Skillshort

Self-Study Preparation Pack

CMA INTERMEDIATE

Paper 11: Financial Management and Business Data Analytics (FMDA)

Chapter-wise Detailed Notes

For the December 2026 term (Tue 15 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 | FM 80% · BDA 20%

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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** – Section A Financial Management (Chapters 1–7, 80%) and Section B Business Data Analytics (Chapters 8–11, 20%). Each chapter gives the concepts and formulas examined, worked examples verified in Python, and model answer frames for the theory questions that repeat.

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** (about 4–6 short numericals)
Section B	**Any 5 of Q2–Q8**, 14 marks each = 70
Typical Section B order	Q2 markets theory + BDA theory · Q3 ratios / cash flow · Q4 comparative or common-size statements + cost of capital · Q5 capital budgeting · Q6 working capital, receivables, inventory · Q7 dividend, capital structure, leverage · Q8 BDA theory
ICMAI weightage	M1 Fundamentals 5% · M2 Institutions and instruments 10% · M3 Tools for financial analysis 15% · M4 Sources of finance and cost of capital 10% · M5 Capital budgeting 15% · M6 Working capital 15% · M7 Financing decisions 10% · M8–M11 BDA 5% each

NOTE What applies for December 2026

- Paper 11 has no statute cut-off; it follows the ICMAI study material. Present-value tables are given in the exam – show the factors you use.
- Regulatory figures (RBI policy rates, SEBI norms) change often; use the figures given in the question.

EXAM TIP High-yield for Dec 2026

TVM & annuities · Ratio-based BS construction · Fund flow & cash flow · WACC & MCC · NPV/IRR/PI · Replacement & unequal lives · Operating cycle & WC estimate · Credit policy · EOQ · Leverages · EBIT-EPS · Walter/Gordon/MM · Data types · Data cleaning · Dashboards · Descriptive-predictive-prescriptive · XBRL · RPA/ML

Chapter 1: Fundamentals of Financial Management, TVM, Risk & Return

In this chapter: Introduction to FM - objectives, scope, finance functions · Time value of money · Risk & return

1.1 Profit vs wealth maximisation

Basis	Profit max.	Wealth max.
Focus	Accounting profit	**Market value of shares** (NPV)
Time value	Ignored	Considered
Risk	Ignored	Considered
Vague?	Yes (which profit?)	Clear (cash flows)
Acceptance	Traditional	**Modern - superior objective**

1.2 Finance functions

- **Investment** (capital budgeting, WC) - where to invest.
- **Financing** - mix of debt/equity (capital structure).
- **Dividend** - payout vs retention.
- **Liquidity** - managing current assets/cash.
- Finance executive role: raising funds, allocation, profit planning, capital market understanding, treasury, risk.

1.3 Agency problem

- Conflict between **shareholders (principal)** & **managers (agent)**; also shareholders vs debt-holders.
- **Agency costs**: monitoring (audit, board), bonding (managers' guarantees), opportunity costs, structuring compensation.
- **Solutions**: ESOPs, performance-linked pay, independent directors, market for corporate control, monitoring.

1.4 Evolution of financial management

Traditional phase (till 1940s) - episodic fund raising, legal & institutional focus → **Transitional phase** (1940s-50s) - day-to-day funds & working capital → **Modern phase** (1950s onwards) - analytical, decision-oriented: capital budgeting, cost of capital, valuation, risk-return

1.5 FM & other disciplines

- **Accounting**: provides data (FS, cash flows); FM uses it for decisions - accounting = **accrual**, FM = **cash flow** basis.
- **Economics**: macro (interest rates, inflation, monetary policy) & micro (marginal analysis, demand) feed FM decisions.
- **Production, marketing, HR**: every functional plan has a financial impact - capex, pricing, payroll.
- Inter-relationship of 3 decisions: investment ↔ financing ↔ dividend - all aim at **maximising shareholder wealth**.

MEMORY TRICK **Three core decisions – "IFD"**

IFD – I Investment (where to invest - capital budgeting & WC); F Financing (from where - debt/equity mix); D Dividend (how much to distribute vs retain)

Note: Wealth = Present value of future cash flows to shareholders → reflected in **market price per share**.

1.6 Role of the finance executive (modern)

- Raising of funds at minimum cost; allocation to profitable uses; profit planning; understanding capital markets.
- Value creation: identify value drivers, risk management (hedging FX, interest), treasury, investor relations.

- **CFO in strategic role**: M&A, restructuring, ESG reporting, digital finance, compliance & governance.

EXAM TIP FAQ – Chapter 1

- Why is wealth maximisation superior? Considers **time value, risk, cash flows**; long-term; aligns with market value.
- Conflicts in profit maximisation: ignores timing (₹1 today ≠ ₹1 tomorrow), ignores risk, ambiguous term "profit".
- Agency cost examples: auditing costs, stock options, board oversight, restrictive covenants by lenders.

1.7 Time value of money

FV (single) = PV × (1 + r)^n

PV (single) = FV ÷ (1 + r)^n

FV of annuity = A × [(1 + r)^n – 1] ÷ r

PV of annuity = A × [1 – (1 + r)^–n] ÷ r

Perpetuity = A ÷ r; growing perpetuity := A_1 ÷ (r – g)

Effective annual rate = (1 + i/m)^m – 1

- **Annuity due** = ordinary annuity × (1 + r).

WORKED EXAMPLE TVM illustration

- ₹1,00,000 invested at 10% for 3 years: FV = 1,00,000 × 1.331 = **₹1,33,100**.
- PV of ₹50,000 p.a. for 4 years @ 10% = 50,000 × 3.170 = **₹1,58,500**.
- 12% p.a. compounded quarterly: EAR = (1.03)^4 – 1 = **12.55%**.
- Loan EMI = Loan ÷ PVAF (r, n): ₹5 lakh, 10%, 5 yrs → 5,00,000 ÷ 3.791 = **₹1,31,891** p.a.

1.8 Risk & return

Expected return = $\Sigma p_i R_i$

Standard deviation = $\sqrt{\Sigma p_i (R_i - E(R))^2}$

Coefficient of variation = σ ÷ E(R)

Portfolio return = $\Sigma w_i R_i$

CAPM = Rf + β (Rm – Rf)

- **Systematic** (market, non-diversifiable, measured by β) vs **unsystematic** (diversifiable) risk.
- Two-asset portfolio $\sigma^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho\sigma_1\sigma_2$.

Chapter 2: Financial Institutions, Capital Market & Money Market

In this chapter: Indian financial system · Financial institutions (banks, NBFCs, DFIs, insurance, mutual funds) · Capital market - primary & secondary · Money market instruments · Regulators (RBI, SEBI, IRDAI, PFRDA)

2.1 Indian financial system

Financial system → Institutions (banks, NBFCs, DFIs - NABARD, SIDBI, EXIM, NHB; insurers; mutual funds; pension funds) → Markets (money, capital, forex, derivatives) → Instruments → Services (merchant banking, credit rating, depository, leasing, factoring)

- Regulators: **RBI** (banks, NBFCs, money & forex market), **SEBI** (securities), **IRDAI** (insurance), **PFRDA** (pension), **IFSCA** (GIFT City).

2.2 Capital market vs money market

Basis	Capital market	Money market
Tenure	> 1 year	≤ 1 year
Instruments	Equity, debentures, bonds	T-bills, CP, CD, call money, repo, CBLO/TREPS
Purpose	Long-term finance	Liquidity / short-term
Regulator	SEBI	RBI
Risk & return	Higher	Lower

2.3 Money market instruments

Instrument	Issuer	Tenure
Treasury bills	Govt of India (RBI)	91, 182, 364 days
Commercial paper	Companies, PDs, FIs	7 days - 1 year
Certificate of deposit	Banks (7 days-1 yr), FIs (1-3 yrs)	Discount instrument
Call / notice money	Banks	1 day / 2-14 days
Repo / reverse repo	RBI & banks	Overnight - term

2.4 Primary market – methods

- **IPO / FPO** (public issue), **rights issue**, **bonus**, **private placement**, **preferential allotment**, **QIP** (to QIBs), **offer for sale**.
- **Book building**: price band; bids; cut-off price; anchor investors; ASBA / UPI mandatory.
- Intermediaries: merchant banker (BRLM), registrar, underwriter, bankers, depository (NSDL/CDSL).

2.5 Secondary market

- Stock exchanges (NSE, BSE): **T+1 rolling settlement** VERIFY; trading on screen; clearing corporation guarantees settlement.
- Indices: Sensex (30), Nifty 50; derivatives - futures & options.
- **Depository system**: demat, dematerialisation, rematerialisation; beneficial owner.

EXAM TIP FAQ – markets

- **Functions of financial system**: mobilise savings, allocate capital, payment system, risk management, price discovery.
- **Role of DFIs**: long-term project finance - NABARD (agriculture), SIDBI (MSME), EXIM (trade), NHB (housing).
- **Mutual fund types**: open/close-ended; equity, debt, hybrid, index, ETF; NAV = (assets – liabilities) ÷ units.
- **Venture capital vs private equity**; **credit rating** agencies (CRISIL, ICRA, CARE).

2.6 Exam-ready answer frames – markets and instruments

QUESTION Credit rating – meaning and process (asked June 2026)

Meaning: an independent opinion by a rating agency (CRISIL, ICRA, CARE, India Ratings and others registered with SEBI) on the relative ability and willingness of an issuer to meet a debt obligation on time. It is expressed as a symbol (AAA, AA ... D) and is not a recommendation to buy or sell.

Process:

1. Request from the issuer and signing of the rating agreement.
2. Rating team assigned; information sought – financial statements, projections, business plans.
3. Meetings with management; plant visits; analysis of business risk, financial risk, management quality and industry.
4. Presentation to the **rating committee**, which decides the rating.
5. Communication to the issuer; the issuer may appeal once with fresh information.
6. Publication of the accepted rating.
7. **Surveillance** – continuous monitoring; upgrade, downgrade or "watch" when conditions change.

QUESTION Repo – meaning and features (asked December 2025)

A repo (repurchase agreement) is a sale of government securities with an agreement to **buy them back** at a fixed price on a future date – in effect a collateralised short-term loan. Features: tenor from overnight to a few weeks; collateral of government securities or T-bills; the RBI's **repo rate** is its main policy rate; reverse repo is the opposite transaction; regulated by the RBI; used by banks for liquidity management.

QUESTION Commercial paper – features and advantages (asked December 2024)

Unsecured, short-term **usance promissory note** issued at a discount; maturity 7 days to 1 year; issued by companies, primary dealers and all-India financial institutions meeting RBI eligibility and credit-rating norms; issued in dematerialised form; denomination ₹5 lakh and multiples VERIFY. Advantages: cheaper than bank borrowing for highly rated companies, flexible maturity, no collateral, wider investor base, simple documentation.

Chapter 3: Tools for Financial Analysis & Planning

In this chapter: Comparative, common-size & trend analysis · Ratio analysis · Fund flow analysis · Cash flow analysis

3.1 Liquidity & leverage

Current ratio = Current assets ÷ Current liabilities

Quick ratio = (CA − Inventory − Prepaid) ÷ CL

Cash ratio = (Cash + marketable securities) ÷ CL

Debt-equity = Long-term debt ÷ Shareholders' funds

Debt to total funds = Debt ÷ (Debt + Equity)

Interest coverage = EBIT ÷ Interest

DSCR = (PAT + Depreciation + Interest + non-cash) ÷ (Interest + Principal instalment)

3.2 Activity ratios

Inventory turnover = COGS ÷ Average inventory

Receivables turnover = Credit sales ÷ Average receivables

Debtors collection period = 365 ÷ Receivables turnover

Payables turnover = Credit purchases ÷ Average payables

Fixed asset turnover = Sales ÷ Net fixed assets

Capital turnover = Sales ÷ Capital employed

Working capital turnover = Sales ÷ Net working capital

3.3 Profitability & market

GP ratio = Gross profit ÷ Sales × 100

ROCE = EBIT ÷ Capital employed × 100

ROE = PAT (equity) ÷ Equity shareholders' funds

EPS = (PAT − Pref. dividend) ÷ No. of equity shares

P/E ratio = Market price ÷ EPS

Dividend yield = DPS ÷ MPS

Du Pont ROE = Net margin × Asset turnover × Equity multiplier

WORKED EXAMPLE **Construct BS from ratios**

- Sales ₹30 lakh; GP 25%; inventory turnover (on COGS) 6; debtors' period 73 days; current ratio 2; quick ratio 1.2.

COGS = 22.5 L → inventory = **₹3.75 L**

Debtors = 30 L × 73/365 = **₹6 L**

CA − CL = CR 2 & QR 1.2 → (CA − 3.75)/CL = 1.2 and CA = 2 CL → 0.8 CL = 3.75 → **CL = ₹4.69 L**, CA = ₹9.38 L

COMMON MISTAKE **Ratio traps**

- Use **average** balances when available; year-end otherwise (state assumption).
- Inventory turnover on **COGS** (not sales) unless question says otherwise.
- Limitations: historical, window dressing, different accounting policies, inflation, no single standard.

3.4 Ratios by user

User	Interest	Key ratios
Short-term creditors	Liquidity	Current, quick, cash ratio
Long-term lenders	Solvency	D/E, interest coverage, DSCR
Shareholders	Return & value	ROE, EPS, P/E, dividend yield, payout
Management	Efficiency	Turnover ratios, margins, ROCE

3.5 More coverage & market ratios

Preference dividend coverage = PAT ÷ Preference dividend

Fixed charges coverage = (EBIT + Dep) ÷ (Interest + Principal/(1 − t))

Dividend payout = DPS ÷ EPS; Retention = 1 − payout

Earnings yield = EPS ÷ MPS

Market value to book value = MPS ÷ BVPS

Q ratio (Tobin) = Market value of assets ÷ Replacement cost

Net profit ratio = PAT ÷ Sales

Operating ratio = (COGS + Operating exp.) ÷ Sales

3.6 Du Pont tree

ROE → = ROA × Equity multiplier (Total assets ÷ Equity) → ROA = **Net profit margin** (PAT ÷ Sales) × **Asset turnover** (Sales ÷ Total assets)

- Shows whether ROE is driven by **profitability, efficiency or leverage**.
- Extended (5-step): tax burden × interest burden × EBIT margin × asset turnover × equity multiplier.

3.7 Steps to construct a balance sheet from ratios

Start with **given absolute figure** (sales / net worth / capital) → Use GP ratio → COGS; turnover ratios → stock, debtors, creditors, fixed assets → Use current & quick ratio to solve CA & CL simultaneously → Use D/E or proprietary ratio → debt & net worth → Balance the totals; plug cash/reserves

EXAM TIP **FAQ – Ratio analysis**

- Current ratio 2:1 & quick ratio 1:1 are **conventional norms** - interpret as per industry.
- High inventory turnover = efficient, but too high may mean stock-outs.
- Interest coverage < 1.5-2 times signals solvency stress.
- Ratio analysis limitations: no standard definitions, price-level changes, window dressing, not predictive alone.

3.8 Comparative, common-size & trend

- **Comparative statement**: two or more years side by side - absolute change & % change.
- **Common-size**: P&L items as % of **sales**; BS items as % of **total assets** - inter-firm comparison.
- **Trend analysis**: base year = 100; trend % = current ÷ base × 100.

3.9 Fund flow statement

Funds = Working capital (CA – CL)

Funds from operations = Net profit + non-fund/non-operating charges (depreciation, goodwill w/o, loss on sale) – non-operating incomes (profit on sale, dividend received)

- Statements: **Schedule of changes in working capital** + **Fund flow statement** (sources vs applications).
- Sources: FFO, issue of shares/debentures, long-term loans, sale of fixed assets; applications: purchase of assets, redemption, dividends, taxes (if not provided).

3.10 Fund flow vs cash flow

Basis	Fund flow	Cash flow
Concept	Working capital	Cash & cash equivalents
Basis	Accrual	Cash
Use	Long-term planning	Short-term liquidity
Standard	None	AS 3 / Ind AS 7

- Cash flow: operating (direct/indirect), investing, financing activities.

WORKED EXAMPLE **Funds from operations illustration**

- Net profit for year ₹4,00,000 after: depreciation 1,20,000; goodwill w/o 30,000; loss on sale of machine 10,000; profit on sale of investment 25,000; dividend received 15,000.

FFO = 4,00,000 + 1,20,000 + 30,000 + 10,000 – 25,000 – 15,000 = **₹5,20,000**

- Sale proceeds of investment & dividend shown separately as **sources**.

WORKED EXAMPLE **Common-size P&L illustration**

Item	₹ lakh	% of sales
Sales	500	100
COGS	325	65
Gross profit	175	35
Operating exp.	100	20
EBIT	75	15
Net profit	45	9

EXAM TIP **Analysis FAQs**

- Trend % > 100 shows growth vs base year; compare sales trend with debtors trend (credit control).
- Fund flow ignores changes **within** current assets/liabilities.
- Cash flow (indirect) starts with **PBT**, adjusts non-cash items & working-capital changes.
- Limitations of ratios: historical, window dressing, different policies, inflation.

3.11 Worked examples – ratios, Z-score (verified)

WORKED EXAMPLE **Balance sheet from ratios (pattern of June 2026)**

Current ratio 2.0; liquid ratio 1.4; working capital ₹40,000; stock turnover on cost of goods sold 5 times; fixed-asset turnover on COGS 2 times; gross profit 20%; debtors' velocity 73 days; fixed assets to net worth 0.80; reserves and surplus to share capital 0.25. All sales on credit; opening and closing stock and debtors are equal.

Step	Working	₹
Current assets and liabilities	CA − CL = 40,000 and CA = 2 CL → CL = 40,000; CA = 80,000	
Liquid assets	1.4 × 40,000	56,000
Stock	80,000 − 56,000	24,000
Cost of goods sold	24,000 × 5	1,20,000
Sales	1,20,000 ÷ 0.80	1,50,000
Fixed assets	1,20,000 ÷ 2	60,000
Debtors	1,50,000 × 73 ÷ 365	30,000
Cash (balancing liquid asset)	56,000 − 30,000	26,000
Net worth	60,000 ÷ 0.80	75,000
Share capital : reserves = 1 : 0.25	75,000 ÷ 1.25	60,000 and 15,000
Long-term debt (balancing)	1,40,000 − 75,000 − 40,000	25,000

Balance sheet: share capital 60,000 + reserves 15,000 + long-term debt 25,000 + current liabilities 40,000 = **₹1,40,000** = fixed assets 60,000 + stock 24,000 + debtors 30,000 + cash 26,000.

WORKED EXAMPLE **Altman Z-score – is the firm non-bankrupt? (pattern of December 2024)**

$$Z = 1.2\,X_1 + 1.4\,X_2 + 3.3\,X_3 + 0.6\,X_4 + 1.0\,X_5$$

X_1 working capital ÷ total assets 0.20; X_2 retained earnings ÷ total assets 0.25; X_3 EBIT ÷ total assets 0.15; X_4 market value of equity ÷ book value of debt 1.20; X_5 sales ÷ total assets 1.5.

Z = 0.24 + 0.35 + 0.495 + 0.72 + 1.50 = **3.305** → above **2.99**, the firm is in the **safe (non-bankrupt) zone**. Below 1.81 = distress zone; 1.81–2.99 = grey zone.

Chapter 4: Sources of Finance and Cost of Capital

In this chapter: Long-term, medium & short-term sources · Equity, preference, debentures, term loans, retained earnings · Lease, hire purchase · Venture capital · International sources

4.1 Short-term & special sources

Source	Key feature
Trade credit	Spontaneous; cost if cash discount forgone
Bank: CC/OD, bill discounting	Working capital
Commercial paper	Unsecured promissory note; 7 days-1 year; rated companies
Certificate of deposit	By banks/FIs
Factoring	Sale of receivables (recourse/non-recourse)
Securitisation	Pooling illiquid assets → marketable securities via SPV
Venture capital	Equity to high-risk start-ups; stages: seed, start-up, second round, mezzanine
Lease (operating/financial)	Use of asset without ownership

4.2 International sources

Instrument	Feature
ADR	Depository receipts in USA
GDR	Listed outside India (Luxembourg/London)
ECB	External commercial borrowings - RBI ECB framework
FCCB	Foreign currency convertible bonds
Masala bonds	Rupee-denominated bonds abroad - currency risk on investor
IDR	Foreign companies raising money in India

4.3 Sources compared

Source	Cost	Risk to company	Control
Equity shares	Highest (Ke)	Lowest - no fixed obligation	Dilutes
Preference shares	Medium	Fixed dividend (not legally binding if no profit)	No voting (usually)
Debentures/bonds	Lowest (tax-deductible interest)	High - fixed interest & repayment	No dilution
Retained earnings	Opportunity cost = Ke	None	No dilution
Term loans	Moderate	Covenants	Restrictive covenants

EXAM TIP FAQ

- Leasing vs hire purchase: ownership transfer at end (HP) vs no transfer (lease); depreciation claimed by hirer (HP) vs lessor (lease).
- Crowdfunding & angel investors - early-stage start-up financing; **Start-up India** VERIFY.
- Debt securitisation benefits: liquidity, off-balance sheet, risk transfer.

4.4 Lease vs hire purchase vs loan

Basis	Finance lease	Operating lease	Hire purchase
Ownership	Lessor (may pass at end)	Lessor	Passes to hirer on last instalment
Risk & rewards	Lessee	Lessor	Hirer
Term	Most of asset life	Short, cancellable	Fixed instalments
Depreciation	Lessor (tax law) VERIFY	Lessor	Hirer

Basis	Finance lease	Operating lease	Hire purchase
Example	Aircraft, plant	Car rental, IT equipment	Vehicles

- Types: **sale & lease back**, leveraged lease, direct lease, cross-border lease.

4.5 Securitisation process

Originator pools receivables (loans) > Transfers to **SPV** (true sale) > SPV issues **pass-through / pay-through certificates** to investors > Servicer collects & pays investors

- Benefits: liquidity, off-balance sheet, lower cost, risk transfer; participants: originator, SPV, investors, obligors, rating agency, credit enhancer.

4.6 Modern debt instruments

- **Deep discount / zero coupon bonds** - issued at discount, no coupon; return = discount.
- **Floating rate bonds** - coupon linked to benchmark (e.g., MIBOR, T-bill).
- **Callable / puttable bonds** - issuer / investor redemption option.
- **Convertible debentures** - fully/partly convertible into equity; **warrants** - right to buy shares later.
- **Green bonds** - finance environment-friendly projects.
- **Sweat equity**, **rights issue**, **ESOP** - equity routes.

4.7 Venture capital financing stages

Seed (idea, R&D) > Start-up (product launch) > Second round / early stage > Expansion > Mezzanine / bridge (pre-IPO) > Exit (IPO, buy-back, sale)

- Methods: equity, conditional loan (royalty), income note, participating debentures.
- VC evaluation: management team, market size, product uniqueness, exit route.

4.8 Start-up financing

- **Bootstrapping** - founder's own funds, customer advances, trade credit, equipment leasing.
- **Angel investors** - HNIs at early stage; **VC funds**; **crowdfunding** (reward/equity/debt).
- **Govt schemes** - Start-up India Seed Fund, Fund of Funds for Start-ups (SIDBI) VERIFY.
- Pitch deck essentials: problem, solution, market, business model, team, financials, ask.

⚠ COMMON MISTAKE Types of financing - common errors

- Treating **preference dividend** as tax-deductible - it is **not**.
- Calling retained earnings "cost-free" - opportunity cost = **Ke**.
- ADR = USA only; **GDR** = other international markets.
- Masala bond: **currency risk borne by investor** (rupee-denominated).
- Commercial paper is **unsecured**; CD issued by banks/FIs (not companies).

4.9 Specific costs

Kd (irredeemable) = I (1 – t) ÷ NP

Kd (redeemable) = [I (1 – t) + (RV – NP)/n] ÷ [(RV + NP)/2]

Kp = [PD + (RV – NP)/n] ÷ [(RV + NP)/2]

Ke (Gordon) = D1 ÷ P0 + g

Ke (CAPM) = Rf + β (Rm – Rf)

Ke (new issue) = D1 ÷ (P0 – flotation) + g

Kr = Ke (adjusted for personal tax/brokerage if given)

Growth g = b × r (retention × return on equity)

- YTM via trial & error / interpolation when exactness required.

4.10 WACC

WACC (Ko) = Σ (Weight × specific cost after tax)

- **Book value weights** (balance sheet) vs **market value weights** (preferred - reflect current values); retained earnings included in equity market value.
- **Marginal cost of capital**: WACC of next rupee raised - breakpoints when cheaper source exhausted.

Break point = Amount of cheaper source available ÷ its weight

WORKED EXAMPLE WACC illustration

- Equity ₹50 L (Ke 15%); 10% debentures ₹30 L (tax 25%); 12% preference ₹20 L.

Kd = 10% × 0.75 = 7.5%

WACC = 0.5 × 15 + 0.3 × 7.5 + 0.2 × 12 = 7.5 + 2.25 + 2.4 = **12.15%**

- CAPM check: Rf 6%, β 1.2, Rm 13.5% → Ke = 6 + 1.2 × 7.5 = **15%**.

4.11 More cost of capital formulas

Ke (earnings-price) = E1 ÷ P0 (when payout 100% / no growth)

Ke (realised yield) = Geometric mean of past annual returns [(D + P1) ÷ P0] – 1

Ke (bond yield + risk premium) = YTM of firm's bonds + 3-5% premium

Kd (zero coupon) = (RV ÷ NP)^(1/n) – 1

Kd (convertible) = IRR of [NP vs interest (1 – t) + value of conversion/redemption]

Ke (new equity - Gordon) = D1 ÷ [P0 (1 – f)] + g

- Use **after-tax** cost for debt; preference & equity have **no tax shield**.

4.12 Why cost of capital matters

- **Hurdle rate** / discount rate for capital budgeting.
- Basis for designing capital structure - mix minimising WACC.
- Evaluating financial performance (EVA = NOPAT – WACC × capital employed).
- Decisions on dividend vs retention, leasing vs buying, working capital financing.

EVA = NOPAT – (WACC × Capital employed)

MVA = Market value of firm – Capital employed

WORKED EXAMPLE Marginal cost of capital (breakpoints)

- Target mix: equity 60%, debt 40%. Retained earnings available ₹30 L (Ke 14%); beyond → new equity 15%. Debt up to ₹20 L @ 8% post-tax; beyond 9%.

Break point (RE) = 30 ÷ 0.60 = **₹50 L**

Break point (Debt) = 20 ÷ 0.40 = **₹50 L**

WACC up to 50 L = 0.6 × 14 + 0.4 × 8 = **11.6%**

WACC above 50 L = 0.6 × 15 + 0.4 × 9 = **12.6%**

WACC behaviour with leverage - Traditional view (illustrative)

Debt ratio	0%	20%	40%	60%	80%
Ke	12	12.5	13.5	16	20
Kd (post-tax)	6	6	6.5	8	11
WACC (Ko)	12	11.2	10.7	11.2	12.8

4.13 Worked example – specific costs and WACC (verified)

WORKED EXAMPLE **Cost of capital with redeemable securities (pattern of December 2024)**

Capital: equity ₹50 lakh, 10% preference shares ₹10 lakh, 12% debentures ₹40 lakh. Equity share price ₹32; expected dividend ₹3, growth 5%. Preference shares of ₹100 issued at ₹95, redeemable at ₹105 after 8 years. Debentures of ₹100 issued at ₹96, redeemable at ₹105 after 7 years. Tax 25%.

Ke = 3 ÷ 32 + 5% = **14.375%**

Kp = [10 + (105 − 95) ÷ 8] ÷ [(105 + 95) ÷ 2] = 11.25 ÷ 100 = **11.25%**

Kd = [12 × 0.75 + (105 − 96) ÷ 7] ÷ [(105 + 96) ÷ 2] = 10.286 ÷ 100.5 = **10.23%**

Source	Amount (₹ lakh)	Weight	Cost	Weighted cost
Equity	50	0.50	14.375%	7.19%
Preference	10	0.10	11.25%	1.13%
Debentures	40	0.40	10.23%	4.09%
WACC	100	1.00		**12.41%**

Chapter 5: Capital Budgeting

In this chapter: Capital budgeting process · Estimation of cash flows · Cash flow vs accounting profit · Techniques - payback, ARR, NPV, IRR, PI, discounted payback · Hurdle rate in conglomerate business · Capital rationing · Risk

5.1 Evaluation techniques

Payback = Years until cumulative cash flow = investment

ARR = Average PAT ÷ Average investment × 100 (avg inv. = (cost − salvage)/2 + salvage + WC)

NPV = Σ CFt ÷ (1 + k)^t − Initial outlay

PI = PV of inflows ÷ PV of outflows

IRR = r where NPV = 0 (interpolate: L + NPV_L ÷ (NPV_L − NPV_H) × (H − L))

MIRR = [Terminal value of inflows @ k ÷ PV of outflows]^(1/n) − 1

- Accept: NPV > 0; PI > 1; IRR > k.

5.2 Technique comparison

Method	Time value	Cash flows all?	Issue
Payback	× (DPB ✓)	× (after payback ignored)	Liquidity focus
ARR	×	Accounting profit	Simple
NPV	✓	✓	**Best** - absolute value, additive
PI	✓	✓	Useful in capital rationing
IRR	✓	✓	Multiple IRRs, reinvestment at IRR assumption

- NPV vs IRR conflict (size/timing differences) → **NPV preferred**.

5.3 Cash flow rules

- Use **incremental after-tax cash flows**; include working capital (outflow at start, recovery at end); **ignore sunk costs**, allocated overheads, financing costs (interest - in discount rate).
- Include **opportunity cost** of resources; tax shield on depreciation (Dep × t); salvage & tax on profit/loss on sale.

Operating CF = (Sales − cash costs − Dep)(1 − t) + Dep

NPV profile - IRR where NPV crosses zero (illustrative project)

Item	Value
NPV @ 0%	50
NPV @ 5%	33
NPV @ 10%	18
NPV @ 15%	6
NPV @ 18% (≈ IRR)	0

WORKED EXAMPLE NPV illustration

- Machine ₹10 L; life 5 yrs; no salvage; SLM dep 2 L; PBDT ₹3.5 L p.a.; tax 25%; k 10% (PVAF 3.791).

CFAT = (3.5 − 2)(0.75) + 2 = **₹3.125 L**

NPV = 3.125 × 3.791 − 10 = **₹1.85 L** → accept

Payback = 10 ÷ 3.125 = **3.2 years**; PI = 11.85/10 = **1.185**

5.4 Capital rationing & risk

- **Capital rationing**: divisible projects → rank by **PI**; indivisible → combinations maximising total NPV.
- **Risk-adjusted discount rate**: k + risk premium; **certainty equivalent**: CE coefficient × CF discounted at Rf.
- **Sensitivity**: change one variable; **scenario**: several variables (best/base/worst).

COMMON MISTAKE Capital budgeting traps

- Deducting **interest** from cash flows (double counting).
- Ignoring **working capital recovery** in last year.
- Using profit instead of **cash flow**.
- Forgetting **tax on salvage** gain (book value vs sale).

5.5 Special capital budgeting situations

- **Unequal lives** → **Equivalent annual cost/benefit** = NPV ÷ PVAF (n, k); or replacement chain.
- **Replacement decision** → incremental cash flows: Δ savings, Δ depreciation tax shield, sale value of old asset (net of tax), Δ WC.
- **Inflation**: nominal rate (1 + n) = (1 + r)(1 + i); discount **nominal cash flows at nominal rate** or real at real - never mix.
- **Discounted payback** - payback on PV of cash flows; **payback reciprocal** ≈ IRR for long-life even flows.

5.6 Risk analysis tools

Expected NPV = Σ (NPV_i × p_i)

Standard deviation = $\sqrt{\Sigma\ p_i\ (NPV_i - ENPV)^2}$

Coefficient of variation = σ ÷ Expected NPV

Certainty equivalent NPV = $\Sigma\ (\alpha_t \times CF_t) \div (1 + Rf)^{t} - I$

RADR = Rf + risk premium (or CAPM β-based)

- **Decision tree** - sequential decisions, roll back with expected values; **simulation** (Monte-Carlo) VERIFY.

5.7 Capital budgeting process

Identify investment proposals > Screening & evaluation (NPV/IRR) > Selection (accept/reject, ranking) > Financing & implementation > Performance review / post-audit

- Types: expansion, replacement, modernisation, diversification, mutually exclusive vs independent, contingent.

WORKED EXAMPLE Equivalent annual cost - unequal lives

- Machine X: cost ₹1.5 L, life 3 yrs, running cost ₹40,000 p.a.; Machine Y: ₹2.4 L, 5 yrs, ₹35,000 p.a.; k = 10% (PVAF 3: 2.487; 5: 3.791).

PV cost X = 1.5 L + 40,000 × 2.487 = 2,49,480 → EAC = 2,49,480 ÷ 2.487 = **₹1,00,314**

PV cost Y = 2.4 L + 35,000 × 3.791 = 3,72,685 → EAC = 3,72,685 ÷ 3.791 = **₹98,308**

- Choose **Y** (lower EAC).

EXAM TIP FAQ – Investment decisions

- NPV & IRR give conflicting ranking for **mutually exclusive** projects with size/timing/life differences → use NPV (reinvestment at k is realistic).
- Multiple IRRs arise with **non-conventional cash flows** (sign changes more than once).
- PI ranks projects under **single-period capital rationing** (divisible projects).
- Sunk cost ×; opportunity cost ✓; WC ✓; interest × (in discount rate); allocated fixed overheads ×.

5.8 Hurdle rate in conglomerates

- Single company-wide WACC **misleads** divisions with different risk: low-risk projects rejected, high-risk accepted.
- Use **divisional / project-specific hurdle rate**: β of **pure-play** comparable firm → unlever → relever at division's D/E → CAPM Ke → divisional WACC.

Unlevered β = βL ÷ [1 + (1 – t) D/E]

Relevered β = βU × [1 + (1 – t) D/E (division)]

5.9 Cash flow vs accounting profit

Basis	Cash flow	Profit
Depreciation	Excluded (tax shield only)	Deducted
Timing	When received/paid	Accrual
Working capital	Investment & release included	Ignored
Financing cost	Excluded (in discount rate)	Interest deducted

- Use **incremental, after-tax** cash flows; ignore sunk cost; include opportunity cost.

WORKED EXAMPLE Hurdle-rate illustration

- Conglomerate WACC 12%. New division (pharma) pure-play β 1.4 (D/E 0.5); division D/E 1.0; t 25%; Rf 7%; Rm 13%.

βU = 1.4 ÷ (1 + 0.75 × 0.5) = **1.018**

βL (division) = 1.018 × 1.75 = **1.78**

Ke = 7 + 1.78 × 6 = **17.7%** - use this (with Kd) rather than 12%

5.10 Worked examples – NPV with working capital, capital rationing (verified)

WORKED EXAMPLE NPV, IRR and PI with working capital and salvage

Machine ₹10 lakh; working capital ₹2 lakh at the start, released at the end; life 4 years; salvage ₹1 lakh (equal to book value); straight-line depreciation; cash profit before depreciation and tax ₹4 lakh a year; tax 25%; cost of capital 12% (PVAF 3.037; PVF year 4 0.636).

Depreciation = (10 – 1) ÷ 4 = ₹2.25 lakh

CFAT = (4 – 2.25) × 0.75 + 2.25 = **₹3.5625 lakh**

PV of inflows = 3.5625 × 3.037 + (1 + 2) × 0.636 = 10.819 + 1.908 = ₹12.727 lakh

NPV = 12.727 – 12 = **₹0.727 lakh** → accept; PI = 12.727 ÷ 12 = **1.06**

IRR (trial and error, NPV = 0) ≈ **14.6%** > 12%.

WORKED EXAMPLE **Capital rationing – budget ₹15 lakh**

Project	Outlay	PV of inflows	NPV	PI	Rank
A	5	6.5	1.5	1.30	II
B	4	4.6	0.6	1.15	IV
C	6	7.8	1.8	1.30	II
D	3	3.3	0.3	1.10	V
E	2	2.8	0.8	1.40	I

- **Divisible projects:** E, A, C in full (₹13 lakh) + half of B → NPV = 0.8 + 1.5 + 1.8 + 0.3 = **₹4.4 lakh**.
- **Indivisible projects:** test combinations within ₹15 lakh – best is **A + C + E** (₹13 lakh), NPV **₹4.1 lakh** (A + B + C uses ₹15 lakh but gives only ₹3.9 lakh).

Chapter 6: Working Capital Management

In this chapter: Working capital cycle & estimation · Management of receivables, payables, inventory & cash · Financing of working capital

6.1 Operating cycle & estimation

Operating cycle = R + W + F + D − C

- R = raw material holding; W = WIP; F = finished goods; D = debtors collection; C = creditors payment period.

RM days = Average RM stock ÷ (RM consumption per day)

WIP days = Average WIP ÷ (cost of production per day)

Net WC = Current assets − Current liabilities (estimate on **cash cost basis** - excl. depreciation & profit)

- Add **safety margin/contingency** % if given.

6.2 Cash management models

Baumol optimal cash = √(2 × A × T ÷ I)

- A = annual cash requirement; T = cost per transaction; I = interest rate.

Miller-Orr spread = 3 × [(3/4 × T × σ^2) ÷ i]^(1/3)

Return point = Lower limit + Spread ÷ 3; Upper limit = LL + spread

- Cash budget: receipts & payments method; **float** management - concentration banking, lock-box.

6.3 Financing approaches

Approach	Permanent CA	Temporary CA	Risk / Return
Matching (hedging)	Long-term	Short-term	Moderate
Conservative	Long-term	Partly long-term	Low risk, low return
Aggressive	Partly short-term	Short-term	High risk, high return

- Gross vs net WC; permanent vs temporary (fluctuating) WC.

6.4 Receivables & payables

- Credit policy evaluation (incremental approach): Δ contribution − Δ bad debts − Δ cost of investment in debtors (**on cost**, × required return) − Δ discount − Δ admin.

Investment in debtors = Cost of credit sales × collection period ÷ 365

Cost of forgoing cash discount = d/(100 − d) × 365/(credit period − discount period)

- **Factoring**: compare factor's commission + interest on advance vs savings (bad debts, admin, interest on reduced debtors).

WORKED EXAMPLE Trade credit illustration

- Terms **2/10 net 40**.

Annualised cost = 2/98 × 365/30 = **24.83%**

- If bank borrowing cost 12% → **borrow & take discount**.

6.5 Financing of WC

- **Spontaneous**: trade credit, outstanding expenses.

- **Bank finance**: CC/OD, working capital demand loan, bill discounting, letter of credit.
- **Others**: commercial paper, factoring, inter-corporate deposits, public deposits.
- Bank norms - **Tandon Committee** methods (maximum permissible bank finance: 75% of (CA − CL) / 75% of CA − CL / 75% of (CA − core CA) − CL); Chore Committee VERIFY.

WORKED EXAMPLE WC estimation illustration

- Annual production & sales 60,000 units; RM ₹40, labour ₹20, OH (cash) ₹15 per unit; selling price ₹100. RM stock 1 month; WIP ½ month (RM full, conversion 50%); FG 1 month; debtors 2 months; creditors 1 month; wages lag ½ month.

RM = 60,000 × 40/12 = **2,00,000**

WIP = 5,000 × 0.5 × (40 + 17.5) = **1,43,750**

FG = 5,000 × 75 = **3,75,000**; Debtors (cost) = 10,000 × 75 = **7,50,000**

Less creditors = 2,00,000; wages 50,000 → **Net WC = ₹12,18,750**

EXAM TIP Inventory & receivables FAQ

- Inventory techniques - EOQ, ABC, JIT, VED (see Paper 8 Cost Accounting) applied to minimise holding cost.
- Credit standards (5 Cs): character, capacity, capital, collateral, conditions.
- Monitoring receivables: ageing schedule, DSO, collection matrix.

6.6 Inventory management

EOQ = √(2 × A × O ÷ C)

Reorder level = Max usage × Max lead time

Minimum level = ROL − (Avg usage × Avg lead time)

Maximum level = ROL + ROQ − (Min usage × Min lead time)

Safety stock = (Max lead time − Avg lead time) × Avg usage

- **ABC** (value), **VED** (criticality), **JIT**, **FSN** (movement) - control techniques.
- Total inventory cost = ordering + carrying (+ stock-out); minimum at EOQ.

6.7 Treasury & cash management

- Treasury functions: **cash management, currency management, fund raising, banking relations, risk management (interest & FX), investment of surplus**.
- Motives for holding cash (Keynes): **transaction, precautionary, speculative** (+ compensating).
- Cash budget: receipts & payments method (short-term), adjusted profit & loss method (long-term).
- Surplus investment: T-bills, CDs, CPs, money market mutual funds, repo.
- Float: **disbursement float** (good), **collection float** (minimise via lock-box, concentration banking, e-payments).

WORKED EXAMPLE **Credit policy evaluation**

- Present sales ₹50 L, credit 30 days; proposed 60 days ↑ sales to ₹60 L; contribution 25%; bad debts ↑ from 1% to 2%; required return 15% (on cost 75% of sales).

Δ Contribution = 10 L × 25% = **2,50,000**

Δ Bad debts = (1.2 L − 0.5 L) = **70,000**

Δ Cost of funds = [(45 L × 60/365) − (37.5 L × 30/365)] × 15% ≈ **64,726**

Net gain = 2,50,000 − 70,000 − 64,726 = **₹1,15,274** → adopt

6.8 Payables management

- Trade credit = spontaneous source; cost arises only if **cash discount forgone** or supplier raises price.
- **Stretching payables** - beyond due date harms credit rating & supplier relations.
- Evaluate: annualised cost of forgoing discount vs bank borrowing rate.
- Supply-chain finance / reverse factoring - payer-initiated early payment to suppliers VERIFY.

6.9 WC financing - bank norms

Tandon method	Maximum permissible bank finance (MPBF)
Method I	75% × (CA − CL other than bank borrowings)
Method II	75% × CA − CL
Method III	75% × (CA − core CA) − CL

- **Chore Committee** - bifurcation of cash credit into loan & cash credit components; **Nayak Committee** (MSEs: 20% of turnover) VERIFY.

EXAM TIP **FAQ - Working capital**

- Operating cycle ↓ → WC need ↓; reduce via faster collection, JIT, longer creditor period.
- WC on **cash cost basis** excludes depreciation & profit; total cost basis includes depreciation VERIFY.
- Excess WC → idle funds, low ROI; inadequate WC → stock-outs, loss of credit standing.
- Factoring vs bill discounting: factoring = **sale & management** of receivables; discounting = **loan** against bills.

Typical composition of current assets (illustrative %)

Item	Value
Raw material	22
WIP	10
Finished goods	18
Receivables	35
Cash & bank	10
Prepaid & others	5

WORKED EXAMPLE **Cash budget skeleton**

Month	Apr	May	Jun
Opening cash	50	42	35
+ Collections	180	200	220
– Payments (creditors, wages, OH)	168	187	230
– Capex / tax / dividend	20	20	-
Closing cash	42	35	25

- Minimum cash ₹30 → June shortfall **₹5** → arrange overdraft / defer payment.

EXAM TIP **WCM exam points**

- Collections lag: credit sales of month t collected in t+1/t+2 as per pattern; ignore depreciation (non-cash).
- Cost of trade credit (2/10 net 30) = (2/98) × 365/20 = **37.2%** p.a.
- Factoring: compare cost of factoring vs savings (bad debts, admin, interest on advance).

6.10 Worked examples – credit policy and inventory levels (verified)

WORKED EXAMPLE **Relaxing credit period (pattern of June 2025 and June 2026)**

Present sales 20,000 units at ₹300; variable cost ₹200; fixed cost ₹10 lakh; credit 1 month; bad debts 1%. Proposal: 2 months' credit raises sales by 10%; bad debts 2%. Required return 20%; investment in debtors at total cost.

Particulars	Present	Proposed
Sales (₹)	60,00,000	66,00,000
Total cost (₹)	50,00,000	54,00,000
Investment in debtors at cost	50,00,000 × 1/12 = 4,16,667	54,00,000 × 2/12 = 9,00,000
Incremental contribution (2,000 × 100)		2,00,000
Less: extra bad debts (1,32,000 – 60,000)		(72,000)
Less: cost of extra funds (4,83,333 × 20%)		(96,667)
Net gain		**31,333**

The proposal is **acceptable** – net gain ₹31,333.

WORKED EXAMPLE **EOQ and stock levels**

Annual usage 2,400 units (300 working days, 8 units a day on average); ordering cost ₹75; carrying cost ₹4 per unit a year; usage 6–10 units a day; lead time 5–10 days (normal 7).

EOQ = √(2 × 2,400 × 75 ÷ 4) = √90,000 = **300 units**

Reorder level = max usage × max lead time = 10 × 10 = **100 units**

Minimum level = 100 – 8 × 7 = **44 units**

Maximum level = 100 + 300 – 6 × 5 = **370 units**

Chapter 7: Financing Decisions – Capital Structure, Leverage and Dividend

In this chapter: Capital structure theories (NI, NOI, traditional, MM) · EBIT-EPS analysis · Capital stacking · Factors

7.1 Capital structure theories

Theory	Value of firm	WACC with leverage
Net Income (NI)	↑ with debt	↓ continuously (Kd, Ke constant)
Net Operating Income (NOI)	Constant	Constant (Ke ↑ linearly)
Traditional	↑ then ↓	U-shaped - optimum exists
MM (no tax)	Constant (arbitrage)	Constant
MM (with tax)	Vl = **Vu + D × t**	↓ with debt
Trade-off	Tax benefit vs **bankruptcy costs**	Optimum
Pecking order	Internal funds → debt → equity	Information asymmetry

7.2 EBIT-EPS

EPS = (EBIT − I)(1 − t) − PD ÷ N

Indifference point = (EBIT − I1)(1 − t) ÷ N1 = (EBIT − I2)(1 − t) ÷ N2

Financial BEP = Interest + PD ÷ (1 − t)

Value (NI) = EBIT − I over Ke + D; NOI: V = EBIT ÷ Ko

- Above indifference EBIT → **debt plan** gives higher EPS.

WORKED EXAMPLE Indifference illustration

- Need ₹20 L: Plan A - equity at ₹100 (20,000 shares) over existing 10,000 shares; Plan B - 10% debt ₹20 L. Tax 25%.

Equation = (EBIT)(0.75) ÷ 30,000 = (EBIT − 2,00,000)(0.75) ÷ 10,000

EBIT = 3 (EBIT − 2 L) = EBIT → **EBIT = ₹3,00,000**

- EPS at indifference = 3 L × 0.75 ÷ 30,000 = **₹7.50** both plans.

7.3 Over- & under-capitalisation

- **Over-capitalisation**: earnings insufficient for fair return on capital (ROI < normal) - causes: excess issues, high promotion costs, inadequate depreciation; remedy: reduce debt, buy-back, reduce face value.
- **Under-capitalisation**: earnings very high relative to capital - high EPS & share price; may invite competition/labour demands; remedy: bonus/split, more issues.
- **Optimum structure** features: profitability, solvency, flexibility, conservatism, control.

7.4 MM arbitrage (no tax)

Two identical firms - levered L, unlevered U - but V(L) > V(U) > Investor sells shares of overvalued **L** > Borrows personally in same D/E proportion (**home-made leverage**) > Buys shares of **U** → same income, less investment > Prices adjust till V(L) = V(U)

- MM Prop II: **Ke = Ko + (Ko − Kd) × D/E** - cost of equity rises linearly with leverage.

7.5 Valuation under approaches

NI approach - Value of equity = (EBIT − I) ÷ Ke ; V = S + D ; Ko = EBIT ÷ V

NOI approach - V = EBIT ÷ Ko ; S = V − D ; Ke = (EBIT − I) ÷ S

MM with tax = VI = Vu + D × t ; Vu = EBIT (1 − t) ÷ Ke(u)

Ke (levered, MM with tax) = Keu + (Keu − Kd)(1 − t) D/E

WORKED EXAMPLE NI vs NOI quick check

- EBIT ₹4 L; debt ₹10 L @ 10%; Ke 16% (NI); Ko 12.5% (NOI).

NI = S = 3 L ÷ 0.16 = 18.75 L; V = **28.75 L**; Ko = 4 ÷ 28.75 = **13.9%**

NOI = V = 4 ÷ 0.125 = **32 L**; S = 22 L; Ke = 3 ÷ 22 = **13.6%**

7.6 Factors determining capital structure

- **Financial leverage / trading on equity**, growth & stability of sales, cost of capital, cash-flow ability to service debt, control (dilution), flexibility, size, market conditions, tax rate, legal requirements, lenders' covenants.
- **Optimum capital structure** = WACC minimum & value maximum.

EXAM TIP FAQ – Capital structure

- Indifference point - EPS same under two plans; above it, **debt plan** better.
- MM assumptions: perfect capital markets, no taxes (Prop. I original), homogeneous risk class, 100% payout, investors can borrow at same rate as firm.
- Pecking order: managers prefer **internal funds → debt → equity** (signalling).
- Over-capitalisation symptoms: low EPS, falling share price, low dividend rate.

7.7 Capital stacking

- **Capital stack** = layers of capital funding a business/project ranked by **seniority & risk**: senior secured debt → subordinated / mezzanine debt → preferred equity → common equity.
- Top (equity) = highest risk & return, last claim; bottom (senior debt) = lowest cost, first claim.
- Used in real-estate & project finance to optimise cost while meeting lender **coverage ratios**.

Item	Value
Senior debt	50
Mezzanine	15
Preferred equity	10
Common equity	25

EXAM TIP FAQ – capital stack

- Mezzanine finance combines debt with equity kicker (warrants/convertibility).
- Higher senior-debt share lowers WACC up to a point but raises financial risk (DSCR covenants).
- Waterfall: cash distributed top-down by seniority.

7.8 Leverages

DOL = Contribution ÷ EBIT = % change in EBIT ÷ % change in sales

DFL = EBIT ÷ EBT (with PD: EBIT ÷ [EBT − PD/(1 − t)])

DCL = DOL × DFL = Contribution ÷ EBT

- DOL = 1/MOS ratio; DOL high near BEP.
- **Trading on equity**: using fixed-cost funds to magnify EPS when ROI > cost of debt.

WORKED EXAMPLE **Leverage illustration**

- Sales 1,00,000 units @ ₹20; VC ₹12; FC ₹4 L; interest ₹1 L.

Contribution = 8 L; EBIT = 4 L; EBT = 3 L

DOL = 8/4 = **2**; DFL = 4/3 = **1.33**; DCL = **2.67**

- Sales ↑ 10% → EBT ↑ **26.7%**.

7.9 Risk matrix

DOL \ DFL	Low	High
Low	Safe, low returns	Aggressive financing
High	Business risk	**Very risky** - avoid

- Business risk ↔ operating leverage; financial risk ↔ financial leverage.

EBIT-EPS chart - indifference point (illustration above)

EBIT (₹)	0	1L	2L	3L	4L	5L
Plan A - Equity (30,000 sh)	0	2.5	5	7.5	10	12.5
Plan B - Debt (10,000 sh)	-15	-7.5	0	7.5	15	22.5

7.10 Business vs financial risk

- **Business (operating) risk** - variability of EBIT due to sales/costs; measured by **DOL**; depends on cost structure (fixed vs variable).
- **Financial risk** - variability of EPS due to fixed financial charges; measured by **DFL**.
- **Total risk** - DCL; firms balance a high DOL with a low DFL (and vice-versa).

7.11 Leverage from % changes & BEP links

DOL = 1 ÷ Margin of safety ratio

DFL = % change in EPS ÷ % change in EBIT

DCL = % change in EPS ÷ % change in sales

Operating BEP (units) = Fixed cost ÷ Contribution per unit

Financial BEP = Interest + Pref. dividend ÷ (1 – t)

EXAM TIP **FAQ – Leverages**

- DOL is **infinite at BEP** and falls as sales rise above BEP.
- DFL = 1 when there is no debt/preference capital.
- Negative DOL means operating below BEP.
- Trading on equity is favourable only when **ROI > after-tax cost of debt**.

7.12 Dividend models

Walter = $P = [D + (r/Ke)(E - D)] \div Ke$

Gordon = $P0 = E(1 - b) \div (Ke - br)\ (D1 \div (Ke - g))$

MM = $P0 = (D1 + P1) \div (1 + Ke)$

MM new shares = $\Delta N = [I - (E - nD1)] \div P1$

Graham & Dodd = P = m (D + E/3)

Lintner = D1 = D0 + [(EPS × target payout) − D0] × adjustment factor

7.13 Walter's decision rule

Firm	r vs Ke	Optimal payout
Growth	r > Ke	**0%** (retain all)
Normal	r = Ke	Irrelevant
Declining	r < Ke	**100%**

- Gordon: same direction; "**bird-in-hand**" argument - investors prefer current dividends (risk ↑ with time).
- MM assumptions: perfect markets, no taxes, fixed investment policy, certainty.

WORKED EXAMPLE Walter illustration

- EPS ₹10; Ke 10%; r 15%; payout 40% (D = 4).

P = [4 + (0.15/0.10)(6)] ÷ 0.10 = (4 + 9) ÷ 0.10 = **₹130**

- At 0% payout: (0 + 15)/0.10 = **₹150** → retain all (growth firm).

EXAM TIP Determinants & FAQ

- Determinants: earnings stability, liquidity, growth needs, legal (s.123), taxation (dividend taxable in hands of shareholders), access to capital, shareholder preference, inflation, debt covenants.
- **Stock split** vs **bonus**: split - face value ↓, no change in reserves; bonus - reserves capitalised; both raise number of shares.
- Buy-back taxed as **deemed dividend** in shareholders' hands from 1-10-2024 VERIFY.

7.14 Types of dividend policy

Policy	Meaning	Suits
Stable DPS	Fixed rupee dividend, raised gradually	Investors wanting regular income
Constant payout	Fixed % of earnings - DPS fluctuates	Firms with variable earnings
Stable + extra	Low regular + extra in good years	Cyclical businesses
Residual	Pay what remains after funding positive-NPV projects	Growth firms
No dividend	Retain all	Start-ups, high-growth

WORKED EXAMPLE Gordon & MM illustration

- **Gordon**: E = ₹20; b = 60%; r = 15%; Ke = 12%.

g = 0.6 × 15% = 9%; D1 = 20 × 0.4 = 8

P0 = 8 ÷ (0.12 − 0.09) = **₹266.67**

- **MM**: P0 ₹100; Ke 10%; D1 ₹5 expected.

P1 (dividend paid) = 100 × 1.10 − 5 = **₹105**

P1 (no dividend) = ₹110 → wealth same either way

7.15 Lintner & bonus/buy-back

- **Lintner model**: firms have **target payout**, adjust dividends gradually (speed of adjustment); dividends are "sticky".
- **Bonus shares** - capitalisation of reserves, no cash outflow, signals confidence.

- **Buy-back** - returns cash, ↑ EPS, signals undervaluation; alternative to dividend.
- **Radical approach** (tax-based) - if dividends taxed higher than capital gains, investors prefer retention VERIFY.

7.16 Worked examples – financing plans, leverage and MM (verified)

WORKED EXAMPLE Choice of financing plan (pattern of June 2026)

Existing: 10,000 equity shares of ₹100 and 10% debt ₹5 lakh. ₹25 lakh is needed by (i) 20,000 equity shares at ₹125; (ii) 10% preference shares; or (iii) 12% debentures. Expected EBIT ₹10 lakh; tax 25%.

Particulars	(i) Equity	(ii) Preference	(iii) Debentures
EBIT	10,00,000	10,00,000	10,00,000
Less: interest	50,000	50,000	3,50,000
EBT	9,50,000	9,50,000	6,50,000
Less: tax 25%	2,37,500	2,37,500	1,62,500
EAT	7,12,500	7,12,500	4,87,500
Less: preference dividend	–	2,50,000	–
Earnings for equity	7,12,500	4,62,500	4,87,500
Equity shares	30,000	10,000	10,000
EPS (₹)	**23.75**	**46.25**	**48.75**

Indifference EBIT (i) vs (iii): (X − 50,000) ÷ 30,000 = (X − 3,50,000) ÷ 10,000 → **X = ₹5,00,000** (EPS ₹11.25). Indifference (i) vs (ii): **₹5,50,000**. At EBIT of ₹10 lakh the **debenture plan** gives the highest EPS.

WORKED EXAMPLE Leverages in two situations

10,000 units at ₹50; variable cost ₹30; interest ₹40,000. Fixed cost: situation A ₹1,00,000, B ₹60,000.

Measure	A	B
Contribution	2,00,000	2,00,000
EBIT	1,00,000	1,40,000
EBT	60,000	1,00,000
DOL = C ÷ EBIT	2.00	1.43
DFL = EBIT ÷ EBT	1.67	1.40
DCL = C ÷ EBT	3.33	2.00

WORKED EXAMPLE MM dividend irrelevance (pattern of December 2024)

10,000 shares of ₹100 (current price ₹100); Ke 10%; expected dividend ₹8; net income ₹2,00,000; investment ₹3,00,000.

Particulars	No dividend	Dividend ₹8
$P_1 = P_0 (1 + Ke) - D_1$	110	102
Funds needed from new shares	3,00,000 − 2,00,000 = 1,00,000	3,00,000 − 1,20,000 = 1,80,000
New shares (ΔN = funds ÷ P_1)	909.09	1,764.71
Value of firm = [(n + ΔN) P_1 − I + E] ÷ 1.10	₹10,00,000	₹10,00,000

The value of the firm is the same – dividend policy is irrelevant under MM.

Chapter 8: Introduction to Data Science for Business Decision-Making

In this chapter: Meaning, nature, properties & scope of data · Types of data in finance & costing · Digitisation of the economy & data creation · Data transformation into decision-useful information · Communication of information for quality decision-making · Professional scepticism regarding data · Ethical use of data & information

8.1 Data - meaning & types

- **Data** = raw facts; **information** = processed data with context; **knowledge/wisdom** = applied information (DIKW pyramid).
- **Structured** (tables, ERP, ledgers), **semi-structured** (XML, JSON, e-mail), **unstructured** (text, images, audio, social media).
- **Quantitative** (discrete, continuous) vs **qualitative** (nominal, ordinal); **primary** vs **secondary**; **cross-section**, **time-series**, **panel**.
- **Big data - 5 V's**: Volume, Velocity, Variety, Veracity, Value.

8.2 Data in finance & costing

Area	Typical data
Financial accounting	GL, TB, invoices, bank feeds, XBRL filings
Cost accounting	BOM, routing, time sheets, machine logs, cost drivers
Treasury	Market prices, rates, FX, cash positions
Compliance	GST returns, e-invoices, e-way bills, TDS data
Management	KPIs, budgets, sales by region/customer/SKU

8.3 Digitisation & data creation

- Digital payments (UPI), e-invoicing, GSTN, Account Aggregator, IoT sensors, e-commerce → massive transaction data.
- **Data transformation**: collect → store → process → analyse → present → decide.
- **Communication**: right info, right person, right time, right format (dashboards, reports, alerts).

8.4 Professional scepticism & ethics

- **Scepticism**: question source, completeness, accuracy, timeliness; check outliers & bias; reconcile to source records.
- **Ethical use**: consent & purpose limitation, confidentiality, data minimisation, anonymisation, avoid discriminatory algorithms.
- India: **Digital Personal Data Protection Act, 2023** (data fiduciary, consent, rights of data principal) VERIFY.

MEMORY TRICK **Big data – "3V + 2V"**

VVVVV – V Volume; V Velocity; V Variety; V Veracity; V Value

Chapter 9: Data Processing, Organisation, Cleaning & Validation

In this chapter: Development of data processing · Functions of data processing · Data organisation & distribution · Data cleaning & validation

9.1 Data processing cycle

Collection → **Preparation** (cleaning) → **Input** → **Processing** (sort, classify, calculate, summarise) → **Output** / interpretation → **Storage**

- Evolution: manual → mechanical → electronic (batch → online → real-time → cloud).
- Functions: validation, sorting, summarisation, aggregation, analysis, reporting, classification.

9.2 Data organisation

- **Hierarchy**: bit → byte → field → record → file → database.
- Organisation methods: **sequential, indexed, direct/random**; relational database (tables, primary & foreign keys).
- **Data distribution**: frequency distribution, histograms; centralised vs distributed databases; data warehouse vs data lake vs data mart.

9.3 Data cleaning issues & fixes

Issue	Fix
Missing values	Delete, impute (mean/median), flag
Duplicates	De-duplicate on key
Inconsistent formats	Standardise dates, units, codes
Outliers	Investigate; cap/winsorise or exclude
Typos / invalid codes	Lookup tables, validation lists

9.4 Data validation checks

- **Type** check (numeric/date), **range** check, **format** check, **consistency/cross-field** check, **uniqueness**, **existence/referential integrity**, **check digit** (e.g., GSTIN), **control totals / hash totals**.
- Validation at entry (input controls) + periodic reconciliation (output controls).

EXAM TIP FAQ

- Data cleaning vs validation: cleaning **fixes** errors; validation **prevents/detects** them.
- ETL = Extract, Transform, Load (into data warehouse).
- Garbage in, garbage out (GIGO).

Chapter 10: Data Visualisation & Presentation

In this chapter: Data presentation - visualisation & graphical presentation · Data visualisation tools · Analytical tools & dashboards · Presentation architecture & storytelling · Business reporting

10.1 Choosing the right chart

Purpose	Chart
Comparison across categories	Bar / column
Trend over time	Line / area
Composition (part of whole)	Pie / donut / stacked bar / treemap
Relationship	Scatter / bubble
Distribution	Histogram / box plot
Variance to budget	Waterfall / bullet chart
Geography	Map / heat map

10.2 Tools & dashboards

- Tools: **MS Excel** (pivot tables, charts, Power Query), **Power BI**, **Tableau**, Qlik, Google Looker Studio, Python/R libraries.
- **Dashboard**: single-screen view of KPIs; types - **strategic, operational, analytical, tactical**.
- Good dashboard: few KPIs, consistent colours, drill-down, filters, real-time refresh, mobile view.

10.3 Presentation architecture

- **Storytelling**: context → insight → recommendation; know the audience.
- Principles: clarity, simplicity, accuracy, highlight exceptions, avoid chart junk & 3-D distortion, label axes, start bars at zero.
- **Pyramid principle**: lead with the answer, then support.

Item	Value
Bar - compare	30
Line - trend	25
Pie - composition	15
Scatter - relationship	15
Histogram - distribution	15

EXAM TIP FAQ

- Pivot table = summarise large data by dimensions; slicers filter.
- KPI vs metric: KPI linked to strategic objective with target.
- Self-service BI allows managers to build own reports.

Chapter 11: Data Analysis & Modelling

In this chapter: Process, benefits & types of data analysis · Data mining & implementation of data mining · Analytics & model building (descriptive, diagnostic, predictive, prescriptive) · Standards for data tagging & reporting (XML, XBRL) · Cloud computing, BI, AI, RPA & ML · Model vs data-driven decision-making

11.1 Four types of analytics

Type	Question	Example
Descriptive	What happened?	Monthly sales report, variance report
Diagnostic	Why did it happen?	Drill-down of cost overrun, root cause
Predictive	What will happen?	Demand forecast, credit default score
Prescriptive	What should we do?	Optimal product mix (LP), pricing engine

- Value & complexity rise from descriptive → prescriptive.

11.2 Data analysis process & data mining

Define question → Collect data → Clean → Explore (EDA) → Model / mine → Interpret → Communicate & act

- **Data mining** techniques: classification, clustering, association rules (market-basket), regression, anomaly detection, decision trees.
- **CRISP-DM**: business understanding → data understanding → preparation → modelling → evaluation → deployment.

11.3 XML & XBRL

- **XML**: markup language for structured data exchange (tags).
- **XBRL** (eXtensible Business Reporting Language): tags each financial element using a **taxonomy**; machine-readable filings.
- In India: **MCA** XBRL filing for listed & specified companies (Ind AS / AS taxonomy); also **cost audit report XBRL** (Form CRA-4) VERIFY.

11.4 Emerging technologies

- **Cloud**: IaaS, PaaS, SaaS; public/private/hybrid - scalable, pay-per-use.
- **Business intelligence**: data warehouse + OLAP + dashboards.
- **AI**: machines performing tasks needing intelligence; **ML** - learns patterns from data (supervised, unsupervised, reinforcement).
- **RPA**: software bots for rule-based repetitive tasks (bank reconciliation, invoice processing, GST return prep).

11.5 Model-driven vs data-driven decisions

Basis	Model-driven	Data-driven
Basis	Theory / assumptions (e.g., EOQ, CVP)	Patterns in actual data
Data need	Low	High (big data)
Explainability	High	May be "black box"
Example	NPV model	ML credit scoring

EXAM TIP FAQ – BDA

- Supervised ML uses **labelled** data (regression, classification); unsupervised finds clusters.
- RPA suits high-volume, rule-based, stable processes.
- Benefits of XBRL: comparability, faster analysis, fewer errors, regulator monitoring.
- Correlation ≠ causation - apply professional judgment.

11.6 Exam-ready answer frames – business data analytics

QUESTION Prescriptive analytics – how it works, pros and cons (asked June 2026)

How it works: combines descriptive and predictive outputs with business rules, optimisation (linear programming), simulation and machine learning to recommend the **best action** ("what should we do?") – e.g. optimal price, inventory level, delivery route. It tests many scenarios, scores outcomes against objectives and constraints, and feeds results back as new data arrives.

Advantages: actionable recommendations; handles complex trade-offs; faster, consistent decisions; quantifies the impact of each option; continuous improvement.

Disadvantages: needs large, clean data and skilled staff; costly tools; recommendations only as good as the model and assumptions; "black-box" risk; may ignore qualitative factors.

QUESTION Data ethics – five principles (asked December 2024)

1. **Ownership** – individuals own their personal data; collect with consent.
2. **Transparency** – tell people how their data will be collected, stored and used.
3. **Privacy** – protect personal data; anonymise; restrict access.
4. **Intention** – collect only for a legitimate, stated purpose; minimise data.
5. **Outcomes** – watch for harm and bias (disparate impact) from the analysis even when the intention is good.

QUESTION Data mining process (asked December 2025)

Business understanding → data understanding (collect, describe, explore) → data preparation (clean, integrate, transform, select) → modelling (classification, clustering, association, regression) → evaluation against business goals → deployment and monitoring. This is the **CRISP-DM** cycle; it is iterative.

QUESTION Phases of digitisation in an organisation (asked June 2025)

1. **Digitisation of records** – converting paper to digital form (scanning, data entry).
2. **Digitalisation of processes** – using digital tools in workflows (ERP, e-invoicing, online payments).
3. **Integration** – connecting systems and data across functions (APIs, data warehouse).
4. **Digital transformation** – new business models and data-driven decisions (analytics, AI, automation).

QUESTION Business intelligence – meaning and uses (asked December 2024)

BI is the set of technologies and processes – data warehouse, ETL, OLAP, dashboards, reports – that turn data into information for decisions. Uses: performance dashboards and KPIs; sales and customer analysis; budgeting and variance monitoring; supply-chain and inventory analysis; financial consolidation and reporting; fraud and exception detection; benchmarking.

QUESTION Strategic steps in using data visualisation in report design (asked June 2026)

Define the purpose and audience → identify the key message and KPIs → choose the right chart for each comparison → keep design simple (clear titles, labels, consistent colours, no clutter) → order visuals as a story (summary first, then detail) → add context (targets, prior period) → allow interactivity (filters, drill-down) → test with users and refine.

QUESTION Data analytics for lean finance (asked June 2026)

Lean finance removes waste from finance processes. Analytics supports it by: identifying bottlenecks and rework in close, payables and receivables; automating routine reconciliations (RPA); real-time dashboards replacing manual reports; driver-based forecasting; spend analytics to cut costs; working-capital analytics (DSO, DIO, DPO); exception-based review so staff focus on value-adding analysis.

Last-Day Formula Sheet

In this chapter: FM formulas · BDA keywords · Answer checklist

FM formula chips

FV = PV(1+r)^n · PVA = A[1−(1+r)^−n]/r · EAR = (1+i/m)^m − 1 · CAPM Ke = Rf + β(Rm − Rf) · Kd = I(1−t)/NP · Ke (Gordon) = D1/P0 + g · WACC = Σ w k · NPV = PV inflows − outflow · PI = PV inflows ÷ outflow · IRR by interpolation · DOL = C/EBIT · DFL = EBIT/EBT · DCL = C/EBT · Indifference EBIT: (EBIT − I1)(1−t)/N1 = (EBIT − I2)(1−t)/N2 · Walter P = [D + (r/k)(E − D)]/k · Gordon P = E(1−b)/(k − br) · Operating cycle = RMCP + WIPCP + FGCP + DCP − CPP · EOQ = √(2AO/C) · Baumol C = √(2AT/I)

BDA keyword chips

5 V's of big data · DIKW · Structured / semi / unstructured · ETL · Data warehouse vs lake · Validation checks (type, range, format, check digit, hash total) · Descriptive-Diagnostic-Predictive-Prescriptive · CRISP-DM · XBRL taxonomy · IaaS/PaaS/SaaS · RPA · Supervised vs unsupervised ML · Dashboards (strategic/operational/analytical) · DPDP Act 2023