Material Cost

Cost per unit of Material after taking Normal Shortage	$\frac{\text{Total Material Cost}}{\text{Effective Quantity}}$ Effective Quantity = Total Quantity – Normal Loss Units
Economic Order Quantity	$\sqrt{\frac{2AO}{C}}$ A = Annual Requirement of Material O = Ordering Cost per Order C = Carrying Cost per unit per annum
Carrying Cost per unit per annum	Material Price per unit × % of carrying cost
Total Ordering Cost	Ordering Cost per Order × Number of Orders Number of Orders = $\frac{\text{Annual Requirement}}{\text{ROQ}}$
Total Carrying Cost	Average Inventory × Carrying Cost per unit per annum Average Inventory for EOQ purpose = $\frac{\text{ROQ}}{2}$
Re-order Stock Level	Approach 1: Re-order Level = Maximum Usage x Maximum ROP Approach 2: Re-order Level = Minimum Stock Level + (Average Usage x Average ROP) If data is available for both, calculate ROL by both approaches
Minimum Stock Level Or Safety Stock Level	Re-order Level - (Average Usage x Average ROP) Stock maintained in excess of lead time consumption Lead Time consumption = Average Usage x Average ROP
Maximum Stock Level	Re-order Level + Re-order Quantity – (Minimum Usage x Minimum ROP)
Average Stock Level	Type 1: Minimum Stock Level + ½ Re-Order Quantity Type 2: $\frac{\text{Max. Stock Level + Min. Stock Level}}{2}$ If data is available for both, calculate ROL by both approaches
Danger Stock Level	Average Usage x Lead time for emergency purchase
Expected Stock Out Cost	It means weighted average of stock out costs at different levels of safety stock taking probabilities at each level as their weights
Inventory Turnover Ratio	$\frac{\text{Cost of materials consumed during the period}}{\text{Cost of average stock held during the period}}$
Avg no. of days of inventory holding	$\frac{\text{365 days}}{\text{Inventory Turnover Ratio}}$

Employee Cost

Wages per unit of Output	$\frac{\text{Total Employee Cost for a particular period}}{\text{Number of units produced}}$
Total Idle Time	Hours Paid – Productive Hours
Effective Hours for Costing Purpose	Total Hours Paid – Normal Idle Time Hours
OT Condition as per Factories Act	9 hours per day or 48 hours per week whichever is higher
Average Inflated Wage Rate for the purpose of Overtime when it is regular due to worker shortage	$\frac{\text{Total Employee Cost including OT Payment for the period}}{\text{Number of total hours worked including OT hours}}$
Halsey Bonus	50% of Time Saved × Time Rate
Halsey Earnings	(Time Taken × Time Rate) + (50% of Time Saved × Time Rate)
Effective Hourly Rate	$\frac{\text{Total Earnings}}{\text{Actual Hours}}$
Rowan Bonus	$\frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time Taken} \times \text{Time Rate}$
Rowan Earning	$(\text{Time Taken} \times \text{Time Rate}) + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time Taken} \times \text{Time Rate}$
Rowan and Halsey Equilibrium	When Time Saved TS is 50% of Time Allowed SH
Replacement Method	$\frac{\text{Number of employees Replaced during the period}}{\text{Average number of employees during the period}} \times 100$ *Note: Replacement do not includes new joinees on account of expansion*
Separation Method	$\frac{\text{Number of employees Separated during the period}}{\text{Average number of employees during the period}} \times 100$ *Note: Separation means no. of employees left and discharged*
Flux Method	$\frac{\text{Number of employees Separated + Replaced during the period}}{\text{Average number of employees during the period}} \times 100$
Flux with New Recruitment	$\frac{\text{No. of employees Separated + Replaced + Newly Joined during the period}}{\text{Average number of employees during the period}} \times 100$ Alternatively, $\frac{\text{No.of Separations + No.of Accessions}}{\text{Average number of employees during the period}} \times 100$

Average number of employees	$\frac{\text{No. of employees at the beginning + No. of employees at the end of the period}}{2}$
Equivalent Employee Turnover Rate	Annualizing the turnover rate Employee turnover for the period (quarter, month, day) × (4 or 12 or 365)

Overheads

Factory OH Absorption Rate as a % of Direct Wages	$\frac{\text{Budgeted Production Overheads of the Department}}{\text{Budgeted Direct Wages of the Department}} \times 100$
Labour Hour Rate for Absorption	$\frac{\text{Budgeted Production Overheads of the Department}}{\text{Budgeted Direct Labour Hours of the Department}}$
Direct Machine Hour Rate	$\frac{\text{Cost apportioned to machine}}{\text{Estimated Productive machine hours of that machine}}$
Comprehensive Machine Hour Rate	$\frac{\text{Estimated overheads of Department/ Cost Centre}}{\text{Estimated Productive machine hours of department}}$
Normal / Actual Overhead Rate	$\frac{\text{Actual amount of overheads}}{\text{Actual Base}}$
Pre-determined Overhead Rate	$\frac{\text{Budgeted amount of overheads}}{\text{Budgeted Base}}$
Blanket Overhead Rate	$\frac{\text{Total Estimated overheads of the Factory}}{\text{Total number of units of base for the factory}}$
Departmental Overhead Rate	$\frac{\text{Estimated overheads of the Dept.}}{\text{Corresponding base}}$
Over Recovered / (Under Recovered) Overheads	Overheads Recovered – Overheads Incurred
Supplementary Rate	$\frac{\text{Under/ Overabsorbed OH to be charged to cost accounts}}{\text{Units Produced}}$
Normal Idle Capacity	Installed Capacity – Normal Capacity
Abnormal Idle Capacity	Normal Capacity – Actual Capacity Used

ABC

Activity Cost Driver Rate	$\frac{\text{Total Cost of Activity}}{\text{Activity Driver Units}}$
Number of Batches of Production	$\frac{\text{Total units produced}}{\text{Batch size}}$
Cost Distortion	Over-Costed/ (Under-Costed) = Unit Cost as per Traditional – Unit Cost as per ABC
Cost of unused capacity	(Cost Driver Capacity Unit – Cost Driver Unit actually used) × Activity Rate

Cost Sheet

Prime Cost

Direct Material Cost	XXX
Direct Employee/ Labour Cost	XXX
Direct Expenses	XXX
Prime Cost	**XXX**

Direct Material Cost

Opening Stock of Material	XXX
Add: Purchases/ Additions	XXX
Less: Closing Stock of Material	XXX
Direct Materials Consumed	**XXX**

Cost of Production

Prime Cost	XXX
Add: Factory Overheads	XXX
Gross Work Cost	**XXX**
Add: Opening stock of Work-in-process	XXX
Less: Closing stock of Work-in-process	XXX
Factory / Works Cost	**XXX**
Add: Quality Control Cost	XXX
Add: Research and Development Cost (Process Related)	XXX
Add: Administrative Overheads related with Production	XXX
Less: Credit for recoveries (Miscellaneous Income)	XXX
Add: Packing Cost (Primary Packing)	XXX
Cost of Production	**XXX**

Cost of Goods Sold

Production Cost of units which are sold

Cost of Production	XXX
Add: Cost of Opening Stock of Finished Goods	XXX
Less: Cost of Closing Stock of Finished Goods	XXX
Cost of Goods Sold	**XXX**

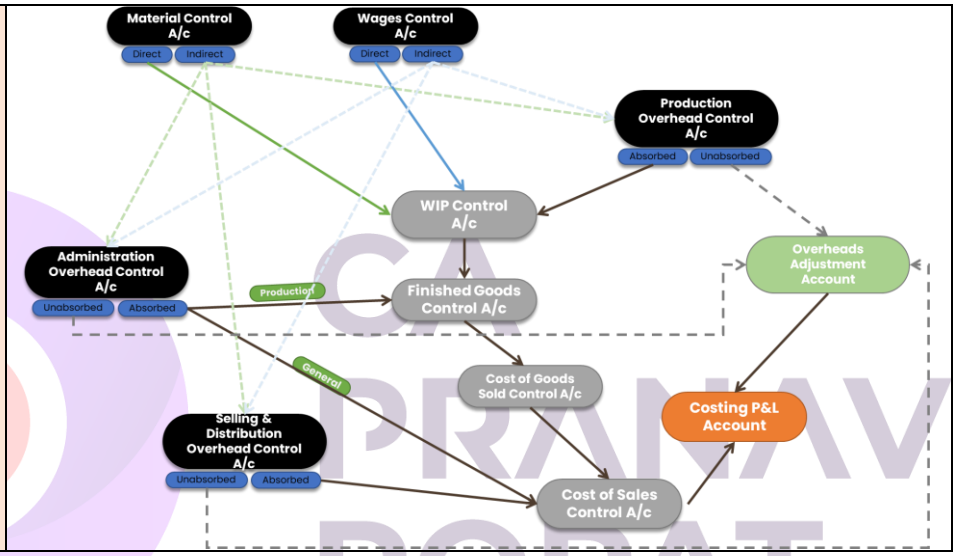
Cost of Sales

Production Cost and all other Cost for units which are sold

Cost of Goods Sold	**XXX**
Add: Administrative Overheads (General)	XXX
Add: Selling Overheads	XXX
Add: Packing Cost (Secondary)	XXX
Add: Distribution Overheads	XXX
Add: Interest and Finance Charges	XXX
Cost of Sales	**XXX**

Cost Accounting System

Flow of Accounts



Unit and Batch Costing

Economic Batch Quantity

$$EBQ = \sqrt{\frac{2DS}{C}}$$

where,
D = Annual Demand for the product
S = Setting Up Cost per Batch
C = Carrying Cost per unit of production

Process Costing

Equivalent Completed Units of Production	Actual Number of Units in the process of manufacture x percentage of work completed
Cost per unit of each Process (when no opening/closing WIP)	$\frac{\text{Total Cost of Process}}{\text{Total Input Units - Normal Loss Units}}$

Value of Normal Loss	Normal Loss Units × Scrap Value per unit
Value of Abnormal Loss	Abnormal Loss Units × Cost per unit
Value of Abnormal Gain	Abnormal Gain Units × Cost per unit
Cost per unit in case of FIFO Method	$\frac{\text{Total Cost of Process for the current period}}{\text{Number of equivalent production units only for current period}}$
Cost per unit in case of Weighted Average Method	$\frac{\text{Total Cost of Process for the current period + Cost of Opening WIP}}{\text{Number of equivalent production units including full Opening WIP}}$
Abnormal Loss debited to Costing PL	Value of Abnormal Loss – Scrap value from Abnormal Loss Units
Abnormal Gain credited to Costing PL	Value of Abnormal Gain – Scrap value lost due to Gain

Joint Product and By Product

NRV at split off point	Sales Value (units after processing x Selling Price) XXX Less: Profit Margin (if given) XXX Less: Selling and Distribution Cost (if given) XXX Less: Further Processing Cost or Post split-off cost XXX **NRV** **XXX**
Average Unit Cost Method	Average Cost per unit = $\frac{\text{Total Joint Costs}}{\text{Units Produced}}$
Joint Cost in case there is a by-product	Gross Joint Cost – Scrap Value of By-Product

Service Costing

Ton KM Absolute Basis	$\sum$ (Distance × Respective Load Quantity)
Ton KM Commercial Basis	Simple Average of Load in tons × Total Distance covered
Passenger KM	Number of running kms for the period × seating capacity × occupancy %
Commission Back Calculation	If commission is 10% of total takings, then all other costs are 90% of takings, then takings can be directly calculated as $\frac{\text{Total cost other than commission}}{90\%}$
Number of Room Days	Number of Days in the period × Total Rooms × Occupancy % during the period

Break Even Point per patient day	$\frac{\text{Total Fixed Cost for the period}}{\text{Contribution per patient day}}$
Effort Cost in the project	Time Spent by the employee (in months, weeks, days) × Employee Rate (monthly, weekly, hourly)
Cost per rupee of insured value	$\frac{\text{Total Cost for the period}}{\text{Total Insured value of all policies issued during the period}}$

Standard Costing

Material Cost Variance	The difference between the Standard Material Cost of the actual production volume and the Actual Cost of Material **(SQ × SP) – (AQ × AP)**
Material Price Variance	The difference between the Standard Price and Actual Price for the Actual Quantity* **AQ × (SP - AP)** ***If Purchased and Consumed both are given in question, calculate MPV by using both**
Material Usage Variance	The difference between the Standard Quantity specified for actual production and the Actual Quantity used, at Standard Price **SP × (SQ - AQ)**
Material Mix Variance	The difference between the Actual Quantity in standard proportion and Actual Quantity in actual proportion, at Standard Price **SP × (RSQ - AQ)**
Material Yield Variance/ Material Sub-usage Variance	Also called as **Material Sub Usage Variance** The difference between the Standard Quantity specified for actual production and Actual Quantity in standard proportion, at Standard Purchase Price **SP × (SQ - RSQ)**
Love Triangle	**SQ (TSQ in Standard Mix)** — **AQ (TAQ in Actual Mix)** **RSQ (TAQ in Standard Mix)**
Special Formula for Material Yield Variance	To calculate **Total** Material Yield Variance directly, use the below **Average SP × (TSQ - TAQ)** Average SP = Total Standard Material Cost / Total SQ of Material TSQ = Total Standard Quantity TAQ = Total Actual Quantity
Labour Cost Variance	The difference between the Standard Labour Cost of the actual production volume and the Actual Cost of Labour **(SH × SR) – (AH_{paid} × AR)**

Labour Rate Variance	The difference between the Standard Rate per hour and Actual Rate per hour for the Actual Hours paid. **$AH_{paid} \times (SR - AR)$**
Labour Efficiency Variance	The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate. **$SR \times (SH - AH_{worked})$**
Labour Idle Time Variance	The difference between the Actual Hours paid and Actual Hours worked at Standard Rate **$SR \times (AH_{worked} - AH_{paid})$**
Labour Mix Variance	The difference between the Actual Hours worked in standard proportion and Actual Hours worked in actual proportion, at Standard Rate **$SR \times (RSH - AH_{worked})$** RSH is Total **$AH_{worked}$** in Standard Mix
Labour Yield Variance	The difference between the Standard Hours specified for actual production and Actual Hours worked in standard proportion, at Standard Rate **SR × (SH – RSH)**
Love Triangle	**SH (TSH in Standard Mix)** **AH (TAH in Actual Mix)** **RSH (TAH in Standard Mix)**
Special Formula for Labour Yield Variance	To calculate total Labour Yield Variance directly, use the below **Average SR × (TSH - TAH_{worked})** Average SR = Total Standard Labour Cost / Total Standard Hours
Variable Overhead Cost Variance	Difference between Variable Overhead charged/ recovered/ absorbed on the basis of standard hours for actual output and actual overheads expenses incurred. **Recovered Overhead – Actual Overhead** **SH × SR (recovery rate) – AH×AR**
Variable Overhead Efficiency Variance	If work is done in-efficiently, then actual output is lower which results in lower recovered overheads than what it should be. This variance shows this difference. **(SH-AH) × SR** Like Labour Efficiency Variance
Variable Overhead Expenditure Variance	This variance is showing the extra expenditure done. No impact of efficiency is taken here. It's a kind of rate variance. **(SR-AR) × AH** **or SR × AH - AR × AH** Note: AR × AH is equal to actual variable overheads
Fixed Overhead Cost Variance	Difference between Fixed Overhead charged/ recovered/ absorbed on the basis of standard hours for actual output and actual overheads expenses incurred. **Recovered Overheads – Actual Overhead** Recovered Overheads = SH for actual output × Recovery Rate per hour Or Recovered Overheads = Actual output units × Recovery Rate per unit

Fixed Overhead Expenditure Variance	This variance is showing the extra expenditure done. No impact of production volume is taken here. **Budgeted Overhead – Actual Overhead**
Fixed Overhead Volume Variance	If the output/ volume of production is lower or higher than budgeted, there will be Under recovery and Over Recovery respectively. This variance shows the same. This variance is also called as Production volume variance. **(SH – BH) × Recovery Rate per hour** or **(Actual Output in units – Budgeted Output in units) × Recovery Rate per unit**
Fixed Overhead Efficiency Variance	If work is done in-efficiently, then actual output is lower which results in lower recovered overheads than what it should be. This variance shows this difference. **(SH – AH) × Recovery Rate per hour**
Fixed Overhead Capacity Variance	It gives the idea of how better we utilized our capacity of production. **(AH – RBH) × Recovery Rate per hour (if calendar data is available)** **(AH – BH) × Recovery Rate per hour (if calendar data is not available)** RBH is Budgeted Hours as per actual days
Fixed Overhead Calendar Variance	This gives view on how much production is lost due to unexpected holidays and other non-working days **(RBH – BH) × Recovery Rate per hour**

Marginal Costing

Marginal Cost Equation	**S - V = C = F ± P** **Particulars** / **Rs.** Sales — XXX Less: Variable Cost — XXX **Contribution** — **XXX** Less: Fixed Cost — XXX **Profit** — **XXX**
PV Ratio	$\text{PV Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$ $\text{PV Ratio} = \frac{\text{Change in Contribution}}{\text{Change in Sales}} \times 100$ $\text{PV Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$ Contribution = Sales x PV Ratio

	Sales = Contribution / PV Ratio
Break Even Point Single Product (Quantity and Rupees)	$\text{BEP Units} = \frac{\text{Fixed Costs}}{\text{Contribution per unit}}$ $\text{BEP Value} = \frac{\text{Fixed Costs}}{\text{PV Ratio}}$ $\text{Cash BEP} = \frac{\text{Cash Fixed Costs}}{\text{Contribution per unit}}$
Sales to obtain desired Profit	$\frac{\text{Fixed Costs + Desired Profit}}{\text{Contribution per unit}}$ $\frac{\text{Fixed Costs + Desired Profit}}{\text{PV Ratio}}$
Break Even Point Multiple Product (Quantity and Rupees)	• In case of multiple product BEP can be calculated assuming the sales mix will not change $\frac{\text{Common Fixed Costs}}{\text{Composite Contribution per unit}}$ • Composite contribution per unit = Weighted Average contribution of multiple products taking sales mix as their weights $\frac{\text{Common Fixed Costs}}{\text{Overall PV Ratio}}$ Overall PV Ratio = Total Contribution of all Products/ Total Overall Sales
Margin of Safety	Total Sales – BEP Sales = MOS Sales $\text{MOS Sales} = \frac{\text{Profit}}{\text{PV Ratio}}$
Cost Indifference Point	$\frac{\text{Incremental Fixed Cost}}{\text{Savings in VC per unit}}$

Budget Costing

Split of Semi-Variable Cost

In case of semi-variable cost, we can calculate variable cost per unit by using below formula

$$\text{Variable Cost per unit} = \frac{\text{Differential Cost}}{\text{Differential Units}}$$

Once the variable cost per unit is obtained, use total cost of any level and subtract variable cost from it to obtain Fixed Cost

Production Budget

Budgeted Sales Quantity	XXX
Add: Desired Closing Stock Quantity	XXX
Total Quantity Required	XXX
Less: Opening Stock	(XXX)
Production Budget in Quantity	XXX

Direct Material Usage Budget & Purchase Budget

Material Usage per unit of FG	XXX
Total Material Usage (Production Budget Units x Material Usage per unit)	XXX
Add: Closing Stock of Material Quantity	XXX
Less: Opening Stock of Material Quantity	(XXX)
Material Purchase Budget in Quantity	XXX
Material Purchase Price per unit	XXX
Material Purchase Budget in Amount	XXX

Number of Direct Workers Required

$$\frac{\text{Total Hours Required in the period}}{\text{Number of hours worked by a worker in that period}}$$

Efficiency Ratio

$$\frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100$$

Activity Ratio

$$\frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100$$

Calendar Ratio

$$\frac{\text{Available Working Days}}{\text{Budgeted Working Days}} \times 100$$

Standard Capacity Usage Ratio

$$\frac{\text{Budgeted Hours}}{\text{Max possible hours}} \times 100$$

Actual Capacity Usage Ratio

$$\frac{\text{Actual Hours}}{\text{Max possible hours}} \times 100$$

Actual Usage of Budgeted Capacity Ratio

$$\frac{\text{Actual Hours}}{\text{Budgeted hours}} \times 100$$