Module 3 · Part 2 · Q3 sums P16 · 3.2, 3.3, 3.5–3.8

SM pp. 117–236. **Q3 = 7 + 7 in every paper since Dec'23**: (a) **transfer pricing — every paper**; (b) target costing (D23, J25, J26), life-cycle costing (J24, D25) or CVP with probability (D24). MCQs: (i) probability / expected value, (xv) target cost with an ROI. Module 3 per paper: J26-36 · D25-36 · J25-34 · D24-32 · J24-34 · D23-34.

Paper	Q3(a) transfer pricing	Q3(b)
Dec'23	sell to B at 2.25 or cut back? (ROI)	target cost after value engineering
Jun'24	best external price, minimum TP, share the gain (= SM Illus. 24 type)	life-cycle cost of two machines (= SM Illus. 50 × 200)
Dec'24	transfer at 22 under ROI; lowest price	BEP + probability of reaching it (= SM Illus. 56 type)
Jun'25	buy outside at 270, then at 249.75?	**= SM Illus. 41, same numbers**
Dec'25	**= SM Illus. 19, every figure × 10**	product life-cycle cost (= SM Illus. 49 type)
Jun'26	**= SM Illus. 25 word for word**	**= SM Illus. 45 word for word**

THE EXAM COPIES THE SM HERE

- Jun'26 Q3 was **two SM illustrations with the same numbers**; Jun'25 Q3(b) and Dec'25 Q3(a) too. Learn **SM Illus. 19, 24, 25, 41, 45, 49, 50, 56** exactly — layout and figures.
- Dec'26 most likely: (a) a transfer-pricing case from Illus. 17–26 not yet asked word for word (19, 24 and 25 came; **Illus. 26**, 20, 21, 22, 23 have not); (b) target costing or a life-cycle cost.
- Old layout Jun'23: variance investigation by probability (J23 Q5(b)) and MCQs only.

A Formula sheet — when to use

Formula	When to use · notes	SM
Minimum TP = variable cost + contribution given up per unit; maximum = what the buyer pays outside	Opportunity-cost pricing: the seller's floor and the buyer's ceiling; with spare capacity the floor is variable cost.	[SM 139]
Company view: buy outside only if outside price < variable cost saved + any other saving	Fixed costs of the selling division stay; ignore the transfer price itself (it cancels out).	[SM 154–155]
Cost-plus TP = variable + fixed per unit + (assets × ROI) ÷ units	Division priced on a return on its investment (D23, D24 ROI cases).	[SM 140]
Target cost = target price − target profit ("price-led costing")	Profit as % of sales, or ROI × investment ÷ units (MCQ xv).	[SM 176]
Life-cycle cost = all costs from design to after-sales, over the whole life	R&D once + variable × units + fixed per year × years + warranty.	[SM 199]
Equivalent annual cost = PV of all costs ÷ annuity factor for that life	Machines with different lives (J24 type).	[SM 215]
Expected value = Σ probability × outcome; P(break-even) = P(sales ≥ BEP)	MCQ (i) and the Q3(b) probability case.	[SM 230, 232]

B Transfer pricing · Q3(a) every paper 3.3

1 · Each division's statement
at the asked price / output: sales or transfer revenue − its own costs

↓

2 · Company as a whole
external revenue − variable costs actually saved or incurred (transfer price cancels)

↓

3 · Range
minimum = VC + contribution lost; maximum = outside price (+ costs it saves)

↓

4 · Advise
goal congruence: what is best for the company, and the TP that makes each manager agree

- Methods: market price, cost based, **negotiated**, **opportunity cost** (the minimum the seller accepts, the maximum the buyer pays). [SM 139]
- Illus. 17: cost-plus ROI transfer price ₹12.70 = 10 + 2 + 0.70 (28% on ₹10,00,000 of assets ÷ 4,00,000 units). [SM 140]
- Illus. 18: effect on profit of six transfer bases (marginal cost, + 25%, + ROI, full cost, full cost + share of profit, market price). [SM 140–142]

TRAPS

- The division's fixed costs and the old transfer price are **not** savings for the company.
- Check capacity: a transfer that pushes external sales down costs the contribution lost.
- ROI cases: compare ROI with and without the transfer — assets and fixed costs saved count.

PROBLEMS BOX · TRANSFER PRICING (RECOMPUTED BY SCRIPT m03p2_patterns.py)

WORKED PATTERN · SM ILLUSTRATION 25 (= JUN'26 Q3(a) WORD FOR WORD)

Situation (1,000 units)	Outside	Saved	Company
(i) buy at ₹135	1,35,000	1,20,000	**loss 15,000**
(ii) + ₹18,000 other use of A's plant	1,35,000	1,38,000	**gain 3,000**
(iii) price drops by ₹20 (₹115)	1,15,000	1,20,000	**gain 5,000**

Saved = A's variable cost ₹120 per unit (its ₹20 fixed stays). [SM 154–155]

SM ILLUSTRATION 24 (= JUN'24 Q3(a) TYPE)

X alone: best 64,000 at ₹24 = ₹7,68,000. Forced 50,000 to Y: external 50,000 × 14 = 7,00,000, shortfall 68,000 → **minimum TP 12 + 1.36 = ₹13.36**; Y's ceiling 22 + 3 transport = ₹25. Partial: X sells 64,000 outside and offers 36,000 at a **shared ₹17** (12 + half of 22 − 12). Company best: transfer 50,000, net gain **₹5,82,000**. [SM 152–154]

SM ILLUSTRATION 19 (= DEC'25 Q3(a), EVERY FIGURE × 10)

At TP 1.20: A's profit rises to 1,200 at 6,000 units; B peaks at 1,060 (2,000 units). [SM 142–144] Company = A + B: 0, 1,060, **1,350 (3,000 units)**, 920, 150, −1,440. Dec'25 = ×10: company ₹13,500 at 3,000 a day; at A's best (6,000) − ₹14,400; at B's best (2,000) ₹10,600.

OUR WORKINGS · THE OTHER Q3(a)s

- **D24 Roxin** (ROI): now 25%; at ₹22 to N 22.5%; without N (assets −2 lakh, fixed −40,000) 24% → M will refuse 22; **lowest price ₹23.80** keeps 24%.
- **J25 Regal**: inside, company contribution (540 − 256.50 − 202.50) × 2,500 = 2,02,500; Y buys at 270 → 1,68,750 → company loses **33,750**; at 249.75 buying outside gains **16,875**. TP: 270 (market) in (i); in (ii) buy outside (X cannot go below 256.50).
- **D23 Doxin**: price for 25% on ₹12 lakh assets = **₹4.50**. A sells 1,40,000 only: profit 1,30,000, ROI 13%; also sells 60,000 to B at 2.25: profit 1,65,000, ROI 13.75% → sell (+35,000).
- **J24 MN Co**: EXE alone ₹40 × 1,25,000 → ₹31,25,000; forced 1,00,000 to WYE: minimum TP **₹16.25**; partial: 75,000 units at a shared **₹25**.

PRACTISE THESE (MOST LIKELY FIRST)

SM Illus. 26, 20, 21, 22, 23 (not yet asked), 19, 24, 25 (SM 140–159) · J26, D25, J25, D24, J24, D23 Q3(a) · MQP Q3(a), PTP Q3(a), postal Q4(b), Q5(a) · SM exercise MCQ 2 (SM 237), essay 9 (SM 248) · **ICMAI Practice Workbook Ch1 illus. 11, 12** · MCQ bank Q22, Q23, Q186, Q223.

C Target costing · Q3(b) and MCQ (xv) 3.5

PROBLEMS BOX · TARGET COSTING (RECOMPUTED BY SCRIPT)

WORKED PATTERN · SM ILLUSTRATION 45 (= JUN'26 Q3(b) WORD FOR WORD)

Per unit (2,00,000 units)	₹
Target price 1,000 less 20% · less 10% profit	800 − 80 = **720**
Direct: materials 385 + labour 50 + machining 60	495
Overheads: orders 21,250 × 80 · testing 30,00,000 × 2 · rework 13,000 × 100, ÷ 2,00,000	8.50 + 30 + 6.50 = 45
Manufacturing cost · + research and design 50 + marketing 130	540 + 180 = **720**
Profitability: sales 16,00,00,000 − manufacturing 10,80,00,000 = gross margin 5,20,00,000 − other 3,60,00,000	**1,60,00,000**

[SM 193–195] D23 Q3(b) Tecon, same layout: 1,200 less 25% = 900 − 15% = **765**; direct 530 + overheads (22,000 × 80 + 35,00,000 × 2 + 14,400 × 100) ÷ 2,00,000 = 51 → 581 + 184 = 765.

SM ILLUSTRATION 41 (= JUN'25 Q3(b), SAME NUMBERS)

- Each ₹10 cut doubles demand: 100 → 20,000; 90 → 40,000; **80 → 80,000 (full capacity)**. Target cost = 80 − 25% = **₹60**. [SM 188–189]
- Variable cost = 40% of today's cost (100 − 25 = 75) = **₹30**; cost at full capacity 24 + 36 = ₹60 lakh v target ₹48 lakh → **reduce ₹12 lakh**; profit 64 − 48 = 16 lakh ÷ 16% = **₹100 lakh** maximum investment. [SM 189]

MCQ (xv) · SM ILLUSTRATION 36 (TARGET COST WITH AN ROI)

40,000 mixers × ₹6,000 = ₹24,00,00,000; profit 15% of ₹40,00,00,000 = ₹6,00,00,000 → ₹18,00,00,000 ÷ 40,000 = **₹4,500** a mixer. [SM 186] Same template: D23 Q1(v), D25 Q1(xv), J26 Q1(xv).

PRACTISE THESE

SM Illus. 45, 41, 36, then 35, 37–40, 42–44, 46 (SM 185–197) · J26, J25, D23 Q3(b) · MCQs J23 Q1(iii), D23 Q1(v), J24 Q1(vi), D25 Q1(xv), J26 Q1(xv), MQP / PTP Q1(xv), postal Q1(vii) · essays 11, 12 (SM 248) · **ICMAI Practice Workbook Ch1 illus. 8–10** · MCQ bank Q18, Q35–Q38, Q188, Q198, Q200, Q203, Q241, Q244, Q258, Q260, Q265.

D Life-cycle costing · Q3(b) 3.6, 3.7

PROBLEMS BOX · PRODUCT AND ASSET LIFE-CYCLE COST (RECOMPUTED BY SCRIPT)

WORKED PATTERN · SM ILLUSTRATION 49 (= DEC'25 Q3(b) TYPE)

Kent (₹)	80,000 at 300	1,00,000 at 255
Dies and tools (once)	10,25,000	10,25,000
Manufacturing 125 a unit	1,00,00,000	1,25,00,000
Selling 100 a unit + 12,500 × 4 years	80,50,000	1,00,50,000
Administration 50,000 × 4 · warranty parts + visits	2,00,000 + 1,60,000 + 80,000	2,00,000 + 2,00,000 + 1,00,000
Life-cycle cost · profit	**1,95,15,000 · 44,85,000**	**2,40,75,000 · 14,25,000**

Price cut lowers profit → do not cut. [SM 205–206]

DEC'25 Q3(b) MEU (OUR WORKING)

R&D 32,50,000 + manufacturing 175 × 1,25,000 + fixed 12,75,000 × 3 + marketing 90 × 1,25,000 + fixed 6,72,000 × 3 + admin 6,60,000 × 3 + warranty 1,25,000 ÷ 50 × 4 × 30 = **₹4,44,96,000** (₹355.97 a unit) → profit **₹55,04,000**. Revised: 1,40,000 at ₹380, marketing 89.20 (commission 4% of 380), fixed manufacturing 13,95,000 a year, warranty 3,36,000 → **₹4,87,55,000**, profit **₹44,45,000 → do not cut the price**.

ASSET LIFE-CYCLE · SM ILLUSTRATION 50 (= JUN'24 Q3(b) ÷ 200)

- Exe (12 years): 19,000 − 957 scrap + 13,624 repairs + 1,864 overhaul = PV 33,531 → EAC **4,922.35**. [SM 215]
- Wye (6 years): 13,000 − 1,692 + 11,320 + 1,366 = PV 23,994 → EAC **5,511.42** → buy Exe. [SM 215]

> **⚠ SM SLIP · ILLUSTRATION 50**
> Working note 2 calls 4.354 the 8-year annuity factor; it is the 6-year one (Wye's life), which the table uses. The EAC uses rounded factors (23,994 × 0.2297); exact division gives 5,510.89 — same decision.

JUN'24 Q3(b) POSIN (OUR WORKING, THE QUESTION'S FACTORS)

BX: 38,00,000 − 6,00,000 × 0.32 + 4,00,000 × 6.81 + 8,00,000 × 0.47 = 67,08,000 → EAC **₹9,85,022**. SW: 26,00,000 − 6,00,000 × 0.56 + 5,20,000 × 4.36 + 4,00,000 × 0.68 = 48,03,200 → EAC **₹11,01,651 → buy BX**.

PRACTISE THESE

SM Illus. 49, 50, 47, 48, 51–53 (SM 201–218) · D25, J24 Q3(b) · essays 13, 14 (SM 248) · **ICMAI Practice Workbook Ch1 illus. 13** · MCQ bank Q225, Q230, Q231, Q255.

E Probability in decisions · Q3(b), MCQ (i) 3.8, 3.2

WORKED PATTERN · SM ILLUSTRATION 56 (= DEC'24 Q3(b) TYPE)

- Contribution 6 − 3.50 = 2.50; BEP = 34,000 ÷ 2.50 = **13,600** → P(sales ≥ 13,600) = 0.25 + 0.30 + 0.20 = **0.75**. [SM 232]
- Profit ≥ 10,000: 44,000 ÷ 2.50 = 17,600 units → P = **0.20**. [SM 232]

DEC'24 Q3(b) SOVAN (OUR WORKING)

Contribution 200 − 120 = 80. BEP 20,00,000 ÷ 80 = **25,000**; profit ₹6 lakh → **32,500**; loss ₹5 lakh → **18,750**. P(break-even) = **0.80**; P(≥ 32,500) = **0.50**; P(≥ 18,750) = **0.90**.

EXPECTED VALUE · SM ILLUSTRATION 54 (= MCQ (i) TYPE)

Expected profit (₹'000): A 254, **B 280**, C 276 → choose B. [SM 230]

MCQ (i) (D25, J26): expected profit × probability of success (commercial × technical), or the chance of at least a given profit from a demand table. **Practise**: D25 Q1(i), J26 Q1(i), MQP Q1(i), PTP Q1(i), MQP Q3(b), postal Q5(b), J23 Q5(b) · SM Illus. 54–58 (SM 230–236), essay 15 (SM 248) · **WB Ch1 illus. 14**.

3.2 Pricing — MCQs only (J23 Q1(vi) margin with a mark-up and a mark-down; D24 Q1(vi) monopoly price): read SM 117–137 once (pricing strategies, yield management); practise MQP Q1(xi), MCQ bank Q32, Q33, Q39, Q195, Q196, Q209, Q236, Q243, Q266, Q270.

TRAPS

- Probability of "at least X units": add the probabilities of every level ≥ X — not just the next one.
- Life-cycle cost: R&D once, fixed costs × years, warranty per batch of units; re-price any cost tied to sales (commission) when the price changes.
- Target costing: price first, then profit, then cost — never cost + margin.