,500	17,500
Canteen Subsidy	No. of employees ✓ (60:40:19:6)	4,48,000	2,15,040	1,43,360	68,096	21,504
		53,37,000	30,74,078	14,42,832	4,23,393	3,96,697

Re-distribution of Service Departments' Expenses:

Particulars	Basis of Apportionment	Production Department		Service Departments	
		Fabrication	Assembly	Stores	Maintenance
OH as per Primary distribution	Primary distribution	30,74,078	14,42,832	4,23,393	3,96,697
Maint. Depart. Cost	Maintenance Hours (28:23:4:-)	2,01,955	1,65,891	28,851	(3,96,697)
Stores Department	No. of Stores Requisition (18:7)	32,76,033	16,08,723	4,52,244	---
		3,25,616	1,26,628	(4,52,244)	---
		36,01,649	17,35,351	---	---

(b) Overhead Recovery Rate

Department	Apportioned Overhead (₹)	Basis of Overhead Recovery Rate	Overhead Recovery Rate (₹)
	(I)	(II)	[(I)÷(II)]
Fabrication	36,01,649 ✓	30,00,000 Machine Hours	1.20 per Machine Hour ✓
Assembly	17,35,351 ✓	26,00,000 Labour Hours	0.67 per Labour Hour ✓

(c) Calculation of full production costs of Job no. IGI2014.

Particulars	Amount (₹)
Direct Materials	2,30,400
Direct Labour:	
- Fabrication Deptt. (240 hours × ₹ 50)	12,000
- Assembly Deptt. (180 hours × ₹ 50)	9,000
Production Overheads:	
- Fabrication Deptt. (210 hours × ₹ 1.20)	252
- Assembly Deptt. (180 hours × ₹ 0.67)	121
Total Production Cost	2,51,773

Question – 4

SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (₹)	Area (in Sq. Mtr.)	Number of employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Department:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Meters' and 'Number of Employees' respectively:

You are required to:

- Prepare a statement showing the distribution of expenses of service departments to the main departments using the "Step Ladder Method" of overhead distribution.
- Compute the rate per hour of each Main Department, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

Solution

(i) & (ii)

Overheads Distribution Sheet

Particulars	Basis	Main Department			Service Department	
		Purchase	Packing	Distribution	Maintenance	Personnel
Expenses	Allocation	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Maintenance Department Expenses	Area (12:15:7:6)	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Personnel Department Expenses	No. of Ees (8:17:7)	1,04,000	2,21,000	91,000	-	(4,16,000)
Total		7,96,000	12,61,000	5,53,000	-	-

→ 4.16

Total Hours		$12 \times 365 = 4,380$	$24 \times 365 = 8,760$	$8 \times 365 = 2,920$	-	-
Rate per hour		181.74	143.95	189.38	-	-

Working Note - 1

	Main Department			Service Department	
	Purchase	Packing	Distribution	Maintenance	Personnel
Area (in sq. mtr.)	12	15	7	-	6
% of service rendered by Maintenance Department	30%	37.50%	17.50%	-	15%
Number of Employees	800	1700	700	200	-
% of service rendered by Personnel department	23.53%	50%	20.59%	5.88%	-

The usual method used for ranking the support departments for Step Down Allocation Method is % of Service rendered by one Service Department to another. Based on this, Maintenance Department provides 15% (highest %) of service to Personnel Department. Thus, first maintenance department expenses should be distributed first.

Question – 5

From the following data, work out the predetermined machine hour rates for Departments A and B of a factory:

Preliminary estimates of expenses

	Total (₹)	Dept. A (₹)	Dept. B (₹)
Power	→ 15,000	--	--
Spare Parts	8,000	→ 3,000	→ 5,000
Consumable stores	→ 5,000	2,000	3,000
Depreciation on machinery	→ 30,000	10,000	20,000
Insurance on machinery	→ 3,000	--	--
Indirect labour	→ 40,000 ✓	--	--
Building maintenance	→ 7,000	--	--

$$3000 \times \frac{110}{100} = 3300$$

$$5000 \times \frac{110}{100} \times \frac{120}{100} = 6600$$

The final estimates are to be prepared on the basis of above figures after making into consideration the following factors:

- An increase of 10 per cent in price of spare parts.
- An increase of 20 per cent in the consumption of spare parts for department B only. ✓
- Increase in the straight line method of depreciation from 10 percent on the original value machinery to 12 per cent.
- 15 per cent general increase in wage rates.

The following information is available:

	Dept. A	Dept. B
Estimated direct labour hours ✓	→ 80,000	1,20,000
Ratio of K.W. rating	→ 3	→ 2
Estimated machine hours	25,000	30,000
Floor Space (Sq. ft)	15,000	20,000

Option-1) KW Hours = KW × Hours

Option-2) KW

Solution

Statement of Cost

Particulars	Basis	Dept. A	Dept. B
Power	KW Rating - <u>3:2</u>	✓ 9,000	✓ 6,000
Spare Parts	w.n. 1	✓ 3,300	✓ 6,600
Consumable Stores	Allocation	2,000	3,000
Dep. On machine	w.n. 2	12,000	24,000
Insurance on Machine	Value of machine - <u>1:2</u>	1,000	2,000
Indirect Labour (40,000 + 15% = <u>46,000</u>)	DL Hours - <u>8:12</u>	18,400	27,600
Building Maintenance	Floor space - <u>15:20</u>	3,000	4,000
Total (A)		48,700	73,200
Machine Hours (B)		25,000	30,000
Machine Hr. Rate (A÷B)		1.95	2.44

Working note - 1

Particulars	Dept. A	Dept. B
Spare parts	→ 3,000	5,000
(+) Increase in price @10%	→ 300	500
	3,300	5,500
(+) Increase in consumption@20%	→ -	✓ 1,100
Total	3,300	6,600

Working note - 2

Particulars	Dept. A	Dept. B
Existing Depreciation (A)	→ 10,000	20,000
Value of Machine (A ÷ 10%)	→ 1,00,000	2,00,000
New Depreciation @ 12%	→ 12,000	24,000

Question – 6

A manufacturing unit has purchased and installed a new machine at a cost of ₹ 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realize ₹ 90,000 as scrap value at the end of its working life.

$$\text{Eff. M.Hr.} = \frac{2496 - 312}{12} = 2184$$

$$\left[\frac{24900 - 09000}{12} \right]$$

Other relevant data are as follows:

- Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set-up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.
- An estimated cost of maintenance of the machine is ₹ 2,40,000 pa.a
- The machine requires a component to be replaced every week at a cost of ₹ 2,400.
- There are three operators to control the operations of all the 6 machines. Each operator is paid ₹ 30,000 per month plus 20% fringe benefits.

$$\text{Wages} = \frac{30000 \times 12 \times 3}{6} = 1.80$$

$$\text{Fringe} = 1.80 \times 20\% = 0.36$$

$$\begin{aligned}
 \text{Prod.} &= 2184 \times 60 \times 6 = 786240 \\
 \text{Set-up} &= 312 \times 60 \times 6 = 112320 \\
 \text{Maint.} &= 416 \times 10 \times 6 = 24960 \\
 &\underline{923520} \div 2184 = \underline{422.86}
 \end{aligned}$$

- (v) Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is ₹ 6.
- (vi) Departmental and general works overhead allocated to the operation during last year was ₹ 5,00,000. During the current year it is estimated to increase by 10%.

Required to compute the machine hour rate.

Solution

Effective machine hours = 2,496 – 312 = 2,184 hours

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Depreciation $\left[\frac{24,90,000 - 90,000}{12} \right]$	2,00,000
Operator's salary $[30,000 \times 3 \times 12 \times (1/6)]$	1,80,000
Fringe Benefits $(1,80,000 \times 20\%)$	36,000
Department & General Overheads $[5,00,00 \times 110\% \times (1/6)]$	91,667
Fixed expenses	5,07,667
Effective machine hours	2,184
Fixed expenses per machine hour	232.45
Variable Expenses per machine hour	
Maintenance $(2,40,000 \div 2,184)$	109.89
Replacement cost $\left(2,400 \times \frac{312}{6} \times \frac{1}{2,184} \right)$	57.14
Electricity during production $[(2,496 \times 60 \times 6) \div 2,184]$	411.43
Electricity during maintenance $[(416 \times 10 \times 6) \div 2,184]$	11.43
Machine hour rate	822.34

Question – 7

Calculate Machine Hour Rate from the following particulars:

- Cost of Machine ₹ 25,00,000
- Salvage Value - ₹ 1,25,000
- Estimated life of the machine - 25,000 Hours
- Working Hours (per annum) - 3,000 Hours
- Hours required for maintenance - 400 Hours
- Setting-up time required - 8% of actual working hours

Additional Information:

- (a) Power 25 units @ ₹ 5 per unit per hour.
- (b) Cost of repairs and maintenance ₹ 26,000 per annum.
- (c) Chemicals required for operating the machine ₹ 2,600 per month.
- (d) Overheads chargeable to the machine ₹ 18,000 per month.
- (e) Insurance Premium (per annum) 2% of the cost of machine
- (f) No. of operators - 02 (looking after three other machines also)

$$\begin{aligned}
 \text{Let Eff. Hrs.} &= y \\
 \therefore \text{Set-up} &= \frac{8}{100} \times y = 0.08y \\
 \text{Eff. Hrs.} &= 3000 - 400 - 0.08y \\
 y &= 2600 - 0.08y \\
 \underline{y} &= \underline{2407}
 \end{aligned}$$

$$\frac{18500 \times 12 \times 2}{4} =$$

(g) Salary per operator per month ₹ 18,500

Solution

Let effective machine hours = y

∴ set-up time = (0.08)y

Thus, $y = 3,000 - 400 - (0.08)y$

y = 2,407

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Chemicals ($2,600 \times 12$)	→ 31,200
Overheads ($18,000 \times 12$)	2,16,000
Insurance ($25,00,000 \times 2\%$)	50,000
Salary ($\frac{18,500 \times 12 \times 2}{4}$)	1,11,000
Fixed expenses	→ 4,08,200
Effective machine hours	→ 2,407
Fixed expenses per machine hour	<u>169.59</u>
Variable Expenses per machine hour	
Depreciation ($\frac{25,00,000 - 1,25,000}{25,000}$)	<u>95</u>
Repair & Maintenance ($26,000 \div 2,407$)	10.80
Power (25×5)	125
Machine hour rate	<u>400.39</u>

Question – 8

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator

Absenteeism (without pay) hours per operator

Leave (with pay) hours per operator

Normal unavoidable idle time – hours per operator

Average rate of wages per day of 8 hours per operator

Production bonus estimated

Power consumed

Supervision and Indirect Labour

Lighting and Electricity

The following particulars are given for a year:

Insurance

Sundry work Expenses

Management Expenses allocated

Depreciation

208
18
20
10
→ ₹ 100
10% on wages → 10%
→ ₹ 40,250
→ ₹ 16,500
→ ₹ 6,000
→ ₹ 3,60,000 ✓
→ ₹ 50,000 ✓
→ ₹ 5,00,000 ✓
→ 10% on the original cost

$(208 - 18 - 20 - 10) \times 6 = 960$ Per Month for 6 Month

$\rightarrow [(208 - 18) \times 6 \times \frac{100}{8}]$

Repairs and Maintenance (including consumables)

→ 5% of the value of all the machines

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

Solution

$$\text{Effective machine hour} = (208 \times 6 \times 6) - [(18 - 20 - 10) \times 6] = 7,200$$

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Wages [$\{(208 \times 6 \times 6) - (18 \times 6)\} \times (100/8)$]	✓ 92,250
Bonus ($92,250 \times 10\%$)	✓ 9,225
Supervision	✓ 16,500
Lighting and electricity	✓ 6,000
Insurance [$3,60,000 \times (6/12)$]	✓ 1,80,000
Depreciation [$32,00,000 \times 10\% \times (6/12)$]	✓ 1,60,000
Sundry work expenses [$50,000 \times (6/12)$]	✓ 25,000
Management expenses allocated [$5,00,000 \times (6/12)$]	✓ 2,50,000
Fixed expenses	7,38,975
Effective machine hours	→ 7,200
Fixed expenses per machine hour	102.64
Variable Expenses per machine hour	
Repair & Maintenance ($32,00,000 \times 5\% \times \frac{6}{12} \times \frac{1}{7200}$)	11.11
Power ($\frac{40,250}{7,200}$)	5.59
Machine hour rate	119.34

Question – 9

ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal following information:

Budgeted production overheads

→ ₹ 10,35,000

Budgeted machine hours

→ 90,000

Actual machine hours worked

→ 45,000

Actual production overheads

→ ₹ 8,80,000

Production overheads (actual) include –

Paid to worker as per court's award

→ ₹ 50,000

Wages paid for strike period

→ ₹ 38,000

Stores written off

→ ₹ 22,000

Expenses of previous year booked in current year

→ ₹ 18,500

Production –

Finished goods

✓ 30,000 units

Sale of finished goods

✓ 27,000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

RR = 11.50

Recovered = 517500

Actual = 751500

128500

3000 cl. St-

- (i) To find out the amount of under absorbed production overheads.
- (ii) To give the ways of treating it in Cost Accounts
- (iii) To apportion the under absorbed overheads over the items.

Solution

	Amount (₹)
Total production overheads actually incurred during the period	8,80,000 ✓
Less: Amount paid to worker as per court order	50,000
Less: Expenses of previous year booked in current year	18,500
Less: Wages paid for the strike period under reward	38,000
Less: Obsolete material written off	22,000
	(1,28,500) ✓
	→ 7,51,500 ✓
Less: Production overheads absorbed (45,000 x ₹ 11.5)	→ 5,17,500 ✓
<u>Under recovered overheads</u>	<u>2,34,000</u> ✓
Budgeted machine hour rate = $\frac{10,35,000}{90,000 \text{ hours}}$	₹ 11.50 per hour

(ii) As one third of the under absorbed overheads i.e. ₹ 78,000 (₹ 2,34,000 × 1/3) were due to defective production policies, this being abnormal, hence should be debited to profit and loss account.

(iii) Amount of balance under absorbed overheads = ₹ 2,34,000 – 78,000 = ₹ 1,56,000 ✓

$$\text{Supplementary rate} = \frac{1,56,000}{30,000 \text{ units}} = ₹ 5.20 \text{ per equivalent unit}$$

	Amount (₹)
<u>Cost of Sale</u>	
Finished stock (27,000 units × 5.20)	→ 1,40,400
<u>FG</u> Cost of sales (3,000 units × 5.20)	→ 15,600
Total	<u>1,56,000</u>

COS A/c	Dr.	140400
FG LC A/c	Dr.	15600
To OH Cont. A/c		156000

<u>Impact on Profit</u>		
	<u>Under</u>	<u>Over</u>
COS	→ Decrease	Increase
FG LC	→ Increase	Decrease
WIP LC	→ Increase	Decrease

Overheads

MCQs

Q(1). "Fixed overhead costs are not affected in monetary terms during a given period by a change in output". But this statement holds good provided:

- ☒ A. Increase in output is not substantial ✓
- ☐ B. Increase in output is substantial
- ☐ C. Both (a) & (b)
- ☐ D. None of the above

Q(2). ____ capacity is defined as actually utilized capacity of plant.

- ☐ A. Theoretical
- ☒ C. Practical ✓
- ☐ B. Installed
- ☐ D. Normal

Q(3). The allotment of whole items of cost centres or cost units is called:

- ☒ C. Cost allocation ✓
- ☐ A. Overhead absorption
- ☐ B. Cost apportionment
- ☐ D. None of the above

Q(4). Primary packaging cost is a part of:

- ☐ A. Direct material cost ✓
- ☒ B. Production cost ✓
- ☐ C. Selling overheads
- ☐ D. Distribution overheads

Q(5). Director's remuneration and expenses form part of:

- ☒ B. Administration overheads ✓
- ☐ A. Production overheads
- ☐ C. Selling overheads
- ☐ D. Distribution overheads

Q(6). Which of the following is not the classification of overhead based on its functionality?

- ☒ C. Fixed overhead ✓
- ☐ A. Factory overhead
- ☐ B. Administrative overhead ✓
- ☐ D. Selling overhead

Q(7). Bad Debts is an example of:

- ☒ C. Selling overhead ✓
- ☐ A. Distribution overhead
- ☐ B. Production overhead
- ☐ D. Administration overhead

Q(8). Normal capacity of a plant refers to the difference between:

- ☐ A. Maximum capacity and practical capacity
- ☐ B. Practical capacity and normal capacity
- ☒ C. Practical capacity and estimated idle capacity as revealed by long term sales trend ✓
- ☐ D. Maximum capacity and actual capacity

Q(9). The difference between actual factory overhead and absorbed factory overhead will be usually at the minimum level, provided pre-determined overhead rate is based on:

- ☐ A. Maximum capacity
- ☒ D. Normal capacity ✓
- ☐ B. Direct labour hours
- ☐ C. Machine hours

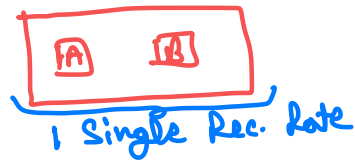
Q(10). Which of the following overhead cost may not be apportioned on the basis of direct wages?

- ☒ A. Worker's holiday pay ✓
- ☒ B. Perquisite to worker ✓
- ☐ C. ESI contribution
- ☒ D. Managerial salaries ✓

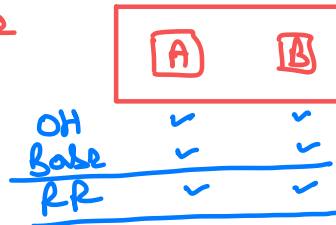
ACTIVITY BASED COSTING - CONCEPTS

1. Background of ABC

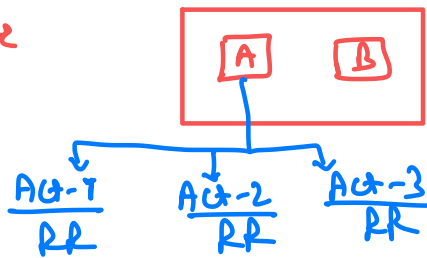
A) Blanket Rate



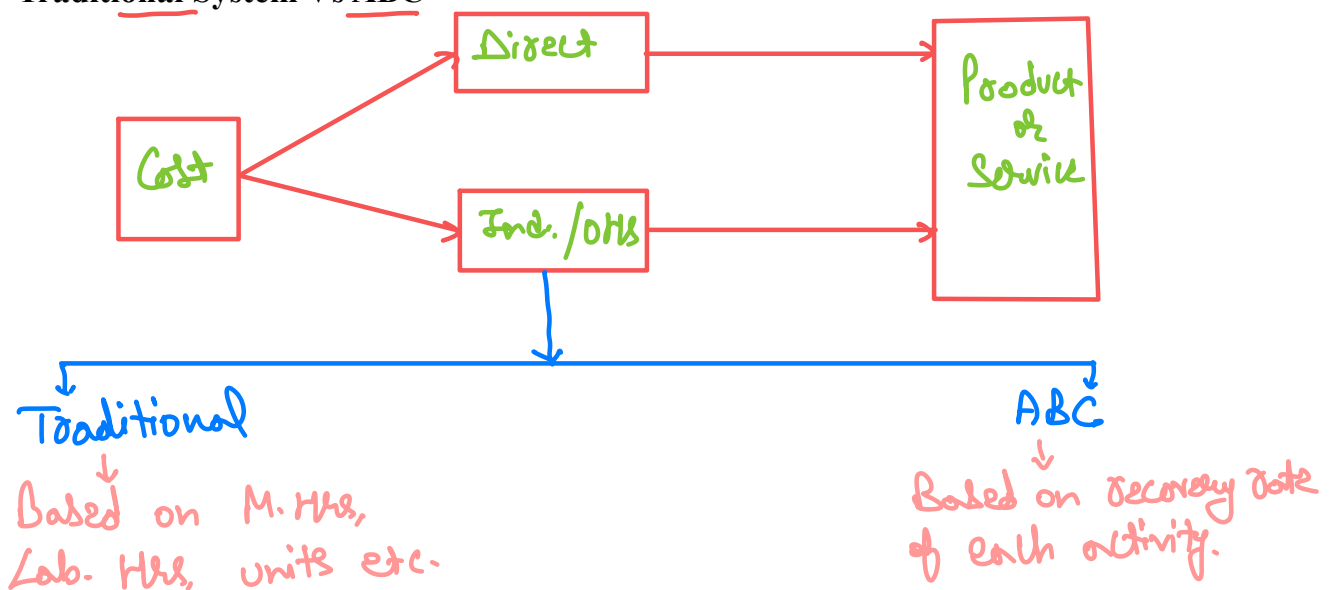
B) Departmental Rate



3) Activity Based Rate



2. Traditional System Vs ABC



3. Cost Pool ✓

It is the total cost of an activity.

4. Cost Driver

It is the base due to which cost changes

5. Steps in ABC

(A) Identify different activities

(B) Identify overheads related to activities

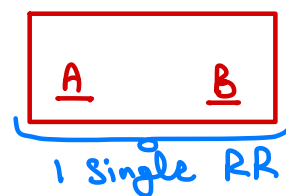
(C) Identify cost drivers

(D) Calculate activity cost driver rate (ACDR)

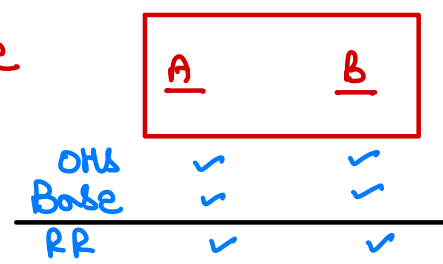
$$\text{ACDR} = \frac{\text{Budgeted Overheads of activity}}{\text{Budgeted Cost Driver}}$$

(E) Recover overheads based on ACDR

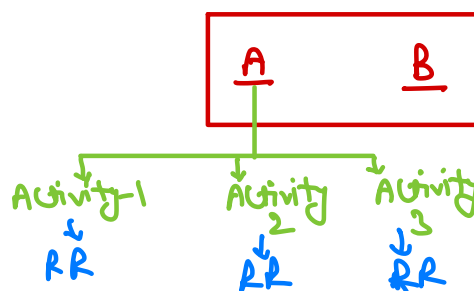
A) Blanket Rate



B) Departmental Rate



C) Activity Based



ACTIVITY BASED COSTING QUESTIONS

Question – 1

PQR Pens Ltd. manufactures two products – ‘Gel Pen’ and ‘Ball Pen’. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	₹
Volume related activity costs → Mac. Hr.	4,75,020
Set up related costs → No. of Set-up	5,79,988
Purchase related costs → Purch. order	5,04,992

→ 15,60,000 ✓

Calculate the overhead cost per unit of each Product – Gel Pen and Ball Pen on the basis of:

- Traditional method of charging overheads
- Activity based costing method and
- Find out the difference in cost per unit between both the methods.

Solution

(i) Calculation of cost under Traditional Approach:

$$\text{Overheads rate per Machine hour} = \frac{\text{Total overheads}}{\text{Total machine hours}} = \frac{15,60,000}{24,000 + 54,000} = ₹ 20 \text{ per machine hour}$$

Statement of Cost

Particulars	Gel Pen	Ball Pen
Overheads absorbed (A)	$20 \times 24,000 = 4,80,000$	$20 \times 54,000 = 10,80,000$
Units (B)	5,500	24,000
Overheads per unit (A ÷ B)	87.27	45

(ii) Statement showing Activity Based Cost

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Gel Pen (₹)	Ball Pen (₹)
Volume Related Activity Costs	Machine Hour	24:54	4,75,020	1,46,160	3,28,860
Set-up Related Costs	No. of Set-ups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Costs				5,24,641	10,35,359
Output (Units)				5,500	24,000
Cost per unit				95.39	43.13

(iii) Statement of Difference in Cost

Particulars	Gel Pen	Ball Pen
-------------	---------	----------

Overheads cost per unit (₹) – Traditional Approach	87.27	45
Overheads Cost per unit (₹) – ABC	95.39	43.13
Difference per unit	-8.12	+1.87

under over

Question – 2

SK Ltd. has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity:

Activity	Cost Driver	Capacity	Cost	ACDR
Power	Kilowatt hours	50,000 kilowatt hours	₹ 40,00,000	80 ✓
Quality inspections	No. of inspections	10,000 inspections	₹ 60,00,000	600 ✓

The company makes three products S, K and M. For the year ended March 31, 2021, the following consumption of cost driver was reported:

Product	Kilowatt Hours	Quality Inspections
S	10,000	3,500
K	20,000	2,500
M	15,000	3,000

Required:

- Compute the costs allocated to each product from each activity
- Calculate the cost of unused capacity for each activity
- Discuss the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

Solution

(a) Power per Kilowatt Hours = $\frac{\text{Power cost}}{\text{Kilowatt Hours}} = \frac{40,00,000}{50,000} = ₹ 80 \text{ per Kwh}$

Quality Inspection per inspection = $\frac{\text{Quality Inspection Cost}}{\text{No. of inspections}} = \frac{60,00,000}{10,000} = ₹ 600 \text{ per inspection}$

Statement of Cost

Particulars	Product S	Product K	Product M	Total
Power cost	$10,000 \times 80 = 8,00,000$	$20,000 \times 80 = 16,00,000$	$15,000 \times 80 = 12,00,000$	36,00,000
Quality inspection cost	$3,500 \times 600 = 21,00,000$	$2,500 \times 600 = 15,00,000$	$3,000 \times 600 = 18,00,000$	54,00,000

(b) Statement showing calculation of unused capacity

Particulars	Capacity (A)	Utilized (B)	Unutilized (A – B)
Power cost	→ 40,00,000	→ 36,00,000	✓ 4,00,000
Quality inspection cost	→ 60,00,000	→ 54,00,000	✓ 6,00,000

(c) The factors considered by management in choosing a capacity level are as follows:

- Effect on product costing and cost management
- Effect on pricing decision
- Effect on performance evaluation

- Effect on financial statement
- Effect on difficulty in forecasting

Question – 3

SK is a global brand created by SK Ltd. The company manufactures three range of beauty soaps i.e. SK-Gold, SK-Pearl, and SK-Diamond. The budgeted costs and production for the month of March, 2021 are as follows:

	SK-Gold ✓		SK-Pearl ✓		SK-Diamond ✓	
Production of soaps (Units)	✓ 4,000		✓ 3,000		✓ 2,000	
Resources per Unit:	Qty	Rate	Qty	Rate	Qty	Rate
- Essential Oils	60 ml	₹ 200 / 100 ml	55 ml	₹ 300 / 100 ml	65 ml	₹ 300 / 100 ml
- Cocoa Butter	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g
- Filtered Water	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml
- Chemicals	10 g	₹ 30 / 100 g	12 g	₹ 50 / 100 g	15 g	₹ 60 / 100 g
- Direct Labour	30 Min.	₹ 10 / hour	40 Min.	₹ 10 / hour	60 Min.	₹ 10 / hour

SK Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at ₹ 1,98,000.

$$[(4000 \times \frac{30}{60}) + (3000 \times \frac{40}{60}) + (2000 \times \frac{60}{60})] = 6000 \rightarrow PR = 3\%$$

Now, SK Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(₹)	Cost drivers
Forklifting cost →	58,000	Weight of material lifted ✓
Supervising cost →	60,000	Direct labour hours ✓
Utilities →	80,000	Number of Machine operations ✓

$$1 \text{ Hr.} = 1 \text{ kg} \\ 1000 \text{ ml} = 1000 \text{ g} \\ 1 \text{ ml} = 1 \text{ g}$$

The number of machine operators per unit of production are 5, 5, and 6 for SK-Gold, SK-Pearl, and SK-Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

- Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.
- Prepare a statement showing the product costs of each product using the ABC approach.
- State what are the reasons for the different product costs under the two approaches?

Solution

(i) Statement of calculation of labour hours

	SK- Gold	SK- Pearl	SK- Diamond	Total
Prod. of soaps (units) (A) →	4,000	3,000	2,000	9,000
Direct labour (min.) (B) →	30	40	60	-

Direct labour hours [(A×B)÷60]	2,000	2,000	2,000	6,000
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Overhead rate per direct labour hour = $\frac{\text{Budgeted overheads}}{\text{Budgeted labour hours}} = \frac{1,98,000}{6,000} = ₹ 33$ per direct labour hour

Statement of cost

	SK – Gold	SK – Pearl	SK – Diamond
Essential oils	$\frac{200 \times 60}{100} = 120$	$\frac{300 \times 55}{100} = 165$	$\frac{300 \times 65}{100} = 195$
Cocoa Butter	$\frac{200 \times 20}{100} = 40$	$\frac{200 \times 20}{100} = 40$	$\frac{200 \times 20}{100} = 40$
Filtered water	$\frac{15 \times 30}{100} = 4.50$	$\frac{15 \times 30}{100} = 4.50$	$\frac{15 \times 30}{100} = 4.50$
Chemicals	$\frac{30 \times 10}{100} = 3$	$\frac{50 \times 12}{100} = 6$	$\frac{60 \times 15}{100} = 9$
Material cost per unit	167.50	215.50	248.50
Direct labour per unit	$\frac{10 \times 30}{60} = 5$	$\frac{10 \times 40}{60} = 6.67$	$\frac{10 \times 60}{60} = 10$
Overheads per unit	$\frac{33 \times 30}{60} = 16.50$	$\frac{33 \times 40}{60} = 22$	$\frac{33 \times 60}{60} = 33$
Total cost per unit	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	7,56,000	7,32,510	5,83,000

(ii)

Calculation of Cost Driver

Activity	Amount(₹) (A)	Cost driver quantity (B)	Cost Driver Rate (A ÷ B)
Forklifting	58,000	Gold – $\{[(60 \times 0.8) + 20 + 30 + 10] \times 4,000\} = 4,32,000$ Pearl – $\{[(55 \times 0.8) + 20 + 30 + 12] \times 3,000\} = 3,18,000$ Diamond – $\{[(65 \times 0.8) + 20 + 30 + 15] \times 2,000\} = 2,34,000$ Total weight = 9,84,000	0.06 per gram
Supervising	60,000	Gold – $\frac{4,000 \times 30}{60} = 2,000$ Pearl – $\frac{3,000 \times 40}{60} = 2,000$ Diamond – $\frac{2,000 \times 60}{60} = 2,000$ Total machine hours = 6,000	10 per machine hour
Utilities	80,000	Gold – $5 \times 4,000 = 20,000$ Pearl – $5 \times 3,000 = 15,000$ Diamond – $6 \times 2,000 = 12,000$ Total operations = 47,000	1.70 per machine operation

Statement of cost

	SK – Gold	SK – Pearl	SK – Diamond
Material cost per unit	167.50	215.50	248.50
Direct labour per unit	$\frac{10 \times 30}{60} = 5$	$\frac{10 \times 40}{60} = 6.67$	$\frac{10 \times 60}{60} = 10$
Forklifting cost per unit	$0.06 \times 108 = 6.48$	$0.06 \times 106 = 6.36$	$0.06 \times 117 = 7.02$

Supervising cost per unit	$\frac{10 \times 30}{60} = 5$	$\frac{10 \times 40}{60} = 6.67$	$\frac{10 \times 60}{60} = 10$
Utilities cost per unit	$1.70 \times 5 = 8.50$	$1.70 \times 6.67 = 11.32$	$1.70 \times 10 = 17.00$
Total cost per unit	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	7,69,920	7,31,100	5,71,440

(iii) Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

Question – 4

PQR Ltd. has decided to analyze the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 45 per case and sells them to retail customers at a list price of ₹ 54 per case. The data pertaining to five customers are given below:

Particulars	Customers				
	A	B	C	D	E
Number of cases sold	9360	14200	62000	38000	9800
List selling price ₹	54	54	54	54	54
Actual selling price	54	53.40	49	50.20	48.60
Number of purchase orders	30	50	60	50	60
Number of customers visits	4	6	12	4	6
Number of deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expedite deliveries	0	0	0	0	2

It's five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 200 per purchase order
Customer visits	₹ 300 per each visit
Deliveries	₹ 4.00 per delivery km travelled
Product Handling	₹ 2.0 per case sold
Expedited deliveries	₹ 100 per each such delivery

You are required to:

- Compute the customer level operating income of each of five retail customers by using the cost driver rates.
- Examine the results to give your comments on Customer 'D' in comparison with Customer 'C' and on Customer 'E' in comparison with Customer 'A'.

Solution

(i) Statement of operating income

Particulars	Customer A	Customer B	Customer C	Customer D	Customer E
-------------	------------	------------	------------	------------	------------

Units	9,360	14,200	62,000	38,000	9,800
Revenue [54 × No. of units]	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
(-) Discount [(List price – Actual price) × No. of units]	-	8,520	3,10,000	1,44,400	52,920
Net revenue	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280
(-) Order taking [200×No. of purch. order]	6,000	10,000	12,000	10,000	12,000
(-) Customer visit [300×No. of visit]	1,200	1,800	3,600	1,200	1,800
(-) Deliveries [4 × km travel × No. of deliveries]	3,200	2,880	4,800	6,400	9,600
(-) Production handling [2 × No. of units]	18,720	28,400	1,24,000	76,000	19,600
(-) Expedited deliveries [100×No. of delivery]	-	-	-	-	200
(-) COGS [45 × No. of units]	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Operating Income	55,120	76,200	1,03,600	1,04,000	(7,920)

(ii) Separate disclosure of revenue helps us to identify the relationship between discount and sales quantity.

<u>Customer</u>	<u>Quantity</u>	<u>Discount</u>	<u>Discount %</u>
A	9,360	-	0%
C	62,000	5	$5 \div 54 = 9.25\%$
D	38,000	3.80	$3.80 \div 54 = 7.03\%$
E	8,775	5.40	$5.40 \div 54 = 10\%$

Customer D gets lower discount as compared to Customer C. It may be due to lower quantity purchased by customer D as compared to Customer C.

Customer E gets higher discount as compared to Customer A. Customer E discount is higher in spite of ordering comparative lower quantity and its reason should be further explored.

Question – 5

A drug store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for the year 2020-21 for each product line:

	Drug Types		
	A	B	C
Revenue (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos)	560	810	630
Number of deliveries received	950	1,000	850

Hours of shelf-stocking time	900	1,250	2,350
Units sold (in nos)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of Activity	Total Cost (₹)	Cost-allocation base
Drug License fee	Drug License fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders
Delivery	Physical delivery and receipt of goods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

- Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:
 - All the support costs (other than cost of goods sold) are allocated in the ratio of cost of goods sold
 - All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.
- Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situation as above.

Solution

(i) (a)

Statement of operating income

Particulars	Drug A	Drug B	Drug C	Total
Revenue (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
COGS	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Gross Margin	33,05,500	43,58,250	65,61,250	1,42,25,000
(-) Operating cost (in COGS Ratio)	16,57,800	27,26,700	48,25,500	92,10,000
Operating Income (B)	16,47,700	16,31,550	17,35,750	50,15,000
Operating income % (B ÷ A)	22.12%	14.60%	9.32%	13.46%

(i) (b)

Statement of Cost

Particulars	Cost (₹) (A)	Cost Driver (B)	Cost per cost driver (A÷B)
Ordering	8,30,000	2,000 purchase order	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf stocking	32,40,000	4,500 hours of shelf stocking time	₹ 720 per hour of shelf stocking time
Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

Statement of operating income

Particulars	Drug A	Drug B	Drug C
Revenue (A) →	74,50,000	1,11,75,000	1,86,25,000
COGS →	41,44,500	68,16,750	1,20,63,750
Gross Margin (B) →	33,05,500	43,58,250	65,61,250
Drug License Fee (in → <u>2:3:5</u>)	1,00,000	1,50,000	2,50,000
Ordering cost →	<u>415</u> × 560 = 2,32,400	<u>415</u> × 810 = 3,36,150	<u>415</u> × 630 = 2,61,450
Delivery cost →	<u>650</u> × <u>950</u> = 6,17,500	<u>650</u> × <u>1000</u> = 6,50,000	<u>650</u> × <u>850</u> = 5,52,500
Shelf Stocking cost →	<u>720</u> × 900 = 6,48,000	<u>720</u> × 1250 = 9,00,000	<u>720</u> × 2350 = 16,92,000
Customer support →	<u>6</u> × 175200 = 10,51,200	<u>6</u> × 150300 = 9,01,800	<u>6</u> × 144500 = 8,67,000
Operating cost (C) →	26,49,100	29,37,950	36,22,950
Operating income (B– C=D) →	6,56,400	14,20,300	29,38,300
Operating income % (D÷A)	8.81%	12.71%	15.78%

- (ii) When the operating costs are distributed on the basis of cost of goods sold, Drug A has the highest level of operating income percentage because lesser operating cost share is distributed to it.

Activity based costing shows that Drug C uses the large amount of operating cost resources than the other two drugs and simultaneously generates the highest level of revenue and thus operating income percentage is maximum in case of Drug C.

Activity Based Costing

MCQs

Q(1). A cost driver is:

- A. An item of production overheads
- C. Any cost relating to transport

B. A common cost which is shared over cost centres

☒ D. An activity which generates costs

Q(2). In activity based costing, costs are accumulated by activity using:

A. Cost drivers

B. Cost objects

☒ C. Cost pools

D. Cost benefit analysis

Q(3). A cost driver:

A. Is a force behind the overhead cost

B. Is an allocation base

C. Is a transaction that is a significant determinant of cost

☒ D. All of the above

Q(4). Which of the following is not a correct match:

Activity		Cost Driver
(a) Production scheduling	→	Number of production runs
(b) Dispatching	→	Number of dispatch orders
(c) Goods receiving	→	Goods received orders
☒ (d) Inspection	→	Machine hours

Q(5). Transactions undertaken by support department personnel are the appropriate cost drivers. Find the out which is not appropriate:

A. The number of purchase, supplies and customers' orders drives the cost associated with new material inventory, work-in-progress and finished goods inventory.

B. The number of production runs undertaken drives production scheduling, inspection and material handling

☒ C. The quality of raw material issued drives the cost of receiving department costs

D. The number of packing orders drives the packing costs.

Q(6). Steps in ABC include:

A. Identification of activities and their respective costs ✓

B. Identification of cost driver of each activity and computation of an allocation rate per activity ✓

C. Allocation of overhead cost to products/services based on the activities involved ✓

☒ D. All of the above

Q(7). Which of the following is not a benefit of ABC?

A. Accurate cost allocation ✓

B. Improved decision making ✓

C. Better control on activity and costs ✓

☒ D. Reduction of prime cost

Q(8). The steps involved for installation of ABC in a manufacturing company include the following except:

☒ A. Borrowing fund -

B. Feasibility study -

C. Building up necessary IT infrastructure and training of line employees -

D. Strategy and value chain analysis

Q(9). Which of the following statements are true: (1) Activity based management involves activity analysis and performance measurement; (2) Activity based costing serves as a major source of information in ABM.

A. (1) True; (2) False

☒ B. (1) True; (2) True

C. (1) False; (2) True

D. (1) False; (2) False

Q(10). The key elements of activity based budgeting are:

A. Type of activity to be performed ✓

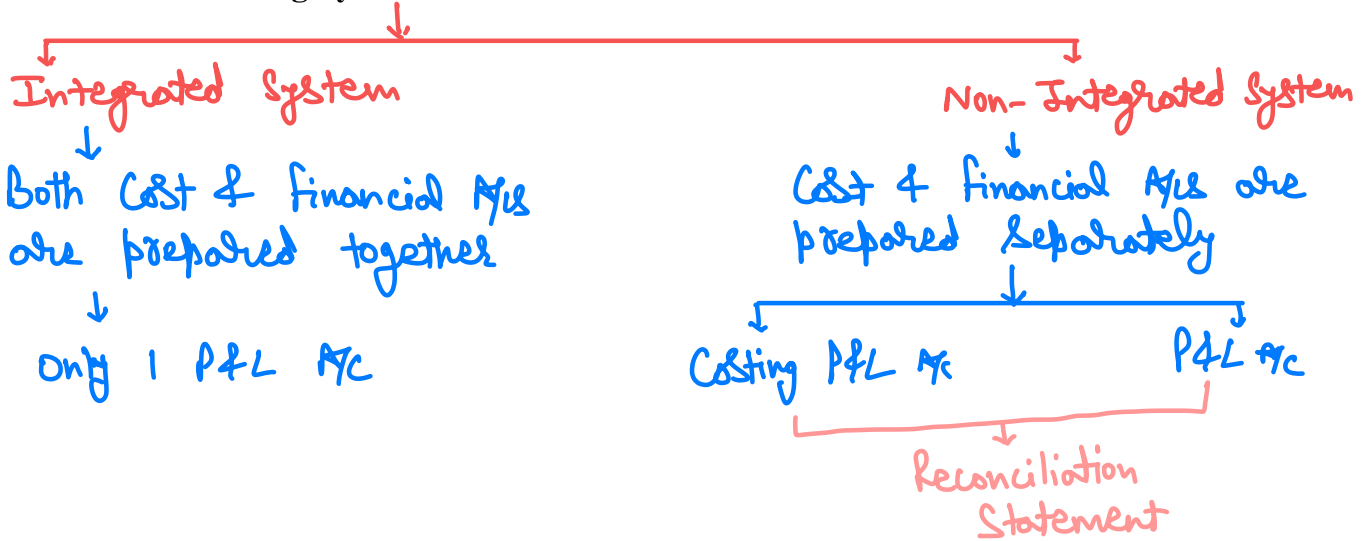
B. Quantity of activity to be performed ✓

C. Cost of activity to be performed ✓

☒ D. All of the above

COST ACCOUNTING SYSTEM - CONCEPTS

1. Cost Accounting System



2. Reasons for Reconciliation

- (A) Items shown only in financial accounts e.g. B/D's, Post. Exp., Income tax
- (B) Items shown only in cost accounts → e.g. Notional rent/salary/interest
- (C) Under or over recovery of overheads in cost accounts → P&L → Actual OH
Costing → Recovery OH
- (D) Different basis for valuation of stock
- (E) Basis of Depreciation

$$\text{P\&L}$$

$$\Delta M + \Delta L + \Delta \cdot \text{Exp.} + \text{fac. OH}$$

$$\text{Costing}$$

$$\text{COP} - \Delta M + \Delta L + \Delta \cdot \text{Exp.} + \text{f. OH} + \text{A. OH (Prod.)}$$

Format of reconciliation statement

(When starting point is taken as profit as per P&L accounts)

	Particulars	(+) Amount	(-) Amount
	Profit as per <u>P&L Accounts</u>	✓	-
→	(+) <u>Expenses in P&L only</u>	✓	-
→	(-) <u>Income in P&L only</u>	-	✓
→	(+) <u>Appropriations in P&L only</u>	✓	-
→	(+) <u>Under recovered OHs in cost accounts</u>	✓	-
→	(-) <u>Over recovered OHs in cost accounts</u>	-	✓
→	(+) <u>Under valued opening stock in cost accounts</u>	✓	-
→	(-) <u>Over valued opening stock in cost accounts</u>	-	✓
→	(+) <u>Over valued closing stock in cost accounts</u>	✓	-

→ (-) Under valued closing stock in cost accounts	-	✓
→ (-) Expenses in cost accounts only	-	✓
Total	✓	✓
Profit as per ^{Cost} P&L Account	✓	-

*In case of loss, the amount will appear in minus column

Memorandum Reconciliation A/c			
To Loss or per Cost/P&L	✓	By Pft. or per Cost/P&L	✓
All '-' items		All '+' items	
To Pft. or per P&L/Cost	✓	By Loss or per P&L/Cost	✓

3. Points to Remember (PTR)

(A) In case of no information then use non-integrated method

(B) Treatment of Overheads

Transfer to P&L A/c → If due to fac. ineff.

Show as Balance c/d → If Seasonal nature

Unless otherwise provided

→ If bal. b/d of OHs is given then show cl. as bal. c/d

→ If No bal. b/d then show cl. as either P&L or bal. c/d by giving note.

COST ACCOUNTING SYSTEM QUESTIONS

Question – 1

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

	₹
Raw materials purchases	20,000 ✓
Direct Materials issued to production	15,000 ✓
Wages paid (30% indirect)	→ 12,000 }
Direct wages charged to production	→ 8,400 }
Manufacturing expenses incurred	✓ 9,500
Manufacturing overheads charged to production	✓ 9,200
Selling and Distribution costs	→ 2,000
Finished Products (at cost)	→ 20,000 ✓
Sales	→ 29,000
Closing stock	→ Nil
Receipts from Debtors	→ 6,900
Payment to Creditors	→ 11,000

Solution

Journal Entries

Particular	Dr. (₹)	Cr. (₹)
✓ Stores Ledger Control A/c Dr. To Creditors A/c	✓ 20,000	20,000
✓ Work-in-progress Ledger Control A/c Dr. To Stores Ledger Control A/c	15,000	15,000
✓ Wages Control A/c Dr. To Bank A/c	12,000	12,000
✓ Work-in-progress Ledger Control A/c Dr. To Wages Control A/c	8,400	8,400
✓ Factory Overhead Control A/c Dr. To Wages Control A/c	3,600	3,600
✓ Factory Overhead Control A/c Dr. To Bank A/c	9,500	9,500
✓ Work-in-progress Ledger Control A/c Dr. To Factory Overhead Control A/c	9,200	9,200
✓ Selling & Distribution Overhead Control A/c Dr. To Bank A/c	2,000	2,000
✓ Finished Goods Ledger Control A/c Dr. To Work-in-progress Ledger Control A/c	20,000	20,000

Particular	Dr. (₹)	Cr. (₹)
Debtors A/c Dr. To P&L A/c	29,000	29,000
Bank A/c Dr. To Debtors A/c	6,900	6,900
Creditors A/c Dr. To Bank A/c	11,000	11,000

Question – 2

The following balances were extracted from a Company's ledger as on 30th June, 2018

	Debit (₹)	Credit (₹)
Raw material control A/c →	2,82,450	
Work-in-progress control A/c →	2,38,300	
Finished stock control A/c →	3,92,500	
General ledger adjustment A/c		9,13,250
<u>Non-Inv:</u>	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

	₹
Factory <u>overheads</u> – <u>allocated</u> to <u>work-in-progress</u>	1,36,350 ✓
Goods <u>finished</u> – <u>at cost</u>	→ 13,76,200
Raw <u>material</u> <u>purchased</u>	→ 12,43,810
Direct <u>wages</u> – <u>allocated</u> to <u>work-in-progress</u>	→ 2,56,800 ✓
Cost of goods sold	→ 14,56,500
Raw materials – <u>issued</u> to <u>production</u>	→ 13,60,430
Raw materials – <u>credited</u> by <u>suppliers</u>	→ 27,200
Raw <u>materials</u> <u>losses</u> – <u>inventory</u> <u>audit</u>	→ 6,000
Work-in-progress <u>rejected</u> (with no <u>scrap</u> value)	→ 12,300
Customer's <u>returns</u> (at cost) of <u>finished</u> <u>goods</u>	→ 45,900 ✓

You are required to prepare:

- Raw material control a/c
- Work-in-progress control a/c
- Finished stock control a/c
- General ledger adjustment a/c

Solution

Raw Material Control A/c

To Balance B/d →	2,82,450	By General Ledger Adj. A/c →	27,200
To General Ledger Adj. A/c →	12,43,810	By Work in Progress Control A/c →	13,60,430
		By Costing P&L A/c (Loss) →	6,000
		By Balance c/d (Balance figure) →	1,32,630
	15,26,260		15,26,260

Work in Progress Control A/c

To Balance b/d	→ 2,38,300	By Finished goods Control A/c	→ 13,76,200
To Raw material control A/c	→ 13,60,430	By Costing P&L A/c	→ 12,300
To Wages control A/c	→ 2,56,800	By Balance c/d (Balancing Figure)	→ 6,03,380
To Factory OH control A/c	→ 1,36,350		
	19,91,880		19,91,880

Finished Stock Ledger Control A/c

To Balance b/d	→ 3,92,500	By Cost of Sales A/c	→ 14,56,500
To Work in Progress Control A/c	→ 13,76,200	By Balance c/d (Bal. Fig.)	→ 3,58,100
To General Ledger Adjustment A/c	→ 45,900		
	18,14,600		18,14,600

General Ledger Adjustment A/c

To Costing P&L (Sales) (Bal. fig.)	→ 25,68,910	By Balance B/d	→ 9,13,250
To Raw material control A/c	→ 27,200	By Raw material control a/c	→ 12,43,810
		By Wages control A/c	→ 2,56,800
		By Factory OH control A/c	→ 1,36,350
		By Finished Goods Control A/c	→ 45,900
	9,55,000		25,96,110

Question – 3

A company operates on historic job cost accounting system, which is not integrated with the financial accounts. At the beginning of a month, the opening balances in cost ledger were:

	₹ (in lakhs)
Stores Ledger Control Account	→ 80
Work-in-progress Control Account	→ 20
Finished goods Control Account	→ 430
Building Construction Account	→ 10
Cost Ledger Control Account	→ 540

During the month, the following transactions took place:

Materials	-	Purchased	→ 40
		Issued to production	→ 50
		Issued to maintenance	→ 6
		Issued to building construction	→ 4
Wages	-	Gross wages paid	→ 150
		Indirect wages	→ 40
		For building construction	→ 10
Works Overheads	-	Actual amount incurred (excluding items shown above)	→ 160
		Absorbed in building construction	→ 20
		Under absorbed	→ 8
Royalty paid (D. Exp.)			→ 5
Selling, distribution and administration overheads			→ 25

$$\text{Costs} = 450 - 20\% = \underline{\underline{360}}$$

Sales

→ 450

At the end of the month, the stock of raw material and work-in-progress was ₹ 55 lakhs and ₹ 25 lakhs respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the month. Company's gross profit margin is 20% on sales. Prepare the relevant control accounts to record the above transactions in the cost ledger of the company.

Solution

Stores Ledger Control A/c (SLC)

To Balance b/d	→ 80	By Work-in-progress	→ 50
To Cost Ledger Control (Purchased)	→ 40	By Works Overhead	→ 6
		By Building Construction	→ 4
		By Factory Overhead (B/F)	→ 5
		By Balance c/d	→ 55
	120		120

Work in Progress Control A/c (WIP)

To Balance b/d	→ 20	By Finished Goods Ledger Control	→ 333
To Stores Ledger Control	→ 50	(B/F)	
To Wages Control	→ 100	By Balance c/d	→ 25
To Factory Overhead	183		
To Cost Ledger Control	→ 5		
(Royalty) (Note 2)			
	358		358

Finished Goods Control A/c (FGC)

To Balance b/d	→ 430	By Cost of Sales (Note 3)	→ 360
To WIP (Finished Goods Produced in the Month)	→ 333	By Balance c/d	→ 403
	763		763

Building Construction A/c

To Balance b/d	→ 10	By Cost Ledger Control	→ 44
To Stores Ledger Control	→ 4	(Capitalized as Building)	
To Wages Control	→ 10		
To Works Overheads	→ 20		
	44		44

Cost Ledger Control A/c (CLC)

To Building Construction	→ 44	By Balance b/d	→ 540
To Costing P & L A/c	→ 450	By Stores Ledger Control	→ 40
To Balance c/d	483	By Wages Control A/c	→ 150
		By Work Overhead	→ 160
		By WIP (Royalty)	→ 5
		By SDA Overheads	→ 25
		By Costing P & L A/c	→ 57
	977		977

Factory/Works Overhead A/c

To Stores Ledger Control	→ 5	By Building Construction	→ 20
To Wages Control	→ 40	By WIP (B/F)	→ 183
To Cost Ledger Control	→ 160	By Costing P & L A/c – Under	→ 8
To Stores Ledger Control	→ 6	Absorption (Note – 1)	
	211		211

Wages Control A/c

To Cost Leger Control (Gross Wages)	→ 150	By WIP (Direct Wages) (B/F)	→ 100
		By Factory Overheads (Indirect Wages)	
		By Building Construction A/c	→ 40
			→ 10
	150		150

S & D Admin. Overheads Control A/c

To Cost Ledger Control	→ 25	By Cost of Sales	→ 25
	25		25

Cost of Sales A/c

To Finished Goods Ledger Control	→ 360	By Costing P & L A/c	→ 385
To SDA Overheads	→ 25		
	385		385

Costing P & L A/c

To Cost of Sales	→ 385	By Cost Ledger Control Sales	→ 450
To Factory Overhead	→ 8		
To Cost Ledger Control Net Profit	→ 57		
	450		450

Trial Balance at the End of the Month

Stores Ledger Control	55	
Work in Progress	25	
Finished Goods Ledger Control	403	
Cost Ledger Control		483
Total	483	483

Note:

- Work Overhead Under-Absorbed:** There are 3 methods of treatment of under-absorption of works overheads. There was no opening balance in works overheads Ac Under-absorption of ₹ 8 lakhs is 4% of ₹ 205 lakhs total. It is a negligible amount. Adoption of supplementary rate is not required. Hence, it has been transferred to the debit of costing P & L A/c.
- Royalty Paid ₹ 5 Lakhs:** Assumed that it has been paid on the basis of production. Then it is a direct expense which is port of prime cost. Hence, it has been debited to WIP control A/c.
- Sales**

450 ✓
Less: G. P. 20% on sales 90 ✓
Cost of sales 360 ✓

Question – 4

A fire destroyed some accounting records of a company. You have been able to collect the following from the spoilt papers/records and as a result of consultation with accounting staff in respect of January:

(i) Incomplete Ledger Entries

Raw Material A/c			
	₹		₹
Beginning Inventory	32,000		

Work in Progress A/c			
	₹		₹
Beginning Inventory	9,200	Finished Stock	151,000

Creditors A/c			
	₹		₹
Closing Balance	19,200	Opening Balance	16,400

Manufacturing Overheads A/c			
	₹		₹
Amount Spent	29,600		

Finished Goods A/c			
	₹		₹
Opening Inventory	24,000	Closing Inventory	30,000

(ii) Additional Information:

- The cash book showed that ₹ 89,200 have been paid to creditors for raw material
- Ending inventory of work in progress included material ₹ 5,000 on which 300 direct labour hours have been booked against wages and overheads
- The job card showed that workers have worked for 7,000 hours. The wage rate is ₹ 10 per labour hour.
- Overhead recovery rate was ₹ 4 per direct labour hour.

You are required to complete the above accounts in the cost ledger of the company.

Solution

Raw Material Control A/c			
To Balance b/d	32,000	By Work-in-progress	53,000
To Creditors	92,000	By Balance c/d (B/F)	71,000
	1,24,000		1,24,000

Work in Progress Control A/c (WIP)			
To Balance b/d	9,200	By Finished Goods Ledger Control	1,51,000
To Raw Material Control (B/F)	53,000	By Balance c/d	
To Wages Control (7,000 × 10)	70,000	Material	5,000
To Manufacturing Overhead	28,000	Wages (300 × 10)	3,000

(7000 × 4)

Mat. = 5000
Lab. = 3000
(300 × 10) = 3000
OH = 1200
(300 × 4) = 1200
9200

		Overheads (300×4) 1,200 ✓	9,200
	1,60,200		1,60,200

Creditors A/c

To Bank →	89,200	By Balance b/d	16,400
To Balance c/d	19,200	By Material (Purchase) (B/F) →	92,000
	1,08,400		1,08,400

Manufacturing Overheads A/c

To Amount Spent ✓	29,600	By Work-in-progress (7,000×4) →	28,000
		By P&L (B/F)	1,600
	29,600		29,600

Finished Goods A/c

To Opening inventory ✓	24,000	By Cost of Sales (B/F)	1,45,000
To Work-in-progress →	1,51,000	By Closing Inventory ✓	30,000
	1,75,000		1,75,000

Question – 5

R Ltd. showed a Net profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021. The following information was revealed as a result of scrutiny of the figures from the both sets of accounts.

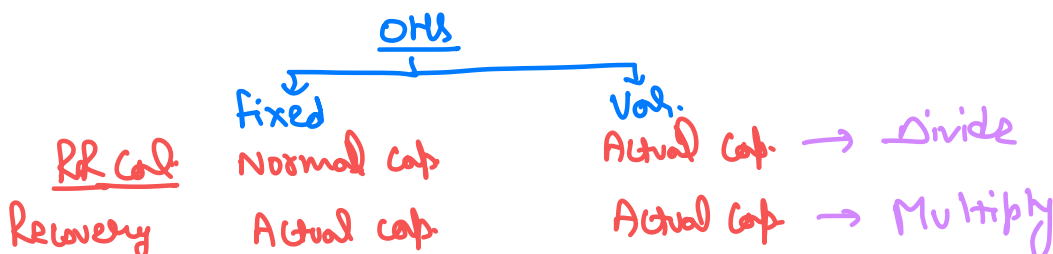
Sr. No.	Particulars	(₹)
i.	Over recovery of selling overheads in cost accounts	— 10,250 (+)
ii.	Over valuation of closing stock in cost accounts	7,300 (-)
iii.	Rent received credited in financial accounts	5,450 (+)
iv.	Bad debts provided in financial accounts	3,250 (-)
v.	Income tax provided in financial accounts	15,900 (-)
vi.	Loss on sale of capital asset debited in financial accounts	5,800 (-)
vii.	Under recovery of administration overheads in cost accounts	3,600 (-)

Required to prepare a reconciliation statement showing the profit as per financial records.

Solution

Reconciliation Statement

Particulars	+ (₹)	- (₹)
Profit as per cost accounts →	3,60,740	-
Add: Over recovered selling OHs	10,250	-
Less: Over valued closing stock in cost accounts	-	7,300
Add: Rent received credited in financial accounts	5,450	-
Less: Bad Debts provided in financial accounts	-	3,250
Less: Income tax provided in financial accounts	-	15,900
Less: Loss on sale of capital assets in financial accounts	-	5,800
Less: Under recovered administration overheads in cost	-	3,600
	3,76,440	35,850
Profit as per financial account	3,40,590	3,40,590 ✓



Question – 6

The profit and loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss Account
(for the year ended 31st March, 2021)

To Direct Material	→ 6,50,000	By Sales	→ 15,00,000
To Direct Wages	→ 3,50,000	(15,000 units)	
To Factory overheads	✓ 2,60,000	By Dividend received	→ 9,000
To Administrative overheads	✓ 1,05,000		
To Selling overheads	✓ 85,000		
To loss on sale of investments	→ 2,000		
To Net Profit	✓ 57,000		
	15,09,000		15,09,000

- Factory overheads are 50% fixed and 50% variable
- Administrative overheads are 100% fixed
- Selling overheads are completely variable
- Normal production capacity of ABC Ltd. is 20,000 units
- Indirect expenses are absorbed in the cost accounts on the basis of normal production capacity.
- Notional rent of own premises charged in cost accounts is amounting to ₹ 12,000.

You are required to:

- Prepare a cost sheet and ascertain the Profit as per cost Records for the year ended 31st March, 2021.
- Reconcile the profit as per Financial records with Profit as per Cost Records.

Solution

(i) **Cost Sheet**

Particulars	Amount
Raw material consumed	→ 6,50,000
Direct wages	→ 3,50,000
Prime Cost	10,00,000
Add: Fixed factory overheads $\left(\frac{2,60,000 \times 50\%}{20,000} \times 15,000\right)$	97,500
Add: Variable factory overheads $(2,60,000 \times 50\%)$	1,30,000
Add: Notional rent of own premises	→ 12,000
GFC/NFC/COP/COGS	→ 12,39,500
Add: Administrative overheads $\left(\frac{1,05,000}{20,000} \times 15,000\right)$	→ 78,750
Add: selling & Distribution overheads	→ 85,000
Cost of Sales	→ 14,03,250
Add: Profit (Balancing figure)	96,750
Sales	→ 15,00,000

(ii) **Reconciliation Statement**

Particulars	+ (₹)	- (₹)
Profit as per P&L Account	✓ 57,000	-

Add: Under recovered factory overheads (2,60,000 – 2,27,500)	32,500	-
Less: Notional rent of own premises	-	12,000
Add: Under recovered administrative overheads (1,05,000 – 78,750)	26,250	-
Add: Loss on sale of investment	2,000	-
Less: Dividend received	-	9,000
Total	1,17,750	21,000
Profit as per Cost Account	96,750	-

Question – 7

The following is the summarized Trading and Profit and Loss Account of SK Ltd. for the year ended 31st March, 2021:

Particulars	Amount (₹)	Particulars	Amount (₹)
Direct Material	✓ 14,16,000	Sales (30,000 units) -	30,00,000
Direct Wages	✓ 7,42,000	Finished stock (2,000 units)	1,67,500
Works Overheads	4,26,000	Work-in-progress:	
Administration Overheads	1,50,000	- Materials	✓ 34,000
Selling & distribution overheads	1,65,000	- Wages	✓ 16,000
Net Profit for the year	3,22,500	- Work overheads	4,000
	32,21,500		54,000
			32,21,500

34,000
 16,000
 50,000
 54,000
 60,000

The company's cost records show that in course of manufacturing a standard unit (i) works overheads have been charged @ 20% on prime cost, (ii) administration overheads are related with production activities and are recovered at ₹ 5 per finished unit, and (iii) selling and distribution overheads are recovered at ₹ 6 per unit sold.

You are required to prepare:

- Costing Profit and Loss Account indicating the net profits
- A statement showing reconciliation between profit as disclosed by the Cost Accounts and Financial Accounts

Solution

$$\text{Units produced} = \text{Units sold} + \text{Cl. Stock FG} - \text{Op. Stock FG} = 30,000 + 2,000 - 0 = 32,000$$

Costing Profit & Loss Account

Particulars	Amount (₹)	Particulars	Amount (₹)
Material consumed	→ 14,16,000	Sales (30,000 units)	30,00,000
Direct wages	→ 7,42,000		
Prime cost	→ 21,58,000		
Work overheads (20% of prime cost)	→ 4,31,600		
Gross factory cost	→ 25,89,600		
Less: Work-in-progress	→ (60,000)		
Net Factory cost	25,29,600		
Administration overheads (5×32,000)	1,60,000		
Cost of production	→ 26,89,600		

20%

Less: Finished stock ($\frac{26,89,600}{32,000} \times 2,000$)	→ (1,68,100)	
Cost of goods sold	→ 25,21,500	
Selling & distribution overheads (6 × 30,000)	→ 1,80,000	
Cost of sales	27,01,500	
Profit (Bal. fig.)	2,98,500	
	30,00,000	30,00,000

Reconciliation statement

Particulars	+ (₹)	- (₹)
Profit as per cost accounts	→ 2,98,500	-
Add: Over recovered work OHs	5,600	-
Less: Over valued closing WIP in cost accounts	-	→ 6,000
Add: Under recovered Administration OHs	10,000	-
Less: Over valued Cl. stock in cost accounts	-	600
Add: Over recovered selling & distribution OHs	15,000	-
	3,29,100	6,600
Profit as per profit & loss account	3,22,500	-

Question – 8

The financial books of a company reveal the following data for the year ended 31st March, 2021:

Particulars	₹
Opening Stock:	
Finished goods 625 units	→ 53,125 ✓
Work-in-process	→ 46,000 ✓
01.04.2020 to 31.03.2021	
Raw materials consumed	→ 8,40,000 ✓
Direct labour	→ 6,10,000 ✓
Factory overheads	→ 4,22,000 ✓
Administration overheads (production related)	→ 1,98,000 ✓
Dividend paid	→ 1,22,000 ✓
Bad Debts	18,000
Selling and Distribution Overheads	72,000
Interest received	38,000
Rent received	46,000
Sales 12,615 units ✓	22,80,000 ✓
Closing stock: Finished goods 415 units ✓	→ 45,650 ✓
Work-in-process	→ 41,200 ✓

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages
- Administration overheads are recovered at 15% of factory cost

- Selling and distribution overheads are charged at ₹ 3 per unit
- Opening stock of finished goods is valued at ₹ 120 per unit ✓
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

- Prepare a statement for the year ended 31st March, 2021. Show
 - The profit as per financial records
 - The profit as per costing records
- Prepare a statement reconciling the profit as per costing records with the profit as per Financial Records.

Solution

(a) Statement of Profit as per Financial Records

Particulars	₹	Particulars	₹
To Opening stock of Finished goods	✓ 53,125	By Sales	→ 22,80,000 ✓
To work-in-process	✓ 46,000	By Closing stock of Finished Goods	→ 45,650 ✓
To Raw materials consumed	✓ 8,40,000	By Work-in-process	→ 41,200 ✓
To Direct labour	✓ 6,10,000	By Rent received	46,000 ✓
To Factory overheads	✓ 4,22,000	By Interest received	38,000 ✓
To Administration overheads	✓ 1,98,000		
To Selling & Distribution overheads	✓ 72,000		
To Dividends paid	1,22,000		
To Bad Debts	18,000		
To Profit	69,725		
	24,50,850		24,50,850

Units produced = Units sold + Closing stock – opening stock = 12,615 + 415 – 625 = 12,405

Statement of Profit as per Costing Records

Particulars	₹
Raw material consumed	→ 8,40,000 ✓
Direct labour	→ 6,10,000 ✓
Prime cost	14,50,000
Factory overheads (<u>6,10,000 × 70%</u>)	→ 4,27,000 ✓
Factory cost	18,77,000
Add: Opening WIP	46,000 ✓
Less: Closing WIP	(41,200) ✓
Factory cost of goods purchased	18,81,800
Add: <u>Administration overheads</u> (<u>15% × 18,81,800</u>)	✓ 2,82,270
Cost of Production	21,64,070
Add: Opening stock (<u>625 × 120</u>) ✓	→ 75,000 ✓
Less: Closing stock (<u>$\frac{21,64,070}{12,405} \times 415$</u>)	→ (72,397) ✓

Cost of goods sold	→	21,66,673
Selling and distribution overheads (<u>12,615</u> × 3)	→	✓ 37,845
Cost of sales		22,04,518
Profit (Bal. fig.)		75,482
Sales		22,80,000

(b) Reconciliation Statement

Particulars	+ (₹)	- (₹)
Profit as per cost accounts	75,482	-
Add: Over absorbed administration overheads	✓ 84,270	-
Add: Over valued opening stock of finished goods .	✓ 21,875	-
Add: Interest received	✓ 38,000	-
Add: Rent received	✓ 46,000	-
Add: Factory overheads over absorbed	✓ 5,000	-
Less: Selling & distribution overheads under recovered	-	✓ 34,155
Less: closing stock overvalued	-	✓ 26,747
Less: Dividend	-	✓ 1,22,000
Less: Bad debts	-	✓ 18,000
	2,70,627	2,00,902
Profit as per financial accounts	69,725	-

Note – It is assumed that administration overheads are related to production.

Cost Accounting System

MCQs

Q(1). Under the Non-integrated accounting system

- A. Some ledger is maintained for cost and financial accounts by accountants
- ☒ B. Separate ledgers are maintained for cost and financial accounts
- C. (a) & (b) both
- D. None of the above

Q(2). Notional costs

- A. May be included in integrated accounts
- ☒ B. May be included in Non-integrated accounts
- C. Cannot be included in Non-integrated accounts
- D. None of the above

Q(3). Under Non-integrated accounting system, the account made to complete double entry is:

- A. Stores ledger control account
- B. work-in-progress control account
- C. finished goods control account
- ☒ D. General ledger adjustment account

Q(4). Integrated systems of accounts are maintained

- A. In separate books of accounts for costing and financial accounting purposes
- ☒ B. In same books of accounts
- C. Both (a) & (b)
- D. None of the above

Q(5). Under Non-integrated system of accounting, purchase of raw material is debited to which account

- ☒ A. Material control account/ Stores ledger control account
- B. General ledger adjustment account
- C. Purchase account
- D. None of the above

Q(6). Under Non-integrated accounts, if materials worth, ₹ 1,500 are purchased for a special job, then which account will be debited:

- ☒ A. Special job account / Work-in-Process account
- B. Material control account
- C. Cost Control Account
- D. None of the above

Q(7). Which account is to be debited if materials worth ₹ 500 are returned to vendor under Non-integrated accounts:

- ☒ A. Cost ledger control account
- B. Finished goods control account
- C. WIP control account
- D. None of the above

Q(8). Which of the following items is included in cost accounts?

- ☒ A. Notional rent
- B. Donations
- C. Transfer to general reserve
- D. Rent receivable

Q(9). When costing loss ₹ 5,600, administrative overhead under-absorbed being ₹ 600, the loss as per financial accounts should be

- A. ₹ 5,600
- ☒ B. ₹ 6,200
- C. ₹ 5,000
- D. None of the above

$$\begin{aligned} & -5600 - 600 \\ & = -6200 \end{aligned}$$

Q(10). Which of the following items should be added to costing profit to arrive at financial profit?

- ☒ A. Over-absorption of works overhead
- B. Interest paid on debentures
- C. Income tax paid
- D. All of the above

JOB & BATCH COSTING - CONCEPTS

1. Job Costing

- It is that form of specific order costing under which each job is treated as a cost unit and costs are accumulated and ascertained separately for each job.
- In other words, it is that form of specific order costing which applies where work is undertaken according to customer's requirement.
- It is generally used in industries where production is not on continuous basis, rather it is only when order from customers are received according to their specifications e.g. printing press, repair shop, etc.
- In this method cost of each job is computed by preparing the Job Cost Sheet.

2. Batch Costing

- It is that form of specific order costing which applies where similar articles are manufactured in batches either for sale or use within the undertaking.
- Each batch of output is a cost unit and is costed separately.
- The total batch cost divided by number of units produced in a batch gives cost per unit.
- It is generally undertaken in case of pharmaceutical production, shoes, garments, etc.

3. Economic Batch Quantity (EBQ)

It is that batch size at which sum total of ~~ordering~~^{set-up} cost and carrying cost is minimum.

$$EBQ = \sqrt{\frac{2 \times A \times S}{C}}$$

Where, A = Annual requirement of raw material

S = Set-up cost per batch

C = Carrying cost per unit per annum

JOB & BATCH COSTING QUESTIONS

Question – 1

The following data presented by the supervisor of a factory for a Job.

	<u>₹ per unit</u>
Direct material	→ 120
Direct wages @ ₹ 4 per hour	→ 60 ✓
(Department A-4 hrs., B-7hrs, C-2hrs & D-2hrs)	
Chargeable Expenses	<u>20</u> ✓
Total	<u>200</u> (A. Est.)

Analysis of the Profit and Loss Account for the year ended 31st March 2019

	<u>₹</u>		<u>₹</u>
Material used	→ 2,00,000 ✓	Sales	4,30,000
Direct Wages:			
Dept. A	12,000 ÷ 4		
Dept. B	8,000 ÷ 4		
Dept. C	10,000 ÷ 4		
Dept. D	<u>20,000</u> ÷ 4	50,000 ÷ 4 = 12,500 hrs. ✓	
Special Stores Items	6,000 ✓		
Overheads:			
Dept. A	12,000		
Dept. B	6,000		
Dept. C	9,000		
Dept. D	<u>17,000</u>	44,000 ✓	
Gross Profit c/d	<u>1,30,000</u>		
	4,30,000		<u>4,30,000</u>
Selling Expenses	→ <u>90,000</u>	Gross Profit b/d	1,30,000
Net Profit	<u>40,000</u>		
	<u>1,30,000</u>		<u>1,30,000</u>

It is also to be noted that average hourly rates for all the four departments are similar. Required:

- (i) Prepare a Job Cost Sheet
- (ii) Calculate the entire revised cost using the above figures as the base.
- (iii) Add 20% profit on selling price to determine the selling price.

Solution

Working Notes:

Overhead recovery rate on overall basis:

Overhead recovery rate = $\frac{44,000}{\left(\frac{50,000}{4}\right)} = ₹ 3.52$ Per Lab. Hr. ✓

on Lab. Hr.

Statement of calculation of recovery rates

Particulars	Working	Recovery Rate
Dept. A	$\frac{12,000}{\left(\frac{12,000}{4}\right)}$ ✓	₹ 4 per direct labour hour
Dept. B	$\frac{6,000}{\left(\frac{8,000}{4}\right)}$	₹ 3 per direct labour hour
Dept. C	$\frac{9,000}{\left(\frac{10,000}{4}\right)}$	₹ 3.60 per direct labour hour
Dept. D	$\frac{17,000}{\left(\frac{20,000}{4}\right)}$	₹ 3.40 per direct labour hour
Selling exp. As % of NFC	$\frac{90,000}{(2,00,000 + 50,000 + 6,000 + 44,000)} \times 100$	30% of NFC ✓

(i) Statement of calculation of cost of Job

Particulars	Working	Amount (₹)
Material		→ 120
Wages		→ 60
Chargeable expenses		→ 20
Prime Cost		200
(+) Overheads	$(4+7+2+2) \times 3.52$	52.80 ✓
GFC\NFC		→ 252.80
(+) Selling expenses	$30\% \times 252.80$	→ 75.84
Total Cost		328.64

(ii) Statement of calculation of cost of Job

Particulars	Working	Amount (₹)
Material		120
Wages		60
Chargeable expenses		20
Prime Cost		200 ✓
(+) Overheads	Dept. A = $4 \times 4.00 = 16$ Dept. B = $7 \times 3.00 = 21$ Dept. C = $2 \times 3.60 = 7.20$ Dept. D = $2 \times 3.40 = 6.80$	51 ✓
GFC\NFC		251
(+) Selling expenses	$30\% \times 251$	75.30
Total Cost		326.30 ✓

(iii) Statement of calculation of selling price of job

Total cost of job ₹ 326.30

Add: Profit ($326.30 \times \frac{1}{4}$)	<u>₹ 81.58</u> ✓
Sales	<u>₹ 407.88</u> ✓

Question – 2

In a manufacturing company, factory overheads are charged as fixed percentage basis on direct labour and office overheads are charged on the basis of percentage of factory cost. The following information are available related to the year ending 31st March:

	Product A	Product B
Direct materials	✓ ₹ 19,000	✓ ₹ 15,000
Direct Labour	✓ ₹ 15,000	✓ ₹ 25,000
Sales	✓ ₹ 60,000	✓ ₹ 80,000
Profit	25% on cost	25% on sales price

You are required to find out:

- The percentage of factory overheads on direct labour
- The percentage of office overheads on factory cost

Solution

Let factory OH % on Direct labour = $x \rightarrow \frac{x}{100}$

Let administration OH % on net factory cost = $y \rightarrow \frac{y}{100}$

Statement of Cost

	Product A	Product B
125 Sales	✓ 60,000	80,000
25 Profit	12,000 $[(60,000 \times (25/125))]$	20,000 $(80,000 \times 25\%)$
100 Total Cost	<u>48,000</u> $[60,000 \div 1.25]$	<u>60,000</u>

Statement of Cost

	Product A	Product B
Direct Material	✓ 19,000	✓ 15,000
Direct labour	✓ 15,000	✓ 25,000
Prime cost	→ 34,000	40,000
Factory OHs	150x	250x
NFC/COP/COGS	34,000 + 150x	40,000 + 250x
(+) Admin. OH	340y + 1.5xy	400y + 2.5xy
COS	34,000 + 150x + 340y + 1.5xy	40,000 + 250x + 400y + 2.5xy

$$\therefore 34,000 + 150x + 340y + 1.5xy = 48,000 \quad \text{_____ (1)}$$

$$\& 40,000 + 250x + 400y + 2.5xy = 60,000 \quad \text{_____ (2)}$$

Multiply equation (1) by 2.5 and equation (2) by 1.5 and subtract them, we get

$$85,000 + 375x + 850y + 3.75xy = 1,20,000$$

$$\pm 60,000 \pm 375x \pm 600y \pm 3.75xy = \pm 90,000$$

We get,

$$25,000 + 250y = 30,000$$

$$y = 20$$

Put value of $y = 20$ in equation (1),

$$34,000 + 150x + 340(20) + 1.5x(20) = 48,000$$

$$x = 40$$

Thus, Factory OH % on direct labour = 40% and administration OH % on factory cost = 20%

Question – 3

AUX Ltd. has an annual demand from a single customer for 60,000 Covid-19 Vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

- Find the most Economical Production Run
- Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

Solution

- Annual demand = $A = 60,000$ vaccines

$$\text{Set-up cost per run} = S = ₹ 4,800$$

$$\text{Carrying cost per unit per annum} = C = ₹ 12 \times 12 = ₹ 144$$

$$\text{Economic Batch Quantity} = \sqrt{\frac{2 \times A \times S}{C}} = \sqrt{\frac{2 \times 60,000 \times 4,800}{144}} = 2,000 \text{ vaccines}$$

- Statement of Cost

Particulars	Batch size = 2,000 vaccines	Batch size = 15,000 vaccines
Set-up cost	$\frac{60,000}{2,000} \times 4,800 = 1,44,000$	$\frac{60,000}{15,000} \times 4,800 = 19,200$
Carrying cost	$\frac{2,000}{2} \times 144 = 1,44,000$	$\frac{15,000}{2} \times 144 = 10,80,000$
Total Cost	2,88,000	10,99,200

$$\text{Extra cost} = ₹ 10,99,200 - ₹ 2,88,000 = ₹ 8,11,200$$

Question – 4

A jobbing factory has undertaken to supply 300 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 actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 8 per piece. From the following data calculate the cost and profit per piece of each batch order and overall position of the order for 1,800 pieces.

Month	Batch output	Material cost (₹)	Direct wages (₹)	Direct labour hours
January	310	1150	120	240
February	300	1140	140	280
March	320	1180	150	280
April	280	1130	140	270
May	300	1200	150	300
June	320	1220	160	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour hours
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

Monthly
RR

Total

Solution

Statement of Cost and Profit per batch

Particulars	Jan.	Feb.	March	April	May	June	<u>Total</u>
Batch output (in units)	310	300	320	280	300	320	1,830
(A) Sale value (₹) @ ₹ 8	2,480	2,400	2,560	2,240	2,400	2,560	14,640
Material cost (₹) (From B)	1,150	1,140	1,180	1,130	1,200	1,220	7,020
Direct wages (₹) (From B)	120	140	150	140	150	160	860
Chargeable expenses* (₹)	589	687	687	662	736	785	4,146
(B) Total cost (₹)	1,859	1,967	2,017	1,932	2,086	2,165	12,026
Profit per batch (₹) (A - B = C)	621	433	543	308	314	395	2,614
Total cost per unit (₹) [B ÷ units]	6.00	6.56	6.30	6.90	6.95	6.77	<u>6.57</u>
Profit per unit (₹) [C ÷ units]	2.00	1.44	1.697	1.10	1.05	1.23	1.43

Overall position of the order for 1,800 units

Sales value of 1,800 units @ ₹ 8 per unit → ₹ 14,400

Total cost of 1,800 units @ ₹ 6.57 per unit → ₹ 11,826

Profit → ₹ 2,574

*Chargeable Expenses Rate = $\frac{\text{Total Chargeable Expenses}}{\text{Total direct labour hours}} = \frac{70,140}{28,600} = ₹ 2.452448$ per labour hour

It is assumed that recovery rate is based on overall 6 months period. Other way is to compute recovery rate for each month and then compute the cost.

Question – 5

SK Confectioners (SKC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. SKC use to bake at least 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch, the following cost would be incurred:

- Direct materials - ₹ 5,000 ✓
- Direct wages - ₹ 500 (irrespective of units) ✓
- Oven set-up cost - ₹ 750 (irrespective of units) ✓

SKC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads. SKC requires a profit margin of 25% of sales value.

Required:

- (a) Determine the price to be charged for 600 cakes
 (b) Calculate cost and selling price per cake
 (c) Determine what would be selling price per unit if the order is for 605 cakes.

$$\text{No. of batch} = \frac{600}{50} = 12 \text{ batch}$$

$$\text{No. of batch} = \frac{605}{50} = 12.10 \text{ (22)} \\ \underline{\underline{13}}$$

Solution

(a) Statement of determination of selling price

No. of batch = 600 units ÷ 50 units = 12 batches

Particulars	Amount (₹)
Direct material cost ($5,000 \times 12$)	60,000
Direct wages (500×12)	6,000
Oven set-up cost (750×12)	9,000
Production overheads ($20\% \times 6,000$)	1,200
Total Production cost	76,200
S&D and Administration overheads ($10\% \times 76,200$)	7,620
Total cost	83,820
Profit ($1/3 \times 83,820$)	27,940
Sales value [$83,820 \div 75\%$]	1,11,760

(b) Cost per cake = $83,820 \div 600 = ₹ 139.70$ ✓

Selling price per cake = $1,11,760 \div 600 = ₹ 186.27$ ✓

(c) Statement of determination of selling price

Particulars	Amount (₹)
Direct material cost ($\frac{5,000}{50} \times 605$)	60,500
Direct wages (500×13)	6,500
Oven set-up cost (750×13)	9,750
Production overheads ($20\% \times 6,500$)	1,300
Total Production cost	78,050
S&D and Administration overheads ($10\% \times 78,050$)	7,805
Total cost	85,855
Profit ($1/3 \times 85,855$)	28,618
Sales value [$85,855 \div 75\%$]	1,14,473
Selling price per unit ($1,14,473 \div 605$)	189.21

Batch Costing

MCQs

Q(1). Different businesses in order to determine cost of their product or service offering follow:

- ☒ A. Different methods of costing
- ☐ B. Uniform costing
- ☐ C. Different techniques of costing
- ☐ D. None of the above

Q(2). In order to determine cost of the product or service, following are used:

- ☐ A. Techniques of costing like marginal, standard etc.
- ☒ B. Methods of costing
- ☐ C. Comparatives
- ☐ D. All of the above

Q(3). Unit costing is applicable where:

- ☐ A. Product produced are unique and no 2 products are same
- ☐ B. Dissimilar articles are produced as per customer specification
- ☒ C. Homogeneous articles are produced on large scale
- ☐ D. Products made require different raw materials

Q(4). In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:

- ☐ A. Process costing
- ☐ B. Operating costing
- ☒ C. Job costing
- ☐ D. None of the above

Q(5). Job costing is:

- ☐ A. Applicable to all industries regardless of the products or services provided
- ☐ B. Techniques of costing
- ☐ C. Suitable where similar products are produced on mass scale
- ☒ D. Method of costing used for non-standard and non-repetitive products

Q(6). The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:

- ☐ A. Bin card
- ☒ B. Bill of material
- ☐ C. material requisition slip
- ☐ D. None of the above

Q(7). Batch costing is a type of:

- ☐ A. Process costing
- ☒ B. Job costing
- ☐ C. differential costing
- ☐ D. Direct costing

Q(8). Batch costing is similar to that under job costing except with the difference that a:

- ☐ A. Job becomes a cost unit
- ☒ B. Batch becomes the cost unit instead of a job
- ☐ C. Process becomes a cost unit
- ☐ D. None of the above

Q(9). The main points of distinction between job and contract costing includes:

- ☐ A. Length of time to complete
- ☐ B. Big jobs
- ☐ C. Activities to be done outside the factory area
- ☒ D. All of the above

Q(10). Economic batch quantity is that size of the batch of production where:

- ☐ A. Average cost is minimum
- ☐ B. Set-up cost of machine is minimum
- ☒ C. Carrying cost is minimum
- ☒ D. Both (b) and (c)

Job Costing

MCQs

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- A. Process costing
- B. Operation costing
- ☒ C. Job costing
- D. None of the above

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- A. Job becomes a cost unit
- B. ☒ Batch becomes the cost unit instead of a job
- C. Process becomes a cost unit
- D. None of the above

Q(4). In job costing which of the following documents are used to record the issue of direct material to a job:

- A. goods received note
- B. ☒ Material requisition note
- C. Purchase order
- D. Purchase requisition

Q(5). The most suitable cost system where the products differ in type of materials and work performed is:

- ☒ A. Job costing
- B. Process costing
- C. Operating costing
- D. None of the above

Q(6). Which of the following statements is true:

- ☒ A. Job cost sheet may be used for estimating profit of jobs ✓
- B. Job costing cannot be used in conjunction with marginal costing ✗
- C. A production order is an order received from a customer for particular jobs
- D. None of the above

Q(7). Which of the following statement is true:

- A. Job cost sheet may be prepare for facilitating routing and scheduling of the job
- B. Job costing can be suitably used for concerns producing uniformly any specific product
- C. Job costing cannot be used in companies using standard costing
- ☒ D. None of the above

Introduction to Cost & Management Accounting

MCQs

Q (1). _____ is anything for which a separate measurement is required.

- A. cost unit
- ☒ B. cost object
- C. cost driver
- D. cost centre

Q (2). Which of the following is true about cost control?

- A. It is a corrective function
- ☒ B. It ends when targets achieved
- C. It challenges the set standards
- D. It is concerned with future

Q (3). Cost unit in power sector is:

- A. Kilometer (KM)
- ☒ B. Kilowatt-hour (kWh)
- C. Number of electric points
- D. Number of hours

Q (4). Process costing method is suitable for

- A. Transport sector
- ☒ B. Chemical industries
- C. Dam construction
- D. Furniture making

Q (5). Distinction between direct cost and indirect cost is an example of _____ classification.

- ☒ A. By Element
- B. By Function
- C. By Controllability
- D. By Variability

Q (6). The advantages of using IT in Cost Accounting does not include:

- A. Integration of various functions
- ☒ B. Stock needs to be reconciled with goods received note
- C. Reduction in multicity of documents
- D. Customized reports can be prepared

Q(7). A taxi provider charges minimum ₹ 80 thereafter ₹ 12 per kilometer of distance travelled, the behavior of conveyance cost is:

- A. Fixed cost
- ☒ B. Semi-variable cost
- C. Variable cost
- D. Administrative cost

Q(8). SK Ltd. has three production department, each department has two machines, which of the following cannot be treated as a cost centre for cost allocation:

- A. Machines under the production department
- B. Production departments
- ☒ C. Both production department and machines
- ☒ D. SK Ltd.

Q(9). Which of the following is an example of functional classification of cost:

- A. Direct material cost
- ☒ B. Fixed cost
- ☒ C. Administrative overheads
- D. Indirect overheads

Q(10). Ticket counter at railway station will be covered under _____ centre.

- A. Cost
- ☒ B. Revenue
- C. Profit
- D. Investment