Module 3 · Part 1 · Decision sums and CVP P16 · 3.1, 3.4

SM pp. 77–116 (3.1 alternative choices) and 160–174 (3.4 relevant cost). Module 3 is the heaviest module — marks per paper: **J26-36 · D25-36 · J25-34 · D24-32 · J24-34 · D23-34** (J23-19, old layout); Dec'26 expected ≈ 35. Part 1 = **Q2, one 14-mark decision sum in every paper since Dec'23**, plus **MCQs (ii)–(iii) on CVP** and an opportunity-cost MCQ. Part 2 = Q3 (transfer pricing, target / life-cycle costing, probability).

Paper	Q2 (14)	MCQs
Jun'23*	old layout: leave a job for a venture — profit and BEP at each price (Q6); minimum price of a modified job (Q4(a))	–
Dec'23	**builder's contract: relevant v irrelevant costs, accept?** (= SM Illus. 34 type)	opportunity cost · price for a target profit
Jun'24	**make or buy + an alternative product per machine hour, best mix**	profit from BEP and MOS · relevant cost of stock
Dec'24	budget profit, **export order at idle capacity**, make or buy a component (= PTP Q2)	price from BEP, fixed cost, MOS
Jun'25	airline: profit and BEP per flight, stop-over offer — accept?	PV ratio · opportunity cost · price for a target profit
Dec'25	**spare hours in two departments**: relevant cost, best price, weekly programme, gain	units for a target profit · fixed cost
Jun'26	**= Jun'24 Q2 word for word** (same numbers)	change in PV ratio · profit at given sales

HOW IT IS ASKED

- **Q2**: one case, three or four asks: contribution / relevant cost per unit → which alternative / what price / what mix → the gain → advise "accept / make / buy" with a reason.
- **December habit**: relevant cost of a contract (D23) or of spare capacity (D25); an export order + make or buy (D24). **June**: the machine-hour mix (J24 = J26), the airline offer (J25).
- **MCQs (ii)–(iii)**: one-line CVP — BEP, MOS, PV ratio, sales or price for a target profit.

A Formula sheet — when to use

Formula	When to use · notes	SM
Contribution = sales − variable cost; profit = contribution − fixed cost	Every decision sum starts here; fixed costs that do not change are left out of the comparison.	[SM 80]
PV ratio = contribution ÷ sales × 100; sales = contribution ÷ PV ratio	MCQs give two of BEP, fixed cost, PV ratio, sales — find the third.	[SM 80]
BEP = fixed cost ÷ PV ratio (₹) or ÷ contribution per unit (units)	"Break-even passengers / units".	[SM 82]
MOS = sales − BEP sales; profit = MOS × PV ratio	Profit straight from BEP data (J24, J26 MCQs).	[SM 82]
Target sales = (fixed cost + target profit) ÷ PV ratio	Units for a target profit: ÷ contribution per unit; price for a target profit: required contribution per unit + variable cost.	[SM 82–83]
Key factor: contribution ÷ units of the scarce factor; rank; fill demand in rank order	Machine / labour / material hours short (J24, J26, D25).	[SM 83, 88]
Shadow price = contribution from one more unit of the scarce factor	The contribution per hour of the product that gets the last hour.	[SM 89]
Relevant cost = future, incremental, cash cost of this decision	Sunk, committed and absorbed fixed costs and depreciation are irrelevant; opportunity costs are relevant.	[SM 160, 162–163]

B Relevant cost of a contract or of spare capacity · Q2 3.4

Item	Relevant amount	SM
Material not in stock, or in regular use	**replacement cost**	[SM 165]
Material in stock, no other use	**realisable value** (what it would sell for)	[SM 165]
Stock that can replace another material	the **cost saved** there (substitution)	[SM 165]
Material on order, no longer needed	its **residual value**	[SM 173]
Labour paid anyway, no other work	**nil**	[SM 169]
Labour that can take over other paid work	the **cost saved** there (lower of the two)	[SM 173]
Scarce skilled labour	**wages + contribution forgone**	[SM 169]
Machine used regularly	**fall in replacement cost** over the period	[SM 170]
Machine with no other use	**fall in resale value** (+ extra maintenance)	[SM 164, 170]
Fixed overheads absorbed	**irrelevant**; only the avoidable part counts	[SM 163, 173]
Work given up for this one	**profit / contribution forgone** (opportunity cost)	[SM 161]

1 · List every cost line
as the question gives it (estimate / cost sheet)

↓

2 · Relevant amount + reason
one line each: replacement, realisable, opportunity, nil (sunk / committed / absorbed)

↓

3 · Total relevant cost
add the opportunity cost of work given up

↓

4 · Compare and advise
price − relevant cost = gain (accept) or loss; minimum price = relevant cost

- Relevant costs must be **futuristic, incremental and cash flows**; depreciation and book values are not. [SM 160]
- Relevant: differential, incremental, opportunity, avoidable, replacement, imputed, out-of-pocket costs. Irrelevant: **sunk, committed, unavoidable, absorbed** costs. [SM 161–162]

PROBLEMS BOX · CONTRACT / SPARE CAPACITY (D23, D25 — RECOMPUTED BY SCRIPT m03p1_patterns.py)

WORKED PATTERN · SM ILLUSTRATION 34 (XYZ CONTRACT = D23 Q2 TYPE)

Element	Relevant ₹	Why
Material X (obsolete; replaces W)	1,08,000	1,35,000 − 15,000 − 12,000 saved
Material Y (on order, not needed)	1,55,000	residual value
Material Z (to be ordered)	3,00,000	current price
Skilled labour	4,00,000	lower of 5,40,000 and 4,00,000 saved
Unskilled (hired for it) · supervisory · avoidable overheads	3,00,000 · 50,000 · 1,25,000	
Total v price 14,00,000	**14,38,000**	profit falls by **38,000**

DEC'25 Q2 BNR (OUR WORKING): SPARE HOURS, SELL TIME AT ₹70 OR MAKE

- Labour is paid anyway → out. Overhead at 90% capacity = 1,800 h a year: fixed ₹20 / ₹28 per hour → variable ₹20 / ₹12.
- Variable cost per hour: Dept 4 = 40 + 20 = **₹60**; Dept 5 = 60 + 12 = **₹72**. Selling Dept 4 time earns ₹10 / h (opportunity cost); Dept 5 time at ₹70 loses ₹2 / h (no opportunity cost).
- **Relevant cost per unit** = 0.75 h × 70 + 20/60 h × 72 + material 10 = **₹86.50**.
- Price: (100 − 86.50) × 1,500 = 20,250 but Dept 4 has only 800 spare hours (max 1,066 units); 110 → 23.5 × 1,000 = **23,500**; 120 → 16,750 → **price ₹110**.
- Week: 20 units; Dept 4 15 h + 1 h sold; Dept 5 6⅔ h, rest left idle (not sold at a loss). Weekly contribution **₹630** v ₹128 now (all 32 h sold) → **gain ₹502 a week**.

PRACTISE THESE (MOST LIKELY FIRST)

D25 Q2, D23 Q2 · J23 Q4(a) (minimum price of a job) · MCQs D23 Q1(iii), J25 Q1(xii) (opportunity cost), J24 Q1(xi) (stock) · postal Q1(vi) · SM Illus. 27–34 (SM 160–174), exercise essay 10 (SM 248) · **ICMAI Practice Workbook Ch1 illus. 6, 7** · MCQ bank Q24–Q30, Q34, Q219, Q268.

[SM 171–174] Then advise: reject on cost (or accept only for strategic reasons).

⚠ SM SLIP · ILLUSTRATION 34

The solution writes Material Y "on order at contract price ₹1,50,000"; the question says ₹1,80,000. The answer (residual value ₹1,55,000) is not affected. [SM 171–173]

DEC'23 Q2 RONTEX (OUR WORKING, SM ILLUS. 34 RULES), ₹ LAKH

Land 1 ground 20 (2 free) · design 3.5 (half sunk) · registration 10 · cement 8 (replacement) · bricks 5 (realisable) · others 8 + 1 = 9 · skilled 2 (profit lost elsewhere; wages paid anyway) · unskilled 8 · supervisor 0 · overheads 4 (avoidable) · equipment 32 − 25 = 7 (fall in replacement cost; depreciation out) · other project's profit 10 → **relevant cost 86.5 v offer 100: accept, gain 13.5**. If the skilled wages are read as extra cost: 98.5 — still accept. State the assumption.

C Make or buy, export order, best mix · Q2 3.1

PROBLEMS BOX · ALTERNATIVE CHOICES (J24 = J26, D24, J25 — RECOMPUTED BY SCRIPT)

WORKED PATTERN · SM ILLUSTRATION 3 (KEY FACTOR AND SHADOW PRICE)

	A	B	C
Contribution per unit (variable = ⅓ of unit cost)	14	23	29
Per processing hour · rank	14 · III	23 · I	14.50 · II
Hours given (13,500)	1,500	8,000	4,000

Profit ₹60,750 → **₹80,000** (+₹19,250); **shadow price ₹14** per hour (one more hour = one more A). [SM 87–89]

EXPORT ORDER · SM ILLUSTRATION 2 (₹ LAKH)

Reject: profit 2.00 · accept and starve the home market: 3.00 · add capacity + overtime: **4.00** → **best**. Variable costs scale with capacity; overtime premium on the extra 10%. [SM 85–87]

JUN'26 Q2 = JUN'24 Q2 MHT (OUR WORKING) — LEARN THIS ONE

Per unit (₹)	MH 100 made	MH 100 bought	MH 200 made
Selling price	900	900	600
Material + machine + **variable** mfg OH + variable selling	200 + 150 + 120 + 80	650 + 40	200 + 50 + 40 + 60
Contribution · per machine hour	**350** · 233.33	**210**	**250** · 500

Fixed mfg OH ₹3,00,000 ÷ 7,500 machine hours (5,000 × 1.5 h) = ₹40 / h, so MH 100 carries 60 fixed (180 − 60 = 120 variable), MH 200 carries 20 (60 − 20 = 40). Plan: MH 200 12,000 (6,000 h) → MH 100 made 1,000 (1,500 h) → MH 100 bought 6,000 (Rex's limit). Operating income = 30,00,000 + 3,50,000 + 12,60,000 − 3,00,000 − 6,00,000 = **₹37,10,000**.

DEC'24 Q2 GREEN SINE (OUR WORKING)

- Variable per unit 30 + 9.40 + 28 + 12 + 12 = 91.40 → contribution 38.60; budget profit = 1,80,000 × 38.60 − fixed 37,80,000 = **₹31,68,000**.
- Export: wages 28 ÷ ₹7 = 4 h a unit, so variable factory OH = 12 ÷ 4 = ₹3 / h. Cost 56 + 70 + 30 + 14 = 170 v price 175 → **₹5 × 6,000 = ₹30,000**; needs 60,000 h of the 80,000 idle h → accept.
- Component EX: make at (30,000 + 52,500 + 25,500) ÷ 15,000 = **₹7.20** v buy ₹7.90 → **make** (fixed OH stays either way).

JUN'25 Q2 AIRWAY (OUR WORKING)

Contribution per passenger 5,000 − 300 − 500 = 4,200; fixed per flight 3,78,000 → profit **₹6,30,000**, BEP **90 passengers**. Stop-over: ZOMB 50 × 2,500 + A–D 60 × 2,400 − 25 lost × 4,200 − snacks 215 × 200 − fuel 45,000 − landing 19,000 = **+₹57,000** → **accept**. ⚠ The question's seats do not fit 260 (A–D 275, D–B 265); answer on its figures and say so.

PRACTISE THESE (MOST LIKELY FIRST)

J26 = J24 Q2, D24 Q2 (= PTP Q2 word for word), J25 Q2 · MQP Q2 (adds the use of the released capacity) · J23 Q6 · SM Illus. 2, 3, 6, 7, 11, 12 (make or buy), 4, 9 (mix), 10 (shut down), 13–16 (SM 84–116), exercise essays 1–3 (SM 247) · **ICMAI Practice Workbook Ch1 illus. 1–5**.

D CVP one-liners · MCQs (ii)–(iii) 3.1

WORKED PATTERN · SM ILLUSTRATION 1 (BEP AND TARGET SALES)

- Revenue ₹80,00,000; variable ₹48,00,000 → contribution ₹32,00,000, **PV ratio 40%**; fixed cost after advertising ₹60,00,000. [SM 84–85]
- BEP = 60,00,000 ÷ 40% = **₹1,50,00,000**; sales for a ₹4,00,000 profit = 64,00,000 ÷ 40% = **₹1,60,00,000**. [SM 85]

OPPORTUNITY COST MCQ · SM ILLUSTRATION 33

One product per period, 1,000 hours: C can make 800 of 900 demanded → 100 × ₹40 = **₹4,000** lost; D 500 of 600 → **₹4,000**; A and B nil. [SM 171]

MCQ asks	Do this
Price for a target profit (D23, D24, J25)	contribution needed = fixed + profit; ÷ units; + variable cost
Profit from BEP and MOS (J24, J26)	(sales − BEP sales) × PV ratio
PV ratio from BEP and fixed cost (J25)	fixed cost ÷ BEP sales
Units for a target profit (D25)	(fixed + profit) ÷ contribution per unit
Change in PV ratio (J26)	new (price − variable) ÷ price, less the old ratio

Practise: D23 Q1(iv), J24 Q1(iv), D24 Q1(ii), J25 Q1(ix), (xv), D25 Q1(ii), (iii), J26 Q1(ii), (iii) · MQP Q1(ii), (iii) · PTP Q1(ii), (iii), (xi) · postal Q1(iv), (v) · MCQ bank Q15, Q17, Q19–Q21, Q31, Q185, Q191, Q194, Q210, Q214, Q217, Q245, Q247, Q248, Q256, Q259, Q271, Q274, Q276, Q279.

TRAPS

- Split each overhead into fixed and variable first (absorption rates hide the fixed part: D25, J26, D24).
- Rank by contribution **per unit of the scarce factor**, never per unit of product.
- Sunk costs, depreciation and staff paid anyway are left out — say why in one line each.
- End with a clear advice sentence ("accept", "make", "price ₹110"): the marks sit there.