CA INTER

COSTING

Formula Sheet

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Material Cost

2.1	Re-order Stock Level	Maximum Consumption × Maximum Re-order Period

OR

2.2	Re-order Stock Level	Minimum Stock Level + (Average Rate of Consumption × Average Re- order period)
2.3	Minimum Stock Level	Minimum Stock Level = Re-order Stock Level - (Average Consumption Rate × Average Re-order Period)
2.3	Maximum Stock Level	Maximum Stock Level = Re-order Level + Re-order Quantity - (Minimum Consumption Rate × Minimum Re-order Period)
2.3	Maximum Stock Level	Maximum Stock Level = Re-order Level + Re-order Quantity - (Minimum Consumption Rate × Minimum Re-order Period)
2.3	Average Stock Level	Minimum Stock Level + 1/2 Re-order Quantity
2.3	Average Stock Level	$\frac{\text{Maximum Stock Level + Minimum Stock Level}}{2}$
2.3	Ordering Cost / Carrying Cost	Tca = No. of Order x Ordering cost per order $Tca = \frac{A}{Q} \times Ca$
2.3	EOQ	$\sqrt{\frac{2 \times \text{Annual Requirement (A)} \times \text{Cost per order (O)}}{\text{Carrying Cost per unit per annum (C)}}}$
2.3	Inventory Turnover Ratio	$\frac{\text{Cost of materials consumed during the period}}{\text{Cost of average stock held duirng the period}}$ Average stock = 1/2 (opening stock + closing stock)
2.3	Average no. of days of Inventory holding	$\frac{\text{365 days /12 months}}{\text{Inventory Turnover Ratio}}$

Employee Cost

2.1	Straight Time Rate System Wages	Time Worked (Hours/ Days/ Months) × Rate for the time
2.1	Straight Piece Rate System Wages	Number of units produced × Rate per unit
2.1	Halsey Premium Plan Wages	Time taken × Time rate + 50% of time saved × Time rate
2.1	Rowan Premium Plan Wages	$\text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$
2.3	Absorption rates of Employee cost	$\text{Rate Per Hour} = \frac{\text{Total estimated monetary benefits and costof non monetary benefits}}{\text{Budgeted direct employee hour-Normal idletime}}$
2.3	Efficiency in %	$\frac{\text{Time allowed as per standard}}{\text{Time Taken}} \times 100$
2.3	Employee Productivity	$\frac{\text{Standard time for doing actual work}}{\text{Actual time taken}}$
2.3	Employee (Labour) Turnover Replacement Method	$= \frac{\text{Number of employees Replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$
2.3	Employee (Labour) Turnover Separation Method	$\frac{\text{Number of employees Replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$
2.3	Employee (Labour) Turnover Flux Method	$\frac{\text{Number of employees Separated + Number of employees Replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$
1.1	Employee Turnover rate by Flux Method	$\frac{\text{No. of Separation+ No. of Replacements+No. of new Joinings}}{\text{Average no. of employees during the period on roll}} \times 100$
	OR	
1.1	Employee Turnover rate by Flux Method	$\frac{\text{No. of Separations+No. of Accessions}}{\text{Average no. of employees during the period on roll}} \times 100$
1.1	Average number of Employees	$\frac{\text{No. of employees at beginning + No. of employees at end of the period}}{2} \times 100$
1.1	Equivalent Employee (Labour) Turnover rate	$\frac{\text{Employee Turnover rate for the period}}{\text{Number of days in the period}} \times 365$

Overhead

1.1	**Percentage of Direct Material Cost**	$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Budgeted Direct Material cost of all products}} \times 100$
1.1	**Percentage of Prime Cost Method**	$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Prime cost}} \times 100$
1.1	**Percentage of Direct Labour Cost**	$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Prime cost}} \times 100$
1.1	**Percentage of Direct Labour Cost**	$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Direct Labour cost}} \times 100$
1.1	**Labour Hour Rate Method**	$\text{Direct Labour Hour Rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Direct Labour Hour}} \times 100$
1.1	**Rate per unit of Output Method**	$\text{Overheads Rate} = \frac{\text{Amount of Overheads}}{\text{Number of units}}$
1.1	**Normal overhead Rate**	$\frac{\text{Actual amount of overheads}}{\text{Actual base}}$
1.1	**Pre-determined Rate**	$\frac{\text{Budgeted amount of overheads}}{\text{Budgeted base}}$
1.1	**Blanket Rate**	$\frac{\text{Total overheads for the factory}}{\text{Total number of units of base for the factory}}$
1.1	**Departmental Overhead Rate**	$\frac{\text{Overheads of department or cost centre}}{\text{Corresponding base}} \times 100$
1.1	**Pre-determined overhead rate**	$\frac{\text{Estimated / Normal overheads for the period}}{\text{Budgeted Number of units during the period}}$
1.1	**Supplementary Rate**	$\frac{\text{Under /Over - absorbed OH}}{\text{Units produced}}$

Activity Based Costing

1.1	**Activity Cost Driver Rate**	$\frac{\text{Total cost of activity}}{\text{Activity driver}}$
1.1	**Traditional Absorption Costing / Recovery Rate**	$\frac{\text{Budgeted level of Overheads}}{\text{Budgeted level of Activity}}$ (Units, Machine hour, Labour hour, etc.)

2.2 Stages in ABC

1. **Identify different activities within organisation**
   Break organisation down into many very small activities
2. **Create a Cost Pool for activities**
3. **Determine activity cost drivers**
   To change overheads collected in cost pools to products
4. **Calculate activity cost driver rates for each activity**
   $\frac{\text{Total Cost Pool}}{\text{Activity Driver}}$
5. **Support activities are then spread across products**

Cost Sheet

COST SHEET/STATEMENT

Specimen Format of Cost Sheet for a Manufacturing entity

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	**Direct Material Consumed:**	xxx	
	Add: Opening Stock of Raw Material	xxx	
	Add: Purchases of Raw Material	xxx	
	Add: Expenses related to Purchase	xxx	
	Less: Sale of Scrap of Material	(xxx)	
	Less: Closing Stock	(xxx)	
		xxx	
2.	Direct employee (labour) cost	xxx	
3.	Direct expenses	xxx	
4.	**Prime Cost (1+2+3)**	**xxx**	
5.	Add: Works/ Factory Overheads	xxx	
6.	Gross Works Cost (4+5)	xxx	
7.	Add: Opening Work in Process	xxx	
8.	Less: Closing Work in Process	(xxx)	
9.	**Works/ Factory Cost (6+7 -8)**	**xxx**	
10.	Add: Quality Control Cost	xxx	
11.	Add: Research and Development Cost	xxx	
12.	Add: Administrative Overheads (relating to production activity)	xxx	
13.	Less: Credit for Recoveries/Scrap/By Products/ misc. income	(xxx)	
14.	Add: Packing cost (primary)	xxx	
15.	**Cost of Production (9+10+11+12-13+14)**	**xxx**	
16.	Add: Opening stock of finished goods	xxx	
17.	Less: Closing stock of finished goods	(xxx)	
18.	**Cost of Goods Sold (15+16-17)**	**xxx**	
19.	Add: Administrative Overheads (General)	xxx	
20.	Add: Marketing Overheads:		
	Selling and Distribution Overheads	xxx	
21.	**Cost of Sales (18+19+20)**	**xxx**	

Unit & Batch Costing

1.1	**Cost per unit**	$\frac{\text{Total Cost of Production}}{\text{No. of units produced}}$
1.1	**EBQ**	$\sqrt{\frac{2DS}{C}}$
1.1	**Annual Set up Costs & Carrying Cost of Producing EBQ**	$=\sqrt{2 \times D \times S \times C}$
1.1	**Number of Set ups Per Annum**	$\frac{\text{Annual Demand of Finished Goods}}{\text{EBQ}}$
1.1	**Annual Set up Cost**	No. of Set ups x Cost per Set up
1.1	**Time Between Two Set ups**	$\frac{\text{360 Days / 12 Months}}{\text{No. of Set ups per annum}}$
1.1	**Annual Carrying Cost**	$\frac{\text{EBQ}}{2}$ x Carrying Cost per unit
1.1	**Cost per unit**	$\frac{\text{Total Cost of a Batch}}{\text{Number of Units produced in a Batch}}$

Process & Operation Costing

1.1	Value of units transferred to Process A/c	$\frac{\text{Total Cost-Realisable value of normal loss}}{\text{Total input units - Normal loss units}} \times \text{Units transferred}$
1.1	Value of Abnormal loss	$\frac{\text{Total Cost - Realisable value of normal loss}}{\text{Total input units - Normal loss units}} \times \text{Abnormal loss units}$
1.1	Value of Abnormal Gain	$\frac{\text{Total Cost - Realisable value of normal loss}}{\text{Total input units -Normal loss units}} \times \text{Abnormal Gain units}$
1.1	Value of Abnormal Gain	$\text{Equivalent completed units} = \left(\text{Actual no. of units in the process of manufacture}\right) \times \left(\text{Percentage of work completed}\right)$

Service Costing

1.1	Weighted Average or Absolute basis	Σ(Weight Carried × Distance)1 + (Weight Carried × Distance)2 +….+(Weight Carried × Distance)n
1.1	Simple Average or Commercial basis	$\Sigma(\text{Distance}_1 + \text{Distance}_2 + \ldots\ldots\ldots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \ldots\ldots + W_n}{n}\right)$
1.1	Simple Average or Commercial basis	$\Sigma(\text{Distance}_1 + \text{Distance}_2 + \ldots\ldots\ldots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \ldots\ldots + W_n}{n}\right)$

Standard Costing

Direct Material Variance

Direct Material Cost Variance is difference between Standard cost of INPUTS (i.e.MATERIALS) specified and the Actual cost Material used.

Responsibility of Material Cost Variance

- Material Price Variance ← Purchase Manager
- Production Manager → Material Usage Variance

ANALYSIS OF MATERIAL VARIANCE

Material Cost Variance
(Standard Material Cost - Actual Material Cost)
(SQ x SR - AQ x AR)
{[Standard Quantity of input for Actual output(SQ) x Standard rate of input (SR)]
-[Actual Quantity consumed (AQ) x Actual rate of input (AR)]}

Material Price Variance
(Standard rate -Actual rate) x Actual quantity of input
(SR - AR) x AQ

Material Usage Variance
(Standard quantity of input for actual output - Actual input) x Standard rate
(SQ - AQ) x SR

Derivation of Sub Usage Variance
Adding & Subtracting SMQ from both sides
(SQ - SMQ + SMQ - AQ) x SR
(SQ - SMQ) x SR + (SMQ - AQ) x SR

Material Sub Usage Variance
(When the total quantity of standard and actual is different)
(SQ - SMQ) x SR

Material Mix Variance
(When the ratio of standard and actual quantity is different)
(SMQ - AQ) x SR

Where, SMQ = Standard Mix Quantity
Calculated as Total of Actual Quantity in Standard Ratio

Variance Table = If, SM > AM = (F)
SR > AR = (F)
SM > SMM = (F)
SMM > AM = (F)

5.1 Labour Variance

These two basic variances that can be calculated in respect of direct labour total variance (also known as labour cost variance) are (a) Rate variance and (b) Efficiency variance

5.2 Responsibility of Labour Cost Variance

- Labour Rate Variance ← Personnel / HR Manager
- Labour Manager → Labour Efficiency Variance

5.3 ANALYSIS OF LABOUR VARIANCE

Labour Cost Variance
(Standard Labour Cost - Actual Labour cost)
(Standard hours for Actual output x Standard Rate per labour hour - Actual Hours paid x Actual Rate)

Labour Efficiency Variance
[(Std hours for Actual Output-Actual hrs) x Std Rate per labour hr]

Derivation of Sub Efficiency Variance
(SH - AH) x SR
(SH - SMH + SMH - AH) x SR
(SH - SMH) x SR + (SMH - AH) x SR

Idle Time Variance
(Actual Hrs Paid - Actual Hrs Worked) x Standard Rate per labour hr
(Always Adverse)

Labour Rate Variance
[(Std Rate - Actual Rate) x Actual Labour hrs PAID]
(SR - AR) x AH

Labour Sub Efficiency Variance
(When **TOTAL** of Standard hours and Actual hours is different)
(SH - SMH) x SR
Adding & Subtracting SMH form both sides
(SH - SMH + SMH - AH) x SR

Labour Mix Variance
(When **RATIO** of Standard and Actual hours is different)
(SMH - AH) x SR

Where, SMH = Standard Mix Hours
SMH = Total of Actual Hours in Standard Ratio

Total Hour is same for Labour, Variable and Fixed Overheads

Idle Time
Actual hours paid (gross hours)
- Actual hours worked (net hours)

Variance Table = If, SH > AH = (F)
SR > AR = (F)
SH > SMH = (F)
SMH > AH = (F)

Overhead Variance

a) Fixed Overhead Variances b) Variable Overhead Variances

6.1 ANALYSIS OF VARIABLE OVERHEAD VARIANCES

Variable Cost Variance

(Std Budgeted Variable OH - Actual Variable OH)

(Std Variable OH Rate p.u x Actual output - Actual Variable Rate p.u x Actual Output)

(Std Hours for Actual x Std VOH Rate per hr - Actual Hrs x Actual Variable Rate / Hrs)

Variable OH Expenditure Variance

(Std variable OH Rate per hour - Actual Variable OH Rate per hr) x Actual hrs worked

Variable OH Efficiency Variance

(Std Hours for Actual Production - Actual hrs worked x Std Variable OH Rate per hour

Total Hour is same for Labour, Variable and Fixed Overheads

Very Important Point:

Standard Variable Overhead Rate > Actual Variable Overhead Rate = (F)

Standard Hours > Actual Hours = (F)

6.2 ANALYSIS OF FIXED OVERHEAD VARIANCES

Fixed Overhead Cost Variance

(Absorbed Fixed Overheads - Actual fixed overhead)

(Actual production x RECOVERY RATE P.U.- Actual Fixed Overheads)

(Actual Production x Standard Hours per unit x Standard Rate Per Hour - Actual Fixed Overhead)

Fixed OH Expenditure Variance

Budgeted Fixed OH - Actual Fixed OH

Fixed OH Volume Variance

(Budgeted Production - Actual Production) x RR p.u.

(Budgeted Prodn - Actual Prodn) x Std hours x RR per hr.

(Budgeted Prodn x Std Hours) - (Actual Prdn x (Std hr)] x RR/hr.

(Budgeted hrs for Budget Prdn - Std Hrs. for Actual Prdn) x RR per hour

(ALWAYS CALCULATED IN TERM OF HOURS)

Fixed OH Capacity Variance

(Budgeted Hrs - Actual hours) x RR per hour

Fixed OH Efficiency Variance

(Std. hours for Actual production - Actual hours) x RR per hour

Fixed OH Calender Variance

(Budgeted days - Actual days) x RR per days

Fixed OH Revised

Capacity Variance (Budgeted hours for Actual days - Actual Hours) x Recovery Rate per hour

Marginal Costing

1.1	**Marginal cost**	Variable cost = Direct labour + direct Material + Direct Expenses + Variable overheads
1.1	**Contribution (C)**	Sales Revenue (S) – Total Variable Cost (V)
1.1	**Marginal Cost Equation**	S - V = C = F ± P Where, S = Selling price per unit, V = Variable cost per unit, C = Contribution, F = Fixed Cost
1.1	**P/V Ratio**	$\frac{\text{Contribution}}{\text{Sales}} \times 100$ **OR** $\frac{\text{Change in contribution / Profit}}{\text{Change in sales}} \times 100$

1.1 Break-even point in units

$$\frac{\text{Fixed costs}}{\text{Contribution per unit}}$$

1.1 Cash break- even point

$$\frac{\text{Cash Fixed Costs}}{\text{Contribution per unit}}$$

1.1 Desired / Required Sales

$$\frac{\text{Fixed Cost + Desired Profit}}{\text{P/V Ratio}}$$

1.1 Desired / Required Sales

$$\frac{\text{Fixed Cost + Desired Profit}}{\text{P/V Ratio}}$$

1.1 Margin of Safety

$$\frac{\text{Profit}}{\text{P / V Ratio}}$$

i. Sales – Variable cost = Fixed cost + Profit /Loss
By multiplying and dividing L.H.S. by S
ii. $\frac{S(S-V)}{S} = F + P$
iii. S x P/V Ratio = F + P or Contribution $\left(\text{P/V Ratio} = \frac{S-V}{S} \times 100\right)$
iv. BES x P/V Ratio = Fixed Cost (∵ at BEP, Profit is zero)
v. $\text{BES} = \frac{\text{Fixed cost}}{\text{P/V Ratio}}$
vi. $\text{P/V Ratio} = \frac{\text{Fixed cost}}{\text{BES}}$

vii	S × P/V Ratio = Contribution (Refer to iii)
viii.	$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sale}} \times 100$
ix.	(BES + MS) × P/V Ratio = Contribution (Total sales = BES + MS)
x.	(BES × P/V Ratio) + (MS × P/V Ratio) = F + P
	By deducting (BES × P/V Ratio) from L.H.S. and F from R.H.S. in (x) above, we get:
xi.	Margin of Safety × P/V Ratio = Profit
xii.	$\text{P/V Ratio} = \frac{\text{Change in profit}}{\text{Change in sales}} \times 100$
xiii.	$\text{P/V Ratio} = \frac{\text{Change in contribution}}{\text{Change in sales}} \times 100$
xiv.	$\text{Profitability} = \frac{\text{Contribution}}{\text{Key factor}}$
xv.	Margin of Safety = Total Sales – BES or $\frac{\text{Profit}}{\text{P/V Ratio}}$
xvi.	BES = Total Sales – MS
xvii.	$\text{Margin of Safety Ratio} = \frac{\text{Total sales – BES}}{\text{Total Sales}}$

Budgetary Control

1.1	**Production Budget**	Sales Budget - Opening inventory + Planned closing inventory
1.1	**Actual Capacity Usage Ratio**	$\frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100$
1.1	**Actual Usage of Budgeted Capacity Ratio**	$\frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100$
1.1	**Standard Capacity Usage Ratio**	$\frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$
1.1	**Calendar Ratio**	$\frac{\text{Available working days}}{\text{Budgeted working days}} \times 100$
1.1	**Efficiency Ratio**	$\frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100$
1.1	**Activity Ratio**	$\frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100$