

PAPER – 3: COST AND MANAGEMENT ACCOUNTING

QUESTIONS

Material Cost

1. A company uses four raw materials A, B, C and D for a particular product for which the following data apply :-

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Re-order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product. What would be the following quantities:-

- (i) Minimum Stock of A?
- (ii) Maximum Stock of B?
- (iii) Re-order level of C?
- (iv) Average stock level of A?
- (v) Re-order level of D?
- (vi) Minimum Stock level of D?

Employee Cost

2. GZ Ld. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

(a)	Basic salary per day	₹1,000
(b)	Dearness allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	₹50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8 th hours.

(f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(h)	Earned leave & Casual leave	These are paid leave.
(h)	Employer's contribution to Provident fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr.Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break.

On 5th and 13th August he worked for 10 and 9 hours respectively.

During the month Mr. Z worked for 100 hours on Job no.HT200.

You are required to CALCULATE:

- (i) Earnings per day
- (ii) Effective wages rate per hour of Mr. Z.
- (iii) Wages to be charged to Job no.HT200.

Overheads: Absorption Costing Method

3. You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
	Total (₹)	Machines		
		A (₹)	B (₹)	C (₹)
Depreciation	2,00,000	75,000	75,000	50,000
Spare parts	1,00,000	40,000	40,000	20,000
Power	4,00,000			
Consumable stores	80,000	30,000	25,000	25,000
Insurance of machinery	80,000			
Indirect labour	2,00,000			
Building maintenance expenses	2,00,000			

Annual interest on capital outlay	1,00,000	40,000	40,000	20,000
Monthly charge for rent and rates	20,000			
Salary of foreman (per month)	42,000			
Salary of Attendant (per month)	12,000			

(The foreman and the attendant control all the three machines and spend equal time on them.)

The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to :

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.

Activity Based Costing

4. KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was ₹24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

Required:

- CALCULATE cost driver rates.
- CALCULATE the total and unit cost for the batch.

Cost Sheet

- The following details are available from the books of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (₹)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax for the assessment year 2019-20	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000
Donation to PM-national relief fund	1,10,000

Value of sales	2,82,60,000
Position of inventories as on 01-04-2019:	
- Raw Material	6,20,000
- W-I-P	7,84,000
- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	
- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31st March 2020.

Cost Accounting System

6. A manufacturing company disclosed a net loss of ₹6,94,000 as per their cost accounts for the year ended March 31,2020. The financial accounts however disclosed a net loss of ₹10,20,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(₹)
(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000
(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000
(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a memorandum Reconciliation Account.

Batch Costing

7. A Ltd. manufactures mother boards used in smart phones. A smart phone requires one mother board. As per the study conducted by the Indian Cellular Association, there will be a demand of 180 million smart phones in the coming year. A Ltd. is expected to have a market share of 5.5% of the total market demand of the mother boards in the coming

year. It is estimated that it costs ₹6.25 as inventory holding cost per board per month and that the set-up cost per run of board manufacture is ₹33,500.

- (i) COMPUTE the optimum run size for board manufacturing?
- (ii) Assuming that the company has a policy of manufacturing 80,000 boards per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

Job Costing

8. AP Ltd. received a job order for supply and fitting of plumbing materials. Following are the details related with the job work:

Direct Materials

AP Ltd. uses a weighted average method for the pricing of materials issues.

Opening stock of materials as on 12th August 2020:

- 15mm GI Pipe, 12 units of (15 feet size) @ ₹600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ ₹ 660 each
- Other fitting materials, 60 units @ ₹ 26 each
- Stainless Steel Faucet, 6 units @ ₹ 204 each
- Valve, 8 units @ ₹ 404 each

Purchases:

On 16th August 2020:

- 20mm GI Pipe, 30 units of (15 feet size) @ ₹ 610 each
- 10 units of Valve @ ₹ 402 each

On 18th August 2020:

- Other fitting materials, 150 units @ ₹ 28 each
- Stainless Steel Faucet, 15 units @ ₹ 209 each

On 27th August 2020:

- 15mm GI Pipe, 35 units of (15 feet size) @ ₹ 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ ₹ 660 each
- Valve, 14 units @ ₹ 424 each

Issues for the hostel job:

On 12th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units

On 17th August 2020:

- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

On 28th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units

On 30th August 2020:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ ₹100 per hour (includes 12 hours overtime)

Helper: 192 hours @ ₹70 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ ₹26 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

- (a) CALCULATE the total cost of the job.
- (b) CALCULATE the price to be charged from the customer.

Process Costing

9. M Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of ₹85 per unit, product Z is produced. The information related for the month of August 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is ₹2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at ₹10 per unit

Product-Z can be sold at ₹135 per unit with a selling cost of ₹15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is not stock at the beginning and end of the month.

You are required to PREPARE accounts for:

- (i) Process-I, II and III
- (ii) By-product process.

Joint Products & By Products

10. ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2019-20, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹3,000 per ton

Y – 527 tons sold for ₹2,250 per ton

Z – 736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000. An additional ₹ 6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2020, using Net realizable value (NRV) method of joint cost allocation.

Service Costing

11. A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day. The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78

Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000
Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop. The transport department has been apportioned ₹88,000 by the workshop during the month. During the month operation was for 25 days.

You are required:

- (i) CALCULATE per ton-km operating cost.
- (ii) DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

Standard Costing

12. Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹100 per hour	800
Variable Overhead 8 hours @ ₹15 per hour	120
Fixed Overhead	<u>400</u>
	<u>2,220</u>

Budgeted output for the year was 2,000 units. Actual output is 1,800 units.

Actual cost for year is as follows:

	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

- (i) Material Usage Variance
- (ii) Material Price Variance
- (iii) Material Cost Variance
- (iv) Labour Efficiency Variance
- (v) Labour Rate Variance
- (vi) Labour Cost Variance
- (vii) Variable Overhead Cost Variance
- (viii) Fixed Overhead Cost Variance.

Marginal Costing

13. J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹1,000 lakhs which appears to be high. Existing selling price is ₹680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –

- (i) Break- even point at existing levels in units and in rupees.
- (ii) The number of units required to be sold to earn the target profit.
- (iii) Profit with 10% increase in selling price and drop in sales volume by 10%.
- (iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged.

Budget and Budgetary Control

14. The information of Z Ltd. for the year ended 31st March 2020 is as below:

	Amount (₹)
Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	Y
Output (units)	8,000	4,000
Selling price per unit (₹)	600	550
Direct material per unit (₹)	140	157.50
Direct wages per unit (₹)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

Product X – ₹40 per unit and Product Y- ₹70 per unit.

For the FY 2020-21, due to a pandemic, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%. Products will be required to be sold at a discount of 20%.

You are required to:

- (i) PREPARE product- wise profitability statement on marginal costing method for the FY 2019-20 and
- (ii) PREPARE a budget for the FY 2020-21.

Miscellaneous

15. (a) DISCUSS short notes on (i) Discretionary Cost Centre and (ii) Investment Centre
- (b) DESCRIBE the three advantages of Cost-plus contract.
- (c) STATE the advantages of Zero-based budgeting.
- (d) DESCRIBE Operation costing with two examples of industries where operation costing is applied.

SUGGESTED HINTS/ANSWERS

1. (i) **Minimum stock of A**

$$\begin{aligned} \text{Re-order level} &= (\text{Average consumption} \times \text{Average time required to obtain delivery}) \\ &= 60,000 \text{ kg.} - (900 \text{ units} \times 12 \text{ kg.} \times 3 \text{ weeks}) = 27,600 \text{ kg.} \end{aligned}$$

(ii) **Maximum stock of B**

$$\begin{aligned} \text{Re-order level} + \text{Re-order quantity} &= (\text{Min. Consumption} \times \text{Min. Re-order period}) \\ &= 70,000 \text{ kg.} + 8,000 \text{ kg.} - (550 \text{ units} \times 8 \text{ kg.} \times 5 \text{ weeks}). \end{aligned}$$

$$=78,000-22,000 = 56,000 \text{ kg.}$$

(iii) Re-order level of C

$$\begin{aligned} & \text{Maximum re-order period} \times \text{Maximum Usage} \\ &= 7 \text{ weeks} \times (1,250 \text{ units} \times 6 \text{ kg.}) = 52,500 \text{ kg.} \end{aligned}$$

OR

$$\begin{aligned} &= \text{Minimum stock of C} + (\text{Average consumption} \times \text{Average delivery time}) \\ &= 25,500 \text{ kg.} + [(900 \text{ units} \times 6 \text{ kg.}) \times 5 \text{ weeks}] = 52,500 \text{ kg.} \end{aligned}$$

(iv) Average stock level of A

$$\begin{aligned} &= \frac{\text{Minimum stock} + \text{Maximum stock}}{2} \quad (\text{Refer to Working Note}) \\ &= \frac{27,600 + 58,800}{2} = 43,200 \text{ kg.} \end{aligned}$$

Working note

$$\begin{aligned} \text{Maximum stock of A} &= \text{ROL} + \text{ROQ} - (\text{Minimum consumption} \times \text{Minimum re-order period}) \\ &= 60,000 \text{ kg.} + 12,000 \text{ kg.} - [(550 \text{ units} \times 12 \text{ kg.}) \times 2 \text{ weeks}] = 58,800 \text{ kg.} \end{aligned}$$

(v) Re-order level of D

$$\begin{aligned} & \text{Maximum re-order period} \times \text{Maximum Usage} \\ &= 3 \text{ weeks} \times (1,250 \text{ units} \times 5 \text{ kg.}) = 18,750 \text{ kg} \end{aligned}$$

(vi) Minimum stock of D

$$\begin{aligned} & \text{Re-order level} - (\text{Average consumption} \times \text{Average time required to obtain delivery}) \\ &= 18,750 \text{ kg.} - (900 \text{ units} \times 5 \text{ kg.} \times 2 \text{ weeks}) = 9,750 \text{ kg.} \end{aligned}$$

2. Workings:

1. Normal working hours in a month = (Daily working hours – lunch break) × no. of days

$$= (8 \text{ hours} - 0.5 \text{ hours}) \times 26 \text{ days} = 195 \text{ hours}$$
2. Hours worked by Mr.Z = No. of normal days worked + Overtime + holiday/ Sunday worked

$$= (21 \text{ days} \times 7.5 \text{ hours}) + (9.5 \text{ hours} + 8.5 \text{ hours}) + (5 \text{ hours} + 6 \text{ hours})$$

$$= 157.5 \text{ hours} + 18 \text{ hours} + 11 \text{ hours} = 186.50 \text{ hours.}$$

(i) Calculation of earnings per day

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × ₹31,200)	3,744
Employer's contribution to Pension fund (7% × ₹31,200)	2,184
	41,288
No. of working days in a month (days)	26
Rate per day	1,588
Transport allowance per day	50
Earnings per day	1,638

(ii) Calculation of effective wage rate per hour of Mr. Z:

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (₹1,000 × 2 days)	2,000
Dearness allowance (20% of basic salary)	5,600
	33,600
House rent allowance (16% of basic salary)	4,480
Transport allowance (₹50 × 23 days)	1,150
Overtime allowance (₹160 × 2 × 2 hours)*	640
Employer's contribution to Provident fund (12% × ₹33,600)	4,032
Employer's contribution to Pension fund (7% × ₹33,600)	2,352
Total monthly wages	46,254
Hours worked by Mr. Z (hours)	186.5
Effective wage rate per hour	248

*(Daily Basic + DA) ÷ 7.5 hours

= (1,000+200) ÷ 7.5 = ₹160 per hour

(iii) Calculation of wages to be charged to Job no. HT200

= ₹ 248 × 100 hours = ₹ 24,800

3. (a) Computation of Machine Hour Rate

	Basis of apportionment	Total (₹)	Machines		
			A (₹)	B (₹)	C (₹)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	80,000	30,000	30,000	20,000
Indirect Labour	Direct Labour (2:3:3)	2,40,000	60,000	90,000	90,000
Building maintenance expenses	Floor Space (2:2:1)	2,00,000	80,000	80,000	40,000
Rent and Rates	Floor Space (2:2:1)	2,40,000	96,000	96,000	48,000
Salary of foreman	Equal	5,04,000	1,68,000	1,68,000	1,68,000
Salary of attendant	Equal	1,44,000	48,000	48,000	48,000
Total standing charges		14,08,000	4,82,000	5,12,000	4,14,000
Hourly rate for standing charges			247.43	262.83	212.53
(B) Machine Expenses:					
Depreciation	Direct	2,00,000	75,000	75,000	50,000
Spare parts	Final estimates	1,32,250	46,000	57,500	28,750
Power	K.W. rating (3:2:3)	4,00,000	1,50,000	1,00,000	1,50,000
Consumable Stores	Direct	80,000	30,000	25,000	25,000
Total Machine expenses		8,12,250	3,01,000	2,57,500	2,53,750
Hourly Rate for Machine expenses			154.52	132.19	130.26
Total (A + B)		22,20,250	7,83,000	7,69,500	6,67,750
Machine Hour rate			401.95	395.02	342.79

Working Notes:**(i) Calculation of effective working hours:**

$$\begin{aligned} \text{No. of full off-days} &= \text{No. of Sunday} + \text{No. of holidays} \\ &= 52 + 12 = 64 \text{ days} \end{aligned}$$

$$\text{No. of half working days} = 52 \text{ days} - 2 \text{ holidays} = 50 \text{ days}$$

No. of full working days	= 365 days – 64 days – 50 days = 251 days
Total working Hours	= {(251 days × 8 hours) + (50 days × 4 hours)} = 2,008 hours + 200 = 2,208 hours.
Total effective hours	= Total working hours × 90% - 2% for break-down = 2,208 hours × 90% - 2% (2,208 hours × 90%) = 1,987.2 hours – 39.74 hours = 1947.46 or Rounded up to 1948 hours.

(ii) Amount of spare parts is calculated as under:

	A (₹)	B (₹)	C (₹)
Preliminary estimates	40,000	40,000	20,000
Add: Increase in price @ 15%	6,000	6,000	3,000
	46,000	46,000	23,000
Add: Increase in consumption @ 25%	–	11,500	5,750
Estimated cost	46,000	57,500	28,750

(iii) Amount of Indirect Labour is calculated as under:

	(₹)
Preliminary estimates	2,00,000
Add: Increase in wages @ 20%	40,000
	2,40,000

(iv) Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

4. (i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

(ii) Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (₹1,535×56 orders)	85,960.00	
- Material handling (₹685.48×84 movements)	57,580.32	
- Maintenance (₹139.94×1,420 hours)	1,98,714.80	
- Set-up (₹628.97×60 set-ups)	37,738.20	
- Quality control (₹242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

5. Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	84,00,000	
	- Carriage inward	1,72,600	
	Add: Opening stock of raw materials	6,20,000	
	Less: Closing stock of raw materials	(4,60,000)	87,32,600
(ii)	Direct employee (labour) cost:		
	- Direct wages	60,00,000	
	- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
(iii)	Direct expenses:		
	- Consumable materials	4,80,000	
	- Cost of power & fuel	28,00,000	32,80,000
	Prime Cost		1,87,32,600
(iv)	Works/ Factory overheads:		
	- Wages to foreman and store keeper	8,40,000	

	- Other indirect wages to factory staffs	1,35,000	9,75,000
	Gross factory cost		1,97,07,600
	Add: Opening value of W-I-P		7,84,000
	Less: Closing value of W-I-P		(6,64,000)
	Factory Cost		1,98,27,600
(v)	Research & development cost paid for improvement in production process		9,60,000
(vi)	Production planning office expenses		12,60,000
	Cost of Production		2,20,47,600
	Add: Opening stock of finished goods		14,40,000
	Less: Closing stock of finished goods		(9,80,000)
	Cost of Goods Sold		2,25,07,600
(vii)	Administrative overheads:		
	- Salary to accountants	7,20,000	
	- Fees to statutory auditor	1,80,000	
	- Fees to cost auditor	80,000	
	- Fee paid to independent directors	9,40,000	19,20,000
(viii)	Selling overheads & Distribution overheads:		
	- Salary to delivery staffs		14,30,000
	Cost of Sales		2,58,57,600
	Profit (balancing figure)		24,02,400
	Sales		2,82,60,000

Note: Income tax and Donation to PM National Relief Fund is avoided in the cost sheet.

6. Memorandum Reconciliation Accounts

Dr.		Cr.		
		(₹)	(₹)	
To	Net Loss as per Costing books	6,94,000	By Administration overheads over recovered in cost accounts	1,20,000

To	Factory overheads under absorbed in Cost Accounts	80,000	By	Interest on investment not included in Cost Accounts	1,92,000
To	Depreciation under charged in Cost Accounts	1,00,000	By	Transfer fees in Financial books	48,000
To	Income-Tax not provided in Cost Accounts	1,08,000	By	Stores adjustment (Credit in financial books)	28,000
To	Interest on Loan Funds in Financial Accounts	4,90,000	By	Dividend received in financial books	64,000
			By	Net loss as per Financial books	10,20,000
		14,72,000			14,72,000

7. (i) Computation of optimum run size

$$\text{Optimum run size or Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

Where, D = Annual demand i.e. 5.5% of 18,00,00,000 = 99,00,000 units

S = Set-up cost per run = ₹33,500

C = Inventory holding cost per unit per annum

= ₹6.25 × 12 months = ₹75

$$\text{EBQ} = \sqrt{\frac{2 \times 99,00,000 \text{ units} \times ₹33,500}{₹75}} = 94,042.5 \text{ units or } 94,043 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	80,000 units	124 $\left(\frac{99,00,000}{80,000}\right)$	41,54,000 (124 × ₹33,500)	30,00,000 $\left(\frac{80,000 \times ₹75}{2}\right)$	71,54,000
B	94,043 units	106 $\left(\frac{99,00,000}{94,043}\right)$	35,51,000 (106 × ₹33,500)	35,26,612.5 $\left(\frac{94,043 \times ₹75}{2}\right)$	70,77,612.50
Extra Cost (A – B)					76,387.50

8. (a) Calculation of Total Cost for the Job:

Particulars	Amount (₹)	Amount (₹)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet 15 units × $\left(\frac{6 \times ₹ 204 + 15 \times ₹ 209}{21 \text{ units}}\right)$	3,113.57	
- Valve 6 units × $\left(\frac{8 \times ₹ 404 + 10 \times ₹ 402 + 14 \times ₹ 424}{32 \text{ units}}\right)$	2,472.75	23,091.95
Direct Labour:		
- Plumber [(180 hours × ₹100) + (12 hours × ₹50)]	18,600.00	
- Helper [(192 hours × ₹70) + (24 hours × ₹35)]	14,280.00	32,880.00
- Overheads [₹26 × (180 + 192) hours]		9,672.00
Total Cost		65,643.95

(b) Price to be charged for the job work:

	Amount (₹)
Total Cost incurred on the job	65,643.95
Add: 25% Profit on Job Price $\left(\frac{65,643.95}{75\%} \times 25\%\right)$	21,881.32
	87,525.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (₹)
17-08-2020	8 units × ₹ 600	4,800.00
28-08-2020	10 units × $\left(\frac{4 \times ₹ 600 + 35 \times ₹ 628}{39 \text{ units}}\right)$	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		Amount (₹)
12-08-2020	2 units × ₹ 660	1,320.00
28-08-2020	2 units × $\left(\frac{8 \times ₹ 660 + 30 \times ₹ 610 + 20 \times ₹ 660}{58 \text{ units}} \right)$	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		Amount (₹)
12-08-2020	18 units × ₹ 26	468.00
17-08-2020	30 units × ₹ 26	780.00
28-08-2020	34 units × $\left(\frac{12 \times ₹ 26 + 150 \times ₹ 28}{162 \text{ units}} \right)$	946.96
30-08-2020	60 units × $\left(\frac{12 \times ₹ 26 + 150 \times ₹ 28}{162 \text{ units}} \right)$	1,671.11
		3,866.07

9. (i)

Process-I A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of ₹42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

$$* \frac{₹(3,42,000 - 3,500)}{(7,000 - 350) \text{ units}} = ₹50.9022$$

Process-II A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600)	660	6,600

To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of ₹54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

$$** \frac{\text{₹}(6,49,955 - 6,600)}{(6,600 - 660)\text{units}} = \text{₹}108.3089$$

Process-III A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200)	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (₹35×600)	600	21,000
To Production OH (200% of ₹48,000)	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

$$*** \frac{\text{₹}(8,05,406 - 2,600 - 21,000)}{(5,200 - 260 - 600)\text{units}} = \text{₹}180.1396$$

$$\# \text{ Realisable value} = \text{₹}135 - (85+15) = \text{₹}35$$

(ii)

By-Product Process A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			

To Selling expenses	-	9,000		
	600	81,000	600	81,000

10. (i) (a) **Statement of Joint Cost allocation of inventories of X, Y and Z**
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2020

(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes**1. Total production of three products for the year 2019-2020**

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. Joint cost apportioned to each product:

$$\frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Total cost of Product X} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 10,98,000 = \text{₹ } 4,66,797$$

$$\text{Total cost of Product Y} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 13,20,750 = \text{₹ } 5,61,496$$

$$\text{Total cost of Product Z} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 5,21,500 = \text{₹ } 2,21,707$$

11. (i) Operating Cost Sheet for the month of August, 2020

Particulars	Amount (₹)
A. Fixed Charges:	
Manager's salary (₹60,000 × 60%)	36,000
Drivers' Salary (₹20,000 × 30 drivers)	6,00,000
Helpers' wages (₹12,000 × 25 helpers)	3,00,000
Insurance (₹8,40,000 ÷ 12 months)	70,000
Road licence (₹6,00,000 ÷ 12 months)	50,000
Garage rent (₹9,00,000 ÷ 12 months)	75,000
Routine mechanical services	3,00,000
Electricity charges (for office, garage and washing station)	55,000
Depreciation of vehicles	6,00,000
Apportioned workshop expenses	88,000
Total (A)	21,74,000

B.	Variable Charges:	
	Loading and unloading charges (Working Note 1)	7,65,000
	Consumable Stores	1,35,000
	Cost of diesel (Working Note 2)	14,04,000
	Lubricant, Oil etc.	1,15,000
	Replacement of Tyres, Tubes & other parts	4,25,000
	Total (B)	28,44,000
C.	Total Cost (A + B)	50,18,000
D.	Total Ton-Kms. (Working Note 3)	9,43,200
E.	Cost per ton-km. (C ÷ D)	5.32

(ii) **Calculation of Chargeable Freight**

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33 $\frac{1}{3}$ % on cost	₹ 1.77
Chargeable freight per ton-km.	₹ 7.09

Working Notes:**1. Wages paid to loading and unloading labours**

Numbers of vehicles available per day × No. of days × trips × wages per trip
 (20 vehicles × 90%) × 25 days × 2 trips × ₹850
 $18 \times 25 \times 2 \times 850 = ₹7,65,000$

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020
 = 100 k.m. × 2 × 25 days × 90% = 4,500 km.

Consumption of diesel = $\frac{4,500 \text{ k.m.} \times 20 \text{ vehicles}}{5 \text{ k.m.}} = 18,000 \text{ litres.}$

Cost of diesel = 18,000 litres × ₹ 78 = ₹14,04,000.

3. Calculation of total ton-km:

Total Ton-Km. = Total Capacity × Distance covered by each vehicle × Average Capacity Utilisation ratio.

$$= [(5 \times 9 \text{ MT}) + (6 \times 12 \text{ MT}) + (7 \times 15 \text{ MT}) + (2 \times 20 \text{ MT})] \times 4,500 \text{ k.m.} \times \frac{(90\% + 70\%)}{2}$$

$$\begin{aligned}
 &= (45 + 72 + 105 + 40) \times 4,500 \text{ k.m.} \times 80\% \\
 &= 262 \times 4,500 \times 80\%. \\
 &= 9,43,200 \text{ ton-km.}
 \end{aligned}$$

12. (i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
 = ₹ 90 (18,000 kg. – 17,800 kg.)
 = ₹ 18,000 (Favourable)
- (ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
 = 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)
- (iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
 = (SQ × SP) – (AQ × AP)
 = (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)
 = ₹ 16,20,000 – ₹ 16,37,600
 = ₹ 17,600 (Adverse)
- (iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
 = ₹ 100 (1,800 units × 8 – 14,000 hrs.)
 = ₹ 100 (14,400 hrs. – 14,000 hrs.)
 = ₹ 40,000 (Favourable)
- (v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
 = 14,000 hrs. (₹ 100 – ₹ 104)
 = ₹ 56,000 (Adverse)
- (vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
 = (SH × SR) – (AH × AR)
 = (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)
 = ₹ 14,40,000 – ₹ 14,56,000
 = ₹ 16,000 (Adverse)
- (vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
 = (14,400 hrs. × ₹ 15) – ₹ 2,17,500
 = ₹ 1,500 (Adverse)

$$\begin{aligned} \text{(viii) Fixed Overhead Cost Variance} &= \text{Absorbed Fixed Overhead} - \text{Actual Fixed Overhead} \\ &= (1,800 \text{ units} \times ₹400) - ₹ 7,68,000 \\ &= ₹ 7,20,000 - ₹ 7,68,000 = ₹ 48,000 \text{ (Adverse)} \end{aligned}$$

13. Sales Volume 5,00,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

$$(i) \text{ Break even sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{₹10,00,00,000}{₹250} = 4,00,000 \text{ units}$$

$$\text{Break even sales in rupees} = 4,00,000 \text{ units} \times ₹ 680 = ₹ 2,720 \text{ lakhs}$$

OR

$$\text{P/V Ratio} = \frac{250}{680} \times 100 = 36.76\%$$

$$\text{B.E.P (Rupees)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{10,00,00,000}{36.76\%} = ₹ 2,720 \text{ lakhs (approx.)}$$

(ii) Number of units sold to achieve a target profit of ₹700 lakhs:

$$\begin{aligned} \text{Desired Contribution} &= \text{Fixed Cost} + \text{Target Profit} \\ &= 1,000 \text{ L} + 700 \text{ L} = 1,700 \text{ L} \end{aligned}$$

$$\text{Number of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{17,00,00,000}{250} = 6,80,000 \text{ units}$$

(iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

$$\text{Existing Selling Price per unit} = ₹ 680$$

$$\text{Revised selling price per unit} = ₹ 680 \times 110\% = ₹748$$

$$\text{Existing Sales Volume} = 5,00,000 \text{ units}$$

$$\text{Revised sales volume} = 5,00,000 \text{ units} - 10\% \text{ of } 5,00,000 = 4,50,000 \text{ units.}$$

Statement of profit at sales volume of 4,50,000 units @ ₹ 748 per unit

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

- (iv) Volume to be achieved to earn target profit of ₹700 lakhs with revised selling price and reduction of 10% in variable costs and ₹170 lakhs in fixed cost:

Revised selling price per unit = ₹748

Variable costs per unit existing = ₹430

Revised Variable Costs

Reduction of 10% in variable costs = ₹ 430 – 10% of 430

= ₹ 430 – ₹43

= ₹387

Total Fixed Cost (existing) = ₹ 1,000 lakhs

Reduction in fixed cost = ₹ 170 lakhs

Revised fixed cost = ₹ 1,000 lakhs – ₹ 170 lakhs = ₹830 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = ₹ 748 – ₹ 387 = ₹ 361

Desired Contribution = Revised Fixed Cost + Target Profit

= ₹ 830 lakhs + ₹700 lakhs = ₹1,530 lakhs

No. of units to be sold = $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{₹15,30,00,000}{₹361} = 4,23,823 \text{ units}$

14. (i) **Product-wise Profitability Statement for the FY 2019-20:**

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (₹140×8,000)	6,30,000 (₹157.50×4,000)	17,50,000

Direct wages	7,20,000 (₹90×8,000)	5,30,000 (₹132.5×4,000)	12,50,000
Variable factory overheads	5,47,200 (76%of 7,20,000)	4,02,800 (76%of 5,30,000)	9,50,000
Other variable costs	3,20,000 (₹40×8,000)	2,80,000 (₹70×4,000)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

(ii) Preparation of Budget for the FY 2020-21:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (₹140×6,400)	5,67,000 (₹157.50×3,600)	14,63,000
Direct wages per unit	6,91,200 (₹108×6,400)	5,72,400 (₹159×3,600)	12,63,600
Variable factory overheads	5,25,312 (76%of 6,91,200)	4,35,024 (76%of 5,72,400)	9,60,336
Other variable costs	2,56,000 (₹40×6,400)	2,52,000 (₹70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110%of ₹4,00,000)	-	-	4,40,000
Profit/ (Loss)			(11,78,936)

15. (a) (i) **Discretionary Cost Centre:** The cost centre whose output cannot be measured in financial terms, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.
- (ii) **Investment Centres:** These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.
- (b) **Advantages of Cost plus contracts are as follows:**
- (i) The Contractor is assured of a fixed percentage of profit. There is no risk of incurring any loss on the contract.
 - (ii) It is useful specially when the work to be done is not definitely fixed at the time of making the estimate.
 - (iii) Contractee can ensure himself about 'the cost of the contract', as he is empowered to examine the books and documents of the contractor to ascertain the veracity of the cost of the contract.
- (c) **The advantages of zero-based budgeting are as follows:**
- It provides a systematic approach for the evaluation of different activities and ranks them in order of preference for the allocation of scarce resources.
 - It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
 - It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
 - The areas of wasteful expenditure can be easily identified and eliminated.
 - Departmental budgets are closely linked with corporation objectives.
 - The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

- (d) This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. This means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two examples of industries are Ready made garments and Jewellery making.