Skillshort

Self-Study Preparation Pack

CMA INTERMEDIATE

Paper 12: Management Accounting (MA)

Chapter-wise Detailed Notes

For the December 2026 term (Thu 17 Dec 2026, 2–5 pm) and June 2027 · ICMAI Syllabus 2022 · Worked examples verified in Python

100 marks · 3 hours | Q1: 15 MCQs × 2 = 30 | Any 5 of Q2–Q8 × 14 = 70 | About 80% numericals

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This subject pack has 6 parts

1 Chapter-wise notes

2 Important topics & weightage

3 Past papers: trends & links

4 Mock tests + solutions

5 Chapter practice questions

6 Last-week plan & strategy

Prepared by Skillshort for self-study. Original explanations and questions; not an official ICAI/ICMAI/ICSI publication. Items marked VERIFY should be checked against the latest official material.

How to use these notes

These notes follow the **ICMAI Syllabus 2022 module order** – ten chapters, one per module. Each chapter gives the concepts and formulas examined, worked examples verified in Python and model answer frames for the theory that repeats. About 80% of the paper is numerical, so solve every example yourself before reading the solution.

Paper at a glance

Item	Detail
Marks / time	100 marks, 3 hours, 2:00–5:00 pm
Section A	Q1 – **15 MCQs × 2 marks = 30**
Section B	**Any 5 of Q2–Q8**, 14 marks each = 70
Typical Section B order	Q2 management accounting theory + ABC · Q3 decisions, CVP, transfer pricing · Q4 CVP and decisions · Q5 standard costing and variances · Q6 budgets · Q7 divisional performance + learning curve · Q8 decision tree + responsibility accounting
ICMAI weightage	M1 Introduction 5% · M2 ABC 10% · M3–M5 Marginal costing, short-term decisions and transfer pricing 30% · M6 Standard costing 15% · M7 Budgeting 15% · M8 Divisional performance 10% · M9 Responsibility accounting 5% · M10 Decision theory 10%

NOTE What applies for December 2026

- Paper 12 has no statute cut-off; follow the ICMAI study material and the MTPs for the term.
- Paper 12 covers **all variances** (material, labour, variable and fixed overhead, sales); Paper 8 covers material and labour only VERIFY.

Decision answer framework

Identify **relevant costs** (future, differential, cash) → Ignore sunk / committed / allocated fixed costs → Compute **incremental contribution / profit** → Consider **qualitative factors** (capacity, customer, quality, labour relations) → Recommend

EXAM TIP High-yield for Dec 2026

Multi-product BEP · Key factor ranking · Make or buy · Shut down · Pricing (marginal-cost, cost-plus) · Transfer price range · Full variance set + reconciliation · Flexible & cash budget · Least squares forecast · ROI vs RI vs EVA · Learning curve 80% · Decision tree EMV · Maximin / minimax regret

Chapter 1: Introduction to Management Accounting

In this chapter: Concept, nature & scope of management accounting · Management accounting vs cost accounting vs financial accounting · Role of management accountant · Tools & techniques

1.1 Meaning & scope

- **CIMA**: application of principles of accounting & financial management to create, protect, preserve & increase value for stakeholders.
- Provides information for **planning, controlling, decision making** & performance evaluation.
- Scope: financial analysis, cost accounting, budgeting, MIS & reporting, tax & treasury planning, internal audit, strategic cost management.
- Future-oriented; uses both **financial & non-financial** data.

1.2 FA vs CA vs MA

Basis	Financial	Cost	Management
Users	External	Internal	Internal (managers)
Focus	Past, entity	Cost of products	Future decisions
Rules	Statutory (Ind AS/AS)	CAS / internal	No rules - need-based
Periodicity	Annual/quarterly	Regular	As required
Precision	Exact	Reasonable	Approximations OK

1.3 Role of management accountant

- **Planning**: budgets, forecasts, strategic plans; **Controlling**: variance & responsibility reports.
- **Decision support**: pricing, make/buy, investment appraisal.
- **Communication**: dashboards, KPIs; **value creation**: cost reduction, performance management.
- Tools: marginal costing, standard costing, budgetary control, ratio analysis, ABC, transfer pricing, decision theory.

1.4 Cost control vs cost reduction

Basis	Cost control	Cost reduction
Aim	Achieve standards/targets	Lower the standards themselves (permanent saving)
Nature	Preventive, routine	Corrective, continuous
Tools	Budgets, standard costing	Value analysis, ABC, BPR, target costing, kaizen
Quality	Maintained	Without compromising utility/quality

EXAM TIP Theory FAQs

- **Limitations of MA**: based on accounting data; personal bias; costly installation; only a tool, not a substitute for management.
- **Management information system (MIS)**: right information, right person, right time; exception-based; cost-effective.
- **Strategic cost management**: value chain, cost drivers, competitive advantage - links MA to strategy.
- **Ethics of management accountants**: integrity, objectivity, professional competence, confidentiality, professional behaviour.

Chapter 2: Activity Based Costing

In this chapter: Traditional absorption costing vs ABC · Steps in ABC · Cost pools & cost drivers · Merits & demerits · ABC for decision making (ABM, ABB)

2.1 ABC steps

Identify **activities** → Create **cost pools** (activity-wise overheads) → Identify **cost drivers** → Compute **activity rate** = pool cost ÷ driver volume → Assign to products by driver usage

2.2 Hierarchy of activities

Level	Example activity	Driver
Unit	Machining, assembly	Machine hours, units
Batch	Set-up, purchase orders, inspection	No. of set-ups / orders
Product	Product design, engineering changes	No. of products/ECNs
Facility	Plant management, rent	Floor area (often not traceable)

2.3 Traditional vs ABC

Basis	Traditional	ABC
Overhead base	Volume (labour/machine hrs)	Multiple activity drivers
Accuracy	Low-volume products **under-costed**	More accurate
Use	Simple	Complex, multi-product, high overheads
ABM	-	**Value-added vs non-value-added** analysis

EXAM TIP FAQ

- When is ABC most useful? High overhead share, diverse products, batch-size variations, competitive pricing.
- ABM components: cost driver analysis, activity analysis, performance analysis; activity based budgeting = budget activity volumes × rates.
- Limitation: costly to implement; facility costs still arbitrary.

WORKED EXAMPLE ABC practice

- Overheads: set-up ₹1,20,000 (drivers: 60 set-ups); ordering ₹80,000 (200 orders); machine ₹2,00,000 (10,000 m/c hrs).

Rates = ₹2,000/set-up; ₹400/order; ₹20/m/c hr

- Product P (low volume): 20 set-ups, 50 orders, 1,000 hrs → 40,000 + 20,000 + 20,000 = **₹80,000** (vs ₹40,000 under machine-hr blanket rate of ₹40/hr) → traditional system **under-costs** low-volume P.

EXAM TIP Theory

- Value-added activities: increase customer value (machining). Non-value-added: storage, movement, waiting, inspection - eliminate/reduce.
- ABC benefits: accurate costs, better pricing, identifies NVA, supports ABM & ABB; Limitations: cost, complexity, subjective driver choice.

2.4 Activities & typical cost drivers

Activity	Cost driver
Machine set-up	No. of set-ups

Activity	Cost driver
Purchasing / ordering	No. of purchase orders
Material handling	No. of moves / material requisitions
Quality inspection	No. of inspections / batches
Machining	Machine hours
Customer support	No. of calls / customers
Despatch	No. of deliveries

- **Resource drivers** assign resource costs to activities; **activity drivers** assign activity costs to products.

2.5 ABM & ABB

- **Activity Based Management (ABM)**: uses ABC information to improve processes - **cost reduction, process improvement, business process re-engineering, benchmarking, performance measurement**.
- **Value-added vs non-value-added** activities: eliminate NVA (moving, waiting, rework, storing).
- **Activity Based Budgeting (ABB)**: budget activities × cost-driver rates → identify capacity needs.

EXAM TIP Benefits & limitations of ABC

- **Benefits**: accurate product costs where overheads are high & product range diverse; better pricing, make/buy, product-mix decisions; cost-control through drivers.
- **Limitations**: costly & time-consuming; selecting drivers is subjective; facility-sustaining costs still arbitrarily allocated; not required for external reporting.
- **When suitable**: high overheads, diversity in volume/batch size, many products, competition.

WORKED EXAMPLE ABC vs traditional – product cost

Item	Product P	Product Q
Units	10,000	2,000
Machine hrs	20,000	5,000
Set-ups	10	40
Orders	20	80

- Overheads: machining ₹2,50,000 (machine hrs); set-up ₹1,00,000 (set-ups); purchasing ₹50,000 (orders).

Rates = ₹10/mh; ₹2,000/set-up; ₹500/order

P OH (ABC) = 2,00,000 + 20,000 + 10,000 = ₹2,30,000 → **₹23/unit**

Q OH (ABC) = 50,000 + 80,000 + 40,000 = ₹1,70,000 → **₹85/unit**

- Traditional (₹16/mh): P ₹32, Q ₹40 → low-volume Q was **under-costed**.

2.6 ABC in decision making

- **Pricing**: true cost of complex, low-volume products → avoid cross-subsidisation.
- **Product mix / customer profitability**: identify loss-making customers (many small orders, deliveries).
- **Make or buy / outsourcing**: activity costs avoided.
- **Cost reduction**: eliminate **non-value-added** activities (moving, waiting, inspection).
- **ABB**: budget = activity volume × activity rate.

COMMON MISTAKE **ABC traps**

- Using a **single plant-wide rate** when the question asks ABC - ×.
- Facility-sustaining costs (plant manager salary) are **not** driven by units/batches - allocate arbitrarily or treat as period cost.
- Cost driver rate = **pool cost ÷ driver volume**, not ÷ units.

WORKED EXAMPLE **Service costing with equivalent units – hotel room rent (pattern of December 2024)**

- A hotel has 50 single and 30 double rooms, open 365 days. Occupancy: single 80%, double 60%. Rent of a double room is 125% of a single room. Total annual cost ₹1,36,87,500. The hotel wants a profit of 20% **on rent**.

Single room-days = 50 × 365 × 80% = 14,600

Double room-days = 30 × 365 × 60% = 6,570 → equivalent single = 6,570 × 1.25 = 8,212.5

Cost per equivalent room-day = 1,36,87,500 ÷ 22,812.5 = **₹600**

Rent – single = 600 ÷ 0.80 = **₹750**; double = 750 × 1.25 = **₹937.50**

- Profit "on rent" means a margin on the selling price – divide cost by (1 – 20%), do not add 20% to cost. With ABC, trace housekeeping, laundry and front-office costs to room types using their own drivers (room-days cleaned, kg of linen, check-ins) before computing the rent.

Chapter 3: Marginal Costing & CVP Analysis

In this chapter: Marginal costing & CVP analysis · Break-even & profit charts · Multi-product BEP · Differential cost analysis · Advanced absorption vs marginal costing

3.1 CVP formulas

Contribution = Sales − Variable cost = Fixed cost + Profit

P/V ratio = Contribution ÷ Sales × 100 = Δ Profit ÷ Δ Sales

BEP (units) = Fixed cost ÷ Contribution per unit

BEP (₹) = Fixed cost ÷ P/V ratio

Margin of safety = Actual sales − BEP sales = Profit ÷ P/V ratio

Sales for desired profit = (FC + desired profit) ÷ P/V ratio

Cash BEP = Cash fixed cost ÷ Contribution per unit

- Shut-down point = Avoidable FC ÷ contribution per unit.

3.2 Absorption vs marginal

Basis	Absorption	Marginal
Fixed production OH	**Product cost** (in stock)	**Period cost**
Stock valuation	Higher	Lower
Production > sales	Profit higher	Lower
Sales > production	Profit lower	Higher
Production = sales	Same	Same

Profit difference = Change in stock units × fixed OH rate per unit

3.3 Decision rules

Decision	Rule
Key / limiting factor	Rank by **contribution per unit of key factor**
Make or buy	Buy if purchase price < **variable cost + avoidable FC + opportunity cost**
Shut down / drop product	Continue if contribution > avoidable fixed costs
Special order (spare capacity)	Accept if price > marginal cost (& no market harm)
Export order	Accept if contribution positive & capacity idle
Sell or process further	Incremental revenue vs incremental cost

Break-even chart (illustrative: FC ₹2,00,000; VC ₹60; SP ₹100)

Units (BEP = 5,000 units)	0	2000	4000	5000	6000	8000	10000
Total cost (₹ '000)	200	320	440	500	560	680	800
Sales (₹ '000)	0	200	400	500	600	800	1000
Fixed cost (₹ '000)	200	200	200	200	200	200	200

WORKED EXAMPLE **CVP illustration**

- Sales ₹10 lakh, profit ₹1 lakh; Sales ₹12 lakh, profit ₹1.6 lakh.

P/V ratio = 60,000 ÷ 2,00,000 = **30%**

Fixed cost = 10,00,000 × 30% − 1,00,000 = **₹2,00,000**

BEP = 2,00,000 ÷ 30% = **₹6,66,667**; MOS at 10 L = **₹3,33,333** (33.3%)

WORKED EXAMPLE **Key factor illustration**

- Products X & Y; contribution/unit ₹40 & ₹60; machine hrs/unit 2 & 4; 2,000 hrs available; max demand 600 each.

Contribution per hour = X = 20; Y = 15 → **produce X first**

- X 600 units (1,200 hrs) → remaining 800 hrs → Y 200 units. Contribution = 24,000 + 12,000 = **₹36,000**.

3.4 Graphs & limitations

- **Angle of incidence**: angle between sales line & total cost line at BEP - larger angle = higher profit rate.
- **P/V graph**: profit on y-axis vs sales; crosses x-axis at BEP.
- Limitations of CVP: linearity assumption, constant selling price & FC, single product/constant mix, no stock changes.
- Advantages of marginal costing: simple, no under/over absorption, decision-making, profit planning.

WORKED EXAMPLE **Make or buy practice**

- Component: DM ₹40, DL ₹25, VOH ₹15, FOH ₹20 (allocated, unavoidable) per unit; supplier price ₹90; capacity freed can earn contribution ₹30,000 on 2,000 units output.

Relevant make cost = 80 per unit + opportunity cost 15 (30,000/2,000) = **₹95**

- Buy at ₹90 → **buy** (saving ₹5/unit = ₹10,000).

WORKED EXAMPLE **Absorption vs marginal profit**

- Production 10,000; sales 8,000; FOH ₹1,00,000 (₹10/unit at normal 10,000).

Difference = 2,000 units × 10 = **₹20,000** - absorption profit **higher**.

- If sales 12,000 (opening stock 2,000 at ₹10 FOH), absorption profit lower by ₹20,000.

WORKED EXAMPLE **Special order & shut-down**

- Normal: 8,000 units @ ₹50; VC ₹30; FC ₹1,20,000; capacity 10,000 units. Special order 1,500 @ ₹38.

Incremental contribution = 1,500 × 8 = **₹12,000** → accept (no displacement of regular sales)

- Shut-down point (avoidable FC ₹60,000): 60,000 ÷ 20 = **3,000 units**; close if sales fall below.

3.5 P/V ratio levers

Change	Effect on PV	Effect on BEP
Selling price ↑	↑	↓
Variable cost ↑	↓	↑
Fixed cost ↑	No change	↑
Sales volume ↑	No change	No change (MOS ↑)

3.6 Multi-product break-even

Composite P/V ratio = Total contribution ÷ Total sales (at given sales mix)

Composite BES (₹) = Total fixed cost ÷ Composite P/V ratio

BEP units (mix basis) = FC ÷ Weighted average contribution per unit (per sales-mix "batch")

- Change in sales mix → changes composite P/V & BEP; shift towards high-P/V products lowers BEP.
- **Angle of incidence**: steeper → higher profit rate after BEP.

3.7 Differential cost analysis

Differential cost = Cost of alternative A − Cost of alternative B

Incremental revenue − Incremental cost = Incremental profit (accept if > 0)

- Fixed costs relevant **only if they change** between alternatives (step / specific fixed cost).
- Opportunity cost is **included**; sunk cost **excluded**.

WORKED EXAMPLE Multi-product illustration

- Products X, Y sold in ratio 2:1; contribution X ₹30, Y ₹60; FC ₹3,60,000.

Contribution per mix (2X+1Y) = 60 + 60 = ₹120

BEP mixes = 3,60,000 ÷ 120 = 3,000 → **X 6,000 + Y 3,000 units**

- If mix changes to 1:1 → contribution per mix ₹90 per 2 units = ₹45/unit avg → BEP 8,000 units (4,000 each).

WORKED EXAMPLE Absorption vs marginal - profit reconciliation

- Production 12,000 units; sales 10,000 units @ ₹50; VC ₹30; FC ₹1,20,000 (normal 12,000 units → ₹10/unit); no opening stock.

Marginal costing profit = 10,000 × 20 − 1,20,000 = **₹80,000**

Absorption profit = 10,000 × (50 − 40) = **₹1,00,000**

Difference = FOH in closing stock 2,000 × 10 = **₹20,000**

- Production > sales → absorption profit higher; production < sales → marginal profit higher.

3.8 CVP extras

Sales for target profit = (FC + Target profit) ÷ PV ratio

Sales for after-tax profit = [FC + Profit after tax ÷ (1 − t)] ÷ PV

Cash BEP = (FC − Non-cash FC) ÷ C per unit

Indifference point = Difference in FC ÷ Difference in VC per unit (or PV ratios)

Shut-down point = (FC − Shut-down cost) ÷ C per unit

EXAM TIP Advanced absorption topics

- **Throughput accounting**: throughput = sales − direct material; TA ratio = return per factory hour ÷ cost per factory hour VERIFY.
- **Super-variable costing** treats only material as variable.
- Normal capacity basis for FOH absorption (CAS 3) - under-absorption due to abnormal idle capacity to Costing P&L.

WORKED EXAMPLE **Multi-product break-even and change in mix**

- Products X, Y, Z sell in the ratio 50 : 30 : 20 (by sales value). P/V ratios: X 40%, Y 30%, Z 25%. Fixed costs ₹6,80,000.

Composite P/V = 0.5 × 40% + 0.3 × 30% + 0.2 × 25% = **34%**

Composite BEP = 6,80,000 ÷ 34% = **₹20,00,000** → X ₹10,00,000, Y ₹6,00,000, Z ₹4,00,000

- If the mix shifts to 30 : 30 : 40, composite P/V = 12% + 9% + 10% = **31%**; BEP rises to 6,80,000 ÷ 31% = **₹21,93,548**. A mix that favours low-P/V products raises the break-even point.

Chapter 4: Short-term Decision Making

In this chapter: Pricing decisions · Make or buy · Accept or reject special order · Limiting / key factor · Replacement of machine · Choice of alternatives · Sub-contracting · Expansion · Shut-down or continue · Relevant cost concepts

4.1 Relevant cost rules

Cost	Relevant?
Future cash cost that differs	✓
Opportunity cost	✓
Avoidable fixed cost	✓
Sunk cost (past)	×
Committed cost	×
Apportioned general fixed OH	×
Depreciation (non-cash)	× (use cash flows)

- Materials in stock: regularly used → **replacement cost**; not used → **higher of NRV / alternative use**.

4.2 Decision matrix

Decision	Rule
Make or buy	Buy if purchase price < **variable cost + avoidable FC + opportunity cost**
Special order	Accept if price > **marginal cost + incremental FC** (spare capacity); else include lost contribution
Key factor	Rank by **contribution per unit of limiting factor**
Shut down	Continue if contribution > **avoidable FC**; shut-down point = (FC − shut-down cost) ÷ C/unit
Subcontract	Compare outside price vs relevant in-house cost
Expansion	Incremental contribution − incremental FC > 0
Drop product	Drop only if its contribution < avoidable FC

4.3 Pricing decisions

- **Full cost-plus**: total cost + markup; **marginal cost-plus**: VC + markup (short run, spare capacity).
- **Target pricing / target costing**: target cost = target price − target profit.
- **Penetration** (low, high volume) vs **skimming** (high, early adopters); **differential pricing** for markets.
- **Pricing in depression**: may sell below total cost but **≥ marginal cost** (keep plant running, retain workers, avoid shut-down costs).

Minimum price (spare capacity) = Relevant (marginal) cost

Minimum price (full capacity) = Marginal cost + Contribution forgone

WORKED EXAMPLE **Key factor illustration**

Item	A	B	C
Contribution/unit	40	60	50
Machine hrs/unit	2	4	2
C per hr	**20**	15	**25**
Rank	II	III	I

- 10,000 hrs available; max demand C 2,000 (4,000 hrs) → A 3,000 (6,000 hrs) → B nil.

WORKED EXAMPLE **Replacement decision**

- Old machine: book value ₹2 lakh (sunk - ignore), sale now ₹80,000; new machine ₹5 lakh saves ₹1.6 lakh cash cost p.a. for 4 yrs; nil scrap.

Net cost now = 5,00,000 − 80,000 = ₹4,20,000

Savings = 1,60,000 × 4 = ₹6,40,000 → **replace** (ignoring time value; with DCF use PV of savings) VERIFY

COMMON MISTAKE **Decision traps**

- Including allocated fixed OH in make/buy - ×.
- Ignoring **opportunity cost** of capacity when at full capacity - ×.
- Ranking by contribution/unit when a **key factor** exists - × use per key-factor unit.
- Forgetting **qualitative factors** (quality, supply reliability, staff morale).

WORKED EXAMPLE **Make or buy illustration**

- Component: DM ₹20, DL ₹15, VOH ₹5, FOH (apportioned) ₹10 = ₹50; outside price **₹45**. 10,000 units.

Relevant make cost = 20 + 15 + 5 = **₹40** < 45 → **make** (saves ₹50,000)

- If capacity can earn rental ₹80,000 p.a. → make cost = 40 + 8 = **₹48** > 45 → **buy**.
- If a supervisor (₹30,000) is avoidable on buying → add ₹3/unit to make cost.

WORKED EXAMPLE **Special order illustration**

- Capacity 1,00,000 units; current 80,000 @ ₹25; VC ₹15; FC ₹4,00,000.
- Export order 15,000 units @ ₹18 (extra packing ₹1/unit).

Incremental contribution = 15,000 × (18 − 15 − 1) = **₹30,000** → accept (spare capacity; FC unchanged)

- If order were 30,000 units: 10,000 units displace domestic sales → lose 10,000 × 10 = 1,00,000; incremental = 30,000 × 2 − 1,00,000 = **−40,000** → reject.

WORKED EXAMPLE **Shut-down / continue**

- Normal: sales 50,000 units @ ₹40, VC ₹25, FC ₹6,00,000; shut-down saves FC ₹2,00,000; extra shut-down cost ₹50,000.

Shut-down point = (Avoidable FC 2,00,000 − extra shut-down cost 50,000) ÷ 15 = **10,000 units**

- Check: at 10,000 units the operating loss is 6,00,000 − 1,50,000 = ₹4,50,000, equal to the loss on closing (unavoidable FC 4,00,000 + 50,000). Below 10,000 units, close down.
- If expected sales during slump < 10,000 units → shut down; else continue.

4.4 Sales mix & product elimination

Product	Sales	Contribution	Avoidable FC	Decision
A	5,00,000	1,50,000	60,000	Keep
B	3,00,000	40,000	70,000	Drop (C < avoidable FC)
C	2,00,000	30,000	10,000	Keep

- Dropping B improves profit by **₹30,000** (unless B supports sales of A/C).

EXAM TIP **Theory FAQs**

- **Relevant cost** - future, incremental cash flows that differ between alternatives.
- **Opportunity cost** - benefit forgone from next best alternative (not recorded in books).
- **Qualitative factors in make/buy** - quality, reliability of supply, secrecy, idle-capacity alternatives, labour relations, long-term price.
- **Pricing in recession** - may sell below total cost; price ≥ marginal cost to retain market & workforce.

WORKED EXAMPLE **Limiting factor - material scarcity**

Item	P	Q
SP	100	150
VC	60	90
Material (kg/unit @ ₹10)	2	4
Contribution / kg	**20**	15

- Only 10,000 kg available; demand P 3,000, Q 2,000 → make P 3,000 (6,000 kg) then Q 1,000 (4,000 kg).

Contribution = 3,000 × 40 + 1,000 × 60 = **₹1,80,000**

4.5 Relevant cost of resources

Resource	Relevant cost
Material in regular use	Replacement cost
Material not in use (no other use)	Scrap / NRV
Labour with spare time (paid anyway)	Nil
Labour diverted from other work	Wage + contribution lost
Machine with spare capacity	Incremental running cost only

WORKED EXAMPLE **Key factor – limited machine hours**

Product	Contribution per unit (₹)	Machine hours per unit	Contribution per hour (₹)	Maximum demand (units)	Rank
A	40	4	10	2,000	III
B	36	3	12	2,000	II
C	30	2	15	3,000	I

- Machine hours available: 16,000. Allocate by rank: C 3,000 units × 2 = 6,000 hrs; B 2,000 × 3 = 6,000 hrs; A gets the remaining 4,000 hrs = 1,000 units.

Maximum contribution = 3,000 × 30 + 2,000 × 36 + 1,000 × 40 = **₹2,02,000**

- Ranking by contribution per unit (A first) would be wrong – always rank by **contribution per unit of the key factor**. Fixed costs do not change the ranking.

Chapter 5: Transfer Pricing

In this chapter: Objectives · Methods (market-based, cost-based, negotiated, dual, two-part) · General rule · Goal congruence & divisional autonomy · Inter-company & international transfer pricing (arm's length)

5.1 Objectives & general rule

- Objectives: **goal congruence**, performance evaluation, **divisional autonomy**, motivation, optimum resource allocation.

Minimum transfer price (seller) = Marginal cost + Opportunity cost (contribution forgone)

Maximum transfer price (buyer) = Lower of market price / net marginal revenue

- Range: **Min ≤ TP ≤ Max** - any price within range keeps decision goal-congruent.
- Spare capacity → opportunity cost nil → min TP = variable cost.

5.2 Methods

Method	Merit	Limitation
Market price	Objective; arm's length	Market may not exist; ignore selling cost savings
Full cost (+ markup)	Simple	Passes inefficiency; not goal-congruent
Variable cost	Good for group decisions	Seller shows loss
Standard cost	Inefficiency stays with seller	Setting standards
Negotiated	Autonomy	Time-consuming; bargaining power
Dual pricing	Both divisions motivated	Group profit < sum of divisions
Two-part tariff	VC per unit + fixed fee	Complex

5.3 International transfer pricing

- Tax authorities require **arm's length price** (Income-tax Act 1961 ss.92-92F [2025: ss.161-174] VERIFY).
- Methods: CUP, resale price, cost plus, profit split, TNMM.
- Issues: tax arbitrage, customs duty, repatriation limits, currency risk, **APA** (advance pricing agreement).

WORKED EXAMPLE Transfer price illustration

- Division A: VC ₹60, market price ₹100 (selling cost saved internally ₹5); capacity 10,000 units; external demand 8,000. Division B needs 4,000.
- Spare capacity 2,000 units → min TP ₹60; for remaining 2,000 units external sales forgone → min TP = 60 + (100 − 5 − 60) = **₹95**.
- If B can buy outside at ₹100 → acceptable range for full-capacity units **₹95 - ₹100**.

EXAM TIP Exam points

- Market-based TP is ideal when **perfect competitive market** exists.
- Cost-based TP should use **standard**, not actual cost, to avoid passing inefficiencies.
- Dual pricing may cause group profit to be **double counted** in divisional reports.
- Goal congruence: divisional decision = group-optimal decision.

WORKED EXAMPLE Negotiated & dual pricing

- Seller VC ₹40; full cost ₹55; market ₹70. Buyer NMR ₹90.
- **Dual price**: seller credited ₹70 (market); buyer charged ₹40 (VC) → group profit per unit = 90 − 40 = 50; divisional sum = (70−40) + (90−40) = 80 → ₹30 "double count" eliminated on consolidation.
- **Negotiated** price likely between ₹40 and ₹70 (spare capacity) / ₹70 (full capacity).

5.4 Behavioural aspects

- TP must allow **fair performance evaluation**; arbitrary central imposition reduces autonomy & motivation.
- Disputes resolved by **arbitration** committee; use standard costs to avoid passing inefficiency.
- Multinationals: TP affects tax, customs, dividend repatriation - ethical & legal limits (arm's length).

MEMORY TRICK **TP methods – "MCN-DT"**

MCNDT – M Market-based; C Cost-based; N Negotiated; D Dual pricing; T Two-part tariff

Transfer price range example (₹ per unit, full-capacity units)

Item	Value
Variable cost (spare capacity min)	60
Min TP at full capacity (VC + lost C)	95
Market price (buyer's max)	100

WORKED EXAMPLE **Transfer-price range with and without spare capacity (pattern of December 2025 and June 2026)**

- Division S makes a component: variable cost ₹60, market price ₹100; selling expenses of ₹5 a unit are saved on internal sales. Division B can buy outside at ₹100.

Minimum TP (spare capacity) = Variable cost = **₹60**

Minimum TP (full capacity) = 60 + (100 − 5 − 60) = **₹95** (variable cost + contribution forgone on external sales)

- Maximum TP (Division B) = outside price ₹100. Negotiable range: ₹60–₹100 with spare capacity; ₹95–₹100 at full capacity. Any price in the range keeps the group better off when B buys internally.

Chapter 6: Standard Costing & Variance Analysis

In this chapter: Material variances · Labour variances · Variable overhead variances · Fixed overhead variances · Sales variances · Interpretation of variances

6.1 Standards & control

- **Standard cost**: pre-determined cost under efficient conditions; **standard costing** = setting standards, comparing actuals, analysing variances, taking action.
- **Types**: ideal (perfect), normal (average over cycle), **basic** (base year, long term), **current** (expected/attainable - most used).
- Preliminaries: cost centres, classification, standard hours, production capacity (theoretical, practical, normal).
- **Management by exception** - investigate significant variances.

6.2 Material variances

MCV (cost) = SQ × SP − AQ × AP

MPV (price) = AQ × (SP − AP)

MUV (usage) = SP × (SQ − AQ)

MMV (mix) = SP × (Revised SQ − AQ) [RSQ = AQ total in standard ratio]

MYV (yield) = SP × (SQ − RSQ) [or std cost per unit × (actual yield − std yield)]

Note: Check: MCV = MPV + MUV; MUV = MMV + MYV

6.3 Labour variances

LCV (cost) = SH × SR − AH(paid) × AR

LRV (rate) = AH(paid) × (SR − AR)

Idle time variance = Idle hours × SR (always **A**)

LEV (efficiency) = SR × (SH − AH worked)

LMV (gang) = SR × (Revised SH − AH worked)

Labour yield (sub-efficiency) = SR × (SH − RSH)

Note: LCV = LRV + Idle time + LEV

6.4 Overhead variances

VOH cost = Absorbed (SH × SVR) − Actual VOH

VOH expenditure = AH × SVR − Actual VOH

VOH efficiency = SVR × (SH − AH)

FOH cost = Absorbed (SH × SFR) − Actual FOH

FOH expenditure = Budgeted FOH − Actual FOH

FOH volume = Absorbed − Budgeted FOH

Efficiency = SFR × (SH − AH); Capacity := SFR × (AH − Revised budgeted hrs); Calendar := SFR × (Revised BH − BH)

6.5 Sales variances (turnover / margin)

Sales price = AQ × (AP − SP)

Sales volume = SP × (AQ − BQ) [margin: std margin × (AQ − BQ)]

Sales mix = SP × (AQ − Revised BQ)

Sales quantity = SP × (RBQ − BQ)

- Profit reconciliation: Budgeted profit ± sales margin variances ± cost variances = Actual profit.

6.6 Variance tree

Total cost variance → Material (price, usage → mix, yield) → Labour (rate, idle time, efficiency → mix, yield) → VOH (expenditure, efficiency) → FOH (expenditure, volume → efficiency, capacity, calendar)

- Responsibility: price - purchase; usage - production; rate - HR/personnel; efficiency - production; FOH volume - top management/sales.

WORKED EXAMPLE Material variance illustration

- Standard for 1 unit: 5 kg @ ₹10. Actual output 1,000 units; actual 5,300 kg @ ₹9.50.

MCV = 50,000 − 50,350 = **₹350 (A)**

MPV = 5,300 × 0.50 = **₹2,650 (F)**

MUV = 10 × (5,000 − 5,300) = **₹3,000 (A)** ✓ 2,650 F − 3,000 A = 350 A

WORKED EXAMPLE Labour & FOH illustration

- SH for actual output 2,000; SR ₹50; paid 2,200 hrs @ ₹52; idle 100 hrs.

LCV = 1,00,000 − 1,14,400 = **14,400 (A)**; LRV = 2,200 × 2 = **4,400 (A)**; idle = **5,000 (A)**; LEV = 50 × (2,000 − 2,100) = **5,000 (A)**

- FOH: budget 1,20,000 for 2,400 hrs (₹50/hr); actual FOH 1,25,000.

FOH = absorbed 1,00,000 − 1,25,000 = **25,000 (A)** = Exp. 5,000 (A) + Volume 20,000 (A)

COMMON MISTAKE Variance traps

- Using **AH paid** in efficiency variance (use **AH worked**).
- Forgetting idle time variance is part of LCV.
- Using **budgeted** output instead of **actual output** for SQ/SH.
- Sign convention: favourable when actual cost < standard; for sales, favourable when actual > budget.

WORKED EXAMPLE Material mix & yield practice

- Std mix: A 60 kg @ 10, B 40 kg @ 15 → 90 kg output (std loss 10%). Actual: A 70 kg @ 9, B 50 kg @ 16 → output 100 kg.

SQ for 100 kg output = A 66.67, B 44.44 (total 111.11)

Mix variance = RSQ (120 in 60:40 = A 72, B 48) → A 10 × (72 − 70) = 20 F; B 15 × (48 − 50) = 30 A → **10 (A)**

Yield variance = Std cost/kg input 12 × (111.11 − 120) = **106.7 (A)**

- Usage variance = mix + yield = **116.7 (A)**.

EXAM TIP Theory

- Advantages: control, cost consciousness, pricing, budgeting, management by exception, simplified stock valuation.
- Criticisms: costly, rigid standards, frequent revision, dysfunctional behaviour.
- Accounting: **single plan** (WIP at standard) vs **partial plan** (WIP at actual, variances at end).
- Revision variance / planning vs operational variances - concept only VERIFY.

WORKED EXAMPLE Sales variances practice

- Budget: X 1,000 @ ₹50 (std margin ₹10); Y 500 @ ₹80 (₹20). Actual: X 1,200 @ ₹48; Y 400 @ ₹82.

Sales price = X 1,200 × (−2) = 2,400 A; Y 400 × 2 = 800 F → **1,600 (A)**

Sales volume (turnover) = X 50 × 200 = 10,000 F; Y 80 × (−100) = 8,000 A → **2,000 (F)**

Margin volume = X 10 × 200 = 2,000 F; Y 20 × (−100) = 2,000 A → **nil**

- Mix/quantity split uses revised budgeted qty (total actual 1,600 in 2:1).

WORKED EXAMPLE VOH variance practice

- SVR ₹20/hr; SH for actual output 4,000; actual hours 4,300; actual VOH ₹88,000.

VOH cost = 80,000 − 88,000 = **8,000 (A)**

Expenditure = 86,000 − 88,000 = **2,000 (A)**

Efficiency = 20 × (4,000 − 4,300) = **6,000 (A)**

6.7 Profit reconciliation

Budgeted profit → ± Sales variances (volume/margin) → ± Material, labour, VOH, FOH cost variances → = **Actual profit**

- Under marginal costing: sales **contribution** volume variance; no FOH volume variance (only FOH expenditure).
- Check: sum of all variances = budgeted − actual profit.

6.8 Interpretation & inter-relationship

- Cheap material → **price (F)** but usage (A) & labour efficiency (A).
- Skilled labour at higher rate → **rate (A)** but efficiency (F) & less wastage.
- FOH **volume (A)** → idle capacity, low demand, strikes, breakdowns; **calendar** variance from fewer working days.
- Investigate only **significant & controllable** variances (management by exception).

MEMORY TRICK FOH split – "ECC"

ECC – E Efficiency (hours vs standard hours); C Capacity (actual hours vs budgeted hours); C Calendar (days actual vs budgeted)

WORKED EXAMPLE **Full variance reconciliation (absorption)**

Item	₹
Budgeted profit	2,00,000
Sales margin volume	20,000 (A)
Sales margin price	15,000 (F)
Material cost	12,000 (A)
Labour cost	8,000 (F)
VOH	4,000 (A)
FOH expenditure	6,000 (A)
FOH volume	10,000 (A)
Actual profit	**1,71,000**

- Under marginal costing: replace margin volume with **contribution volume** and drop FOH volume.

EXAM TIP **Theory FAQs**

- **Types of standards**: ideal, basic, current (attainable), normal - attainable motivates best.
- **Revision of standards** - permanent changes in price, method, technology.
- **Causes of material usage variance**: poor quality, pilferage, inefficient workers, defective machines.
- **Causes of FOH volume variance**: idle capacity, low demand, power failure, strikes, fewer working days.
- **Controllability**: price variances often external; usage/efficiency usually controllable.

6.9 Sales variances - full set

Sales value variance = Actual sales − Budgeted sales

Sales price variance = (AP − BP) × AQ

Sales volume variance = (AQ − BQ) × BP

Sales mix variance = (AQ − Revised std qty in std mix) × BP

Sales quantity variance = (RSQ − BQ) × BP

- **Margin** basis: replace price with standard **profit** (absorption) or **contribution** (marginal) per unit.

6.10 Overhead variances - full set

VOH expenditure = Std VOH rate × AH − Actual VOH

VOH efficiency = (SH for AO − AH) × Std VOH rate

FOH expenditure = Budgeted FOH − Actual FOH

FOH volume = Absorbed FOH − Budgeted FOH

FOH efficiency = (SH − AH) × Std FOH rate/hr

FOH capacity = (AH − Budgeted hrs) × Std rate/hr

FOH calendar = (Actual days − Budgeted days) × Std rate/day

WORKED EXAMPLE Sales mix illustration

Product	BQ	BP	AQ	AP
X	600	10	700	9
Y	400	20	300	22

- Price: X (9−10)×700 = 700 (A); Y (22−20)×300 = 600 (F) → **100 (A)**
- RSQ (1,000 in 6:4) = X 600, Y 400 → mix: X (700−600)×10 = 1,000 (F); Y (300−400)×20 = 2,000 (A) → **1,000 (A)**
- Quantity: total AQ = BQ → **nil**; volume = mix + qty = **1,000 (A)**

WORKED EXAMPLE Material mix and yield variances

- Standard: 60 kg of A at ₹20 and 40 kg of B at ₹30 give 90 kg of output (standard cost ₹2,400 per batch). Actual: A 650 kg at ₹21, B 350 kg at ₹28; output 918 kg.

Material	SQ for actual output	RSQ (actual input 1,000 kg in std ratio)	AQ	SP	AP
A	612	600	650	20	21
B	408	400	350	30	28

Material cost variance = 24,480 − 23,450 = **₹1,030 (F)**

Price variance = (20 − 21) × 650 + (30 − 28) × 350 = −650 + 700 = **₹50 (F)**

Usage variance = (612 − 650) × 20 + (408 − 350) × 30 = −760 + 1,740 = **₹980 (F)**

Mix variance = (600 − 650) × 20 + (400 − 350) × 30 = **₹500 (F)**

Yield variance = (612 − 600) × 20 + (408 − 400) × 30 = **₹480 (F)** (check: 18 kg extra output × ₹2,400 ÷ 90 = ₹480)

- Check: mix + yield = usage (500 + 480 = 980); price + usage = cost (50 + 980 = 1,030).

Chapter 7: Forecasting & Budgetary Control

In this chapter: Forecasting techniques (time series, least squares, moving averages, regression) · Budgets & budgetary control · Flexible & cash budgets · Zero-base & performance budgeting

7.1 Least squares (linear trend)

y = a + bx

b = $(n\Sigma xy - \Sigma x\Sigma y) \div (n\Sigma x^2 - (\Sigma x)^2)$

a = $\bar{y} - b\,\bar{x}$

- With x coded so Σx = 0: **a = Σy ÷ n**, **b = Σxy ÷ Σx²**.
- Use for sales forecast & splitting **semi-variable costs** (b = VC per unit, a = fixed cost).

7.2 Forecasting methods

- **Qualitative**: Delphi, sales force composite, executive opinion, market survey.
- **Time series**: trend, seasonal, cyclical, irregular components; **moving averages** (odd/even periods - centring).
- **Causal**: regression & correlation; r close to ±1 = strong.
- **High-low method**: VC = Δ cost ÷ Δ activity.

WORKED EXAMPLE Forecast illustration

- Sales (₹ lakh) 2021-2025: 10, 12, 13, 15, 17 ; x = −2...+2.

a = 67 ÷ 5 = 13.4; Σxy = (−20 −12 + 0 + 15 + 34) = 17; Σx² = 10 → b = 1.7

2026 (x = 3) = 13.4 + 1.7 × 3 = **₹18.5 lakh**

7.3 Budget preparation sequence

Identify **principal budget factor** (usually sales) → Sales budget → Production budget (Sales + closing FG − opening FG) → Materials usage & purchase budget → Labour, overhead budgets → Cost of production, S&D, admin budgets → Cash budget & capital expenditure budget → **Master budget** (budgeted P&L + balance sheet)

7.4 Fixed vs flexible budget

Basis	Fixed	Flexible
Activity level	One level	Multiple levels
Cost classification	Not needed	Fixed / variable / semi-variable
Comparison	Misleading if activity changes	Meaningful (actual vs flexed)
Use	Stable conditions	Fluctuating output

- Semi-variable split: **high-low** method → variable rate = Δ cost ÷ Δ activity.

7.5 Budget ratios

Activity ratio = Standard hours for actual output ÷ Budgeted hours × 100

Capacity ratio = Actual hours worked ÷ Budgeted hours × 100

Efficiency ratio = Standard hours for actual output ÷ Actual hours × 100

Note: Activity = Capacity × Efficiency

Production budget = Sales + Desired closing FG − Opening FG

Material purchase = Usage + Closing RM − Opening RM

7.6 Modern budgeting

Technique	Feature
Zero-based (ZBB)	Every activity justified from **zero**; decision packages ranked; Peter Pyhrr
Performance budgeting	Budget linked to **outputs/performance** (Govt programmes)
Rolling / continuous	Add a new period as one expires
Activity based budgeting	Activities × cost driver rates
Programme budgeting	Programme-wise allocation

WORKED EXAMPLE Flexible budget illustration

- At 60% capacity (6,000 units): variable ₹1,20,000; semi-variable ₹50,000 (40% fixed); fixed ₹80,000.

Variable/unit = 20; semi-variable: fixed 20,000 + variable ₹5/unit

At 80% (8,000 units) = 1,60,000 + (20,000 + 40,000) + 80,000 = **₹3,00,000** (₹37.50/unit)

- At 60%: ₹2,50,000 (₹41.67/unit) - per unit falls with volume (fixed spread).

WORKED EXAMPLE Cash budget points

- Include only **cash** items: collections from debtors (with lag %), cash sales, payments (with credit period), capital receipts/payments, loans, interest, taxes.
- **Exclude**: depreciation, provisions, notional charges, write-offs.
- Show opening balance + receipts − payments = closing; financing need if below minimum balance.

7.7 Budgetary control essentials

- **Budget committee** (CEO + functional heads; budget officer as secretary); **budget manual** (procedures, responsibilities, timetable); **budget period**.
- **Steps**: set objectives → prepare budgets → compare actuals → analyse variances → corrective action → revise.
- Limitations: estimates, rigidity, cost of operating, human resistance, not a substitute for management.

MEMORY TRICK Budget order - "S-P-M-L-O-C-M"

SPMLOCM – S Sales; P Production; M Materials; L Labour; O Overheads; C Cash; M Master

Note: Principal budget factor could be **materials, labour, capacity** - not always sales.

WORKED EXAMPLE Production & purchase budget practice

- Sales Q1 12,000 units; opening FG 2,000; closing FG 3,000; material 2 kg/unit; opening RM 5,000 kg; closing RM 6,000 kg.

Production = 12,000 + 3,000 − 2,000 = **13,000 units**

RM usage = 26,000 kg; Purchases = 26,000 + 6,000 − 5,000 = **27,000 kg**

- Ratios check: activity 95%, capacity 100%, efficiency 95% → 0.95 = 1.00 × 0.95.

WORKED EXAMPLE **Cash budget practice**

- Sales: Jan 1,00,000, Feb 1,20,000, Mar 1,50,000; 40% cash, 60% next month. Purchases 60% of sales, paid next month. Wages ₹15,000 pm. Opening cash (Feb) ₹20,000. Dec sales ₹90,000 (purchases Dec 54,000).

Feb receipts = 48,000 cash + 60,000 (Jan credit) = **1,08,000**

Feb payments = 60,000 (Jan purchases) + 15,000 = **75,000**

Feb closing = 20,000 + 1,08,000 − 75,000 = **₹53,000**

EXAM TIP **Theory**

- Budget vs forecast: forecast = estimate of likely events; budget = **plan** with targets & responsibility.
- Requisites of effective budgetary control: clear objectives, organisation chart, budget manual, participation, flexible approach, timely reporting.
- Master budget = consolidated summary of all functional budgets (approved by board).

WORKED EXAMPLE **Moving average illustration**

Year	Sales	3-yr moving total	3-yr MA
2021	20	-	-
2022	24	66	22.0
2023	22	72	24.0
2024	26	78	26.0
2025	30	-	-

- Even-period MA must be **centred** (average of two successive MAs).

7.8 Zero-base & performance budgeting

- **ZBB**: every activity justified from **zero**; decision units → decision packages → ranking → funding.
- **Performance budgeting**: links expenditure to **outputs & outcomes** (programmes, activities, results).
- **Rolling budget**: continuous - add a period as one expires; **activity-based budgeting**: activity volumes × rates.
- **Kaizen budgeting**: builds continuous improvement targets into budget.

EXAM TIP **Forecasting FAQs**

- Correlation coefficient r = cov(x,y) ÷ (σx σy); r^2 = % variation explained.
- Regression of y on x used to **predict y**; x on y used to predict x.
- Seasonal index = average of season ÷ grand average × 100.
- Sales forecast is the **starting point** - sales usually the principal budget factor.

WORKED EXAMPLE **Master budget flow**

Sales budget → Production budget (sales + closing FG − opening FG) → Material usage & purchase budgets → Labour & overhead budgets → Cost of production → Cash budget → Budgeted P&L & Balance Sheet (**master budget**)

WORKED EXAMPLE **Production & purchase illustration**

- Sales 10,000 units; opening FG 1,500; closing FG 2,000 → **production 10,500**.
- Material 2 kg/unit → usage 21,000 kg; opening RM 3,000; closing RM 4,000 → **purchases 22,000 kg**.
- At ₹50/kg → purchase budget **₹11 lakh**.

7.9 Flexible budget – worked example

WORKED EXAMPLE **Flexible budget at 50%, 75% and 100% capacity**

- Capacity 20,000 units. Material ₹20 and labour ₹10 per unit. Semi-variable overhead is ₹1,00,000 at 50% capacity, of which ₹60,000 is fixed. Fixed overhead ₹2,00,000. Selling price ₹60.

Item (₹)	50% (10,000 units)	75% (15,000 units)	100% (20,000 units)
Material @ ₹20	2,00,000	3,00,000	4,00,000
Labour @ ₹10	1,00,000	1,50,000	2,00,000
Semi-variable (60,000 + ₹4 per unit)	1,00,000	1,20,000	1,40,000
Fixed overhead	2,00,000	2,00,000	2,00,000
Total cost	**6,00,000**	**7,70,000**	**9,40,000**
Cost per unit	60.00	51.33	47.00
Sales @ ₹60	6,00,000	9,00,000	12,00,000
Profit	**Nil (break-even)**	**1,30,000**	**2,60,000**

- Variable rate of the semi-variable cost = (1,00,000 − 60,000) ÷ 10,000 = ₹4. 50% capacity is the break-even point: 2,60,000 ÷ (60 − 34) = 10,000 units.

Chapter 8: Divisional Performance Measurement

In this chapter: Decentralisation · Divisional performance measures - DuPont analysis, ROI, Residual Income, EVA · Learning curve · Balanced scorecard & variable pay

8.1 ROI, RI & EVA

ROI (DuPont) = Profit margin (PBIT ÷ Sales) × Asset turnover (Sales ÷ Capital employed)

Residual income = Divisional profit − (Capital employed × Cost of capital)

EVA = NOPAT − (WACC × Capital employed)

- ROI may cause **sub-optimal** rejection of projects with return > cost of capital but < current ROI.
- RI & EVA overcome this; EVA adjusts accounting profit (R&D, goodwill, leases) VERIFY.

8.2 ROI vs RI vs EVA

Basis	ROI	RI	EVA
Type	Relative %	Absolute	Absolute
Goal congruence	Weak	Better	Best
Divisions of different size	Comparable	Bias to large	Bias to large
Basis	Accounting	Accounting	Economic (adjusted)

8.3 Decentralisation

- Benefits: faster decisions, local knowledge, motivation, top management freed for strategy, training ground.
- Costs: **goal incongruence**, duplication, sub-optimisation, measurement disputes (transfer pricing).
- Responsibility centres: cost, revenue, profit, **investment** (division).

8.4 Learning curve

y = a x^b ; b := log (learning rate) ÷ log 2

- **80% curve**: every time cumulative output **doubles**, cumulative average time per unit falls to **80%** of previous.
- b for 80% = log 0.8 ÷ log 2 = **−0.322**.
- Applies to labour-intensive, repetitive, new processes; stops at **steady state**.

WORKED EXAMPLE Learning curve illustration

Cumulative units	Avg time/unit	Total time
1	100 hrs	100
2	80	160
4	64	256
8	51.2	409.6

- Time for units 5-8 = 409.6 − 256 = **153.6 hrs**.
- Uses: pricing, budgeting labour, standard setting, make/buy.

8.5 Balanced scorecard & variable pay

- Four perspectives: **Financial, Customer, Internal process, Learning & growth** (Kaplan & Norton).
- Link KPIs to **variable pay**: weights per perspective; payout = Σ (weight × achievement %).
- Avoid gaming: mix of lead & lag indicators; controllable measures.

WORKED EXAMPLE ROI vs RI decision

- Division: profit ₹3 lakh; capital ₹15 lakh (ROI **20%**); cost of capital 15%.
- New project: investment ₹5 lakh, profit ₹85,000 (17%).

ROI after = 3,85,000 ÷ 20,00,000 = **19.25%** → manager **rejects** (ROI falls)

RI before = 3,00,000 − 2,25,000 = ₹75,000; RI after := 3,85,000 − 3,00,000 = **₹85,000** → accept (RI rises; goal-congruent)

WORKED EXAMPLE EVA illustration

- EBIT ₹50 lakh; tax 25%; capital employed ₹200 lakh; WACC 12%.

NOPAT = 50 × 0.75 = ₹37.5 lakh

Capital charge = 12% × 200 = ₹24 lakh

EVA = 37.5 − 24 = **₹13.5 lakh** (value created)

- **MVA** = market value − capital employed (cumulative EVA expectation).

EXAM TIP Divisional FAQs

- Capital employed: **gross vs net book value** - net BV makes ROI rise as assets age (discourages replacement).
- Non-financial measures: quality, delivery, customer satisfaction, innovation (BSC).
- Controllable profit = revenue − controllable costs (used for manager evaluation); divisional profit for division evaluation.
- Learning curve not applicable to highly automated processes or after steady state.

80% learning curve - cumulative average hours per unit (first unit 100 hrs)

Cumulative units (doubling)	1	2	4	8	16	32
Avg hrs/unit (80%)	100	80	64	51.2	41	32.8
Avg hrs/unit (90%)	100	90	81	72.9	65.6	59

WORKED EXAMPLE ROI, RI and EVA – goal congruence (pattern of June 2026)

- Division D: operating profit ₹30 lakh; capital employed ₹150 lakh; cost of capital 12%; tax 25%. A new project needs ₹20 lakh and earns ₹3.5 lakh a year (17.5%).

ROI = 30 ÷ 150 = **20%**; with the project 33.5 ÷ 170 = **19.7%** → manager rejects (ROI falls)

RI = 30 − 12% × 150 = **₹12 lakh**; project adds 3.5 − 2.4 = **₹1.1 lakh** → accept

EVA = 30 × (1 − 25%) − 12% × 150 = 22.5 − 18 = **₹4.5 lakh**

- The project earns more than the 12% cost of capital, so RI and EVA lead to the goal-congruent decision; ROI does not.

WORKED EXAMPLE **Learning curve – cost of a later batch**

- First unit 100 labour hours; 80% learning curve; ₹50 per hour. Four units have been made; an order for four more is received.

Total hours for 8 units = 8 × 51.2 = 409.6 hrs

Hours for first 4 units = 4 × 64 = 256 hrs

Hours for the next 4 units = 409.6 − 256 = **153.6 hrs** × ₹50 = **₹7,680**

- Price the new order on the **incremental** hours, not the average of all units to date.

Chapter 9: Responsibility Accounting

In this chapter: Meaning · Responsibility centres (cost, revenue, profit, investment) · Responsibility reporting · Controllable vs uncontrollable costs

9.1 Responsibility centres

Centre	Manager controls	Measure
Cost (standard / discretionary)	Costs	Variances vs budget
Revenue	Sales	Sales variances
Profit	Revenue & costs	Contribution, controllable profit
Investment	Profit & assets	ROI, RI, EVA

9.2 Principles

- Organisation chart with clearly defined **authority & responsibility**.
- Charge each manager only with **controllable costs**.
- Budget per centre → actual vs budget → **responsibility report** → action.
- Reports become **summarised** as they move up the hierarchy (pyramid reporting).

EXAM TIP Exam points

- Controllable cost: manager can **influence** it within a given period.
- Depreciation of divisional assets is controllable by investment-centre manager, not by cost-centre foreman.
- Responsibility report includes budget, actual, variance, remarks.

WORKED EXAMPLE Responsibility report format

Cost item	Budget	Actual	Variance	Controllable?
Direct material	2,00,000	2,12,000	12,000 (A)	Yes
Direct labour	1,50,000	1,44,000	6,000 (F)	Yes
Supervision	40,000	40,000	-	Yes
Depreciation (allocated)	60,000	60,000	-	No
Total controllable	3,90,000	3,96,000	6,000 (A)	–

COMMON MISTAKE Responsibility accounting traps

- Charging allocated head-office costs to a cost-centre manager - × not controllable.
- Comparing actual with **fixed** budget at a different activity level - × use flexible budget.
- Treating a revenue centre manager as responsible for production costs - ×.

Chapter 10: Decision Theory

In this chapter: Decision making under certainty, risk & uncertainty · Expected value (EMV) · Value of perfect information · Decision tree · Maximax, maximin, minimax regret, Laplace, Hurwicz

10.1 Under risk – EMV

EMV of act = Σ (payoff × probability)

EVPI = Expected value with perfect information – Max EMV

- Choose act with **highest EMV** (profit) / lowest expected cost.
- Risk measured by **standard deviation**; coefficient of variation for comparison.

10.2 Under uncertainty – criteria

Criterion	Rule	Attitude
Maximax	Best of the best payoffs	Optimist
Maximin	Best of the worst payoffs	Pessimist
Minimax regret	Minimise maximum opportunity loss	Avoid regret
Laplace	Equal probabilities → highest average	Rational
Hurwicz (α)	α × max + (1−α) × min	Mixed

10.3 Decision tree steps

Draw left to right: □ **decision** node, ○ **chance** node, branches with probabilities & payoffs → Roll back right to left: compute EMV at chance nodes → At decision nodes choose best branch (prune others) → Recommend path

WORKED EXAMPLE Payoff table illustration

Act \ Demand	Low (0.3)	Medium (0.5)	High (0.2)	EMV
Small plant	20	25	30	24.5
Large plant	−10	30	60	**24**

- EMV: small 6 + 12.5 + 6 = **24.5** → choose small. Maximax → large (60); maximin → small (20).
- Perfect info: 0.3×20 + 0.5×30 + 0.2×60 = 33 → **EVPI = 33 – 24.5 = 8.5**.

COMMON MISTAKE Decision theory traps

- Regret table: regret = **best payoff in that state – payoff** (column-wise, not row-wise).
- Decision tree roll-back: deduct investment cost at the **decision** node.
- EMV ignores risk attitude - mention utility / SD where asked.

WORKED EXAMPLE Decision tree illustration

- Launch new product: cost ₹10 lakh. Demand high (0.6) → PV ₹25 lakh; low (0.4) → ₹5 lakh. Option: test market first ₹1 lakh (perfect info assumed).

EMV (launch) = 0.6 × 25 + 0.4 × 5 − 10 = **₹7 lakh**

With test (launch only if high) = 0.6 × (25 − 10) − 1 = **₹8 lakh** → test first

- EVPI here = 0.6 × 15 − 7 = ₹2 lakh > test cost ₹1 lakh.

WORKED EXAMPLE **Minimax regret table (payoffs as above; medium plant payoffs 10, 28, 45)**

Act \ State	Low	Medium	High	Max regret
Small plant	0	5	30	30
Large plant	30	0	0	30
Medium plant	10	2	15	**15** ✓

- Regret = column best − payoff; choose act with **lowest maximum regret** (medium plant).

WORKED EXAMPLE **Hurwicz & Laplace illustration**

- Payoffs (small 20/25/30; large −10/30/60); α (optimism) = 0.6.

Hurwicz small = 0.6 × 30 + 0.4 × 20 = **26**

Hurwicz large = 0.6 × 60 + 0.4 × (−10) = **32** → choose large

Laplace = small (75/3) = 25; large (80/3) = **26.67** → large

10.4 Risk measures

Standard deviation σ = $\sqrt{\Sigma}\ p\ (x - EMV)^2$

Coefficient of variation = σ ÷ EMV (lower = less risk per unit return)

- Risk-averse decision-maker may choose lower EMV with much lower σ.
- **Utility theory** converts monetary payoffs into utility for risk attitude.

EXAM TIP **Decision theory FAQs**

- Certainty → one outcome per act (LP, CVP); risk → known probabilities (EMV); uncertainty → no probabilities (criteria).
- EVPI = maximum amount worth paying for perfect information.
- Decision tree suits **sequential** decisions.

EMV comparison (₹ lakh)

Item	Value
Small plant	24.5
Large plant	24
Perfect information	33

Theory Answer Bank (MTP favourites)

In this chapter: Introduction & ABC · Decision making & transfer pricing · Standard costing & budgets · Divisional performance, responsibility accounting & decision theory

EXAM TIP Introduction, ABC & marginal costing

- **Q. Functions of management accounting.** Planning, controlling, organising, decision making, communicating, motivating, performance evaluation.
- **Q. Cost pool & cost driver.** Pool = group of costs caused by one activity; driver = factor causing cost (no. of set-ups, orders, inspections).
- **Q. Why ABC is more accurate.** Multiple drivers; links overhead to activities consumed; reveals cross-subsidisation.
- **Q. Assumptions of CVP.** Linear costs & revenue, constant SP, fixed costs constant, constant sales mix, production = sales.
- **Q. Uses of P/V ratio.** BEP, profit at given sales, sales for target profit, product ranking, pricing.
- **Q. Margin of safety - improve by** raising SP, reducing VC/FC, increasing volume, better mix.

EXAM TIP Decisions & transfer pricing

- **Q. Explain differential cost analysis** - compares incremental revenue & cost of alternatives; fixed costs relevant only if changed.
- **Q. Factors in make or buy** - cost, capacity, quality, supplier reliability, confidentiality, flexibility.
- **Q. Explain key factor** - scarce resource limiting output; maximise contribution per unit of key factor.
- **Q. Objectives of transfer pricing** - goal congruence, autonomy, performance evaluation, motivation, tax planning (within law).
- **Q. Market price as TP - limitations** - imperfect markets, distress prices, internal cost savings ignored.
- **Q. International TP issues** - arm's length, double taxation, customs duty, APA, documentation.

EXAM TIP Standard costing & budgets

- **Q. Advantages of standard costing** - control, management by exception, simplified inventory valuation, cost consciousness, aid to pricing.
- **Q. Standard hour** - quantity of output that should be produced in one hour.
- **Q. Explain mix & yield variances** - mix: proportion of inputs differs from standard; yield: output from input differs from standard.
- **Q. Essentials of budgetary control** - clear organisation, budget committee & manual, realistic targets, participation, reporting & follow-up.
- **Q. Flexible budget - need** - activity levels vary; separates fixed & variable; meaningful variances.
- **Q. Principal budget factor** - limiting factor determining all budgets (sales, material, labour, capacity, finance).

EXAM TIP Divisions, responsibility & decision theory

- **Q. Advantages of RI over ROI** - absolute measure, encourages all projects earning > cost of capital, goal congruence.
- **Q. EVA - meaning & adjustments** - NOPAT – capital charge; capitalise R&D/advertising, add back goodwill amortisation, operating leases VERIFY.
- **Q. Applications of learning curve** - pricing, budgeting, standard setting, bid preparation, make/buy.
- **Q. Responsibility accounting - pre-requisites** - defined centres, controllable costs, budgets per centre, timely reports.
- **Q. Decision making under uncertainty** - maximax, maximin, minimax regret, Laplace, Hurwicz criteria.
- **Q. Limitations of EMV** - subjective probabilities, ignores risk attitude, one-off decisions.

Last-Day Formula Sheet

In this chapter: Numbers & formulas to remember · Answer-writing checklist

Formula chips

BEP = FC ÷ PV · MOS = Profit ÷ PV · PV = ΔProfit ÷ ΔSales · Composite PV = ΣC ÷ ΣS · Key factor = C per LF unit · Min TP = MC + OC · ROI = Margin × Turnover · RI = Profit − k × CE · EVA = NOPAT − WACC × CE · Learning b = log r ÷ log 2 · EMV = Σ p × x · EVPI = EV(PI) − max EMV · MPV = (SP−AP)AQ · MUV = (SQ−AQ)SP · LRV = (SR−AR)AH · LEV = (SH−AH)SR · VOH Exp = Budget at AH − Actual · FOH Vol = Absorbed − Budgeted · Least squares b = Σxy ÷ Σx^2 (coded)

Answer checklist

State **assumption** & formula → Present tables (relevant cost / variance / budget) → Mark (F)/(A) clearly → **Recommend** with reason + qualitative factors

Note: In decisions, write "sunk cost - ignored" explicitly - examiners award marks for it.