Module 4 · ABC, JIT, throughput P16 · 4.1–4.5

SM pp. 253–320 (exercise 321–326). **Q4(a) = a 7-mark ABC or throughput sum in every paper** + MCQ (iv) (ABC) and (xii) (Kanban). Q4(b) is the 7-mark theory half — see Module 1 (value analysis, BPR) and Module 2 (cost of quality, lean accounting). Module 4 per paper: **J26-11 · D25-11 · J25-11 · D24-11 · J24-9 · D23-9** (J23-9).

Paper	Q4(a)	MCQs
Dec'23	bank: activity rates, cost of three products	throughput gain at the bottleneck
Jun'24	**throughput ranking + optimal mix; effect of a court-ordered supply** (= SM Illus. 13 + a twist)	ABC cost per unit
Dec'24	batch: prime-cost absorption v ABC (= SM Illus. 4 layout)	ABC (= J23 template) · return per bottleneck hour
Jun'25	**four products, runs of 24, machine cost spread 4 : 3 : 2**	backflush · throughput price
Dec'25	**TFC, cost per hour, return per bottleneck hour, TA ratios, throughput cost, efficiency** (= SM Illus. 15's six asks)	ABC handling · Kanban
Jun'26	**= Jun'25 Q4(a) word for word**	ABC over-recovery · Kanban

HOW IT IS ASKED · DEC'26

- ABC (4 papers) and throughput (2 papers) alternate; Decembers had the bank (D23), the batch (D24) and the six throughput asks (D25).
- Likely: an ABC rate sum (pools → drivers → cost per unit) or the throughput six asks; JIT financial impact (MQP Q4(a), SM Illus. 10) is due — no long JIT question since Jun'23.

TRAPS

- ABC: build the pools first (shared cost in the given ratio), then rates; runs = units ÷ run size, orders = units ÷ batch size.
- Throughput ranks by return per **bottleneck** hour; a TA ratio below 1 does not mean drop the product if a fixed order (court, contract) forces it.
- JIT: never count depreciation and the interest on the same capital.

A Formula sheet — when to use

Formula	When to use · notes	SM
Cost driver rate = activity cost ÷ driver volume; product cost = Σ rate × its driver use	Pools first (spread shared costs in the given ratio), then rates, then cost per unit.	[SM 266–269]
Throughput = sales − direct material	Everything else is factory cost (fixed in the short run).	[SM 292]
Return per factory hour = throughput per unit ÷ bottleneck time	Rank by this; fill demand in rank order.	[SM 292]
Cost per factory hour = TFC ÷ bottleneck time available	TFC = all costs except material.	[SM 292]
TA ratio = return per hour ÷ cost per hour	Above 1: the product covers the factory cost; below 1: cut it.	[SM 292]
Throughput cost = standard bottleneck time of output × cost per unit of time; efficiency = throughput cost ÷ actual TFC	Asks (v)–(vi) of the six.	[SM 297, 300]

JIT impact = interest on stock released + savings − (interest on new capital + new running cost + stock-out cost)	Depreciation is ignored (it is the capital cost again).	[SM 287]

B Activity based costing · Q4(a), MCQ (iv) 4.1

PROBLEMS BOX · ABC (RECOMPUTED BY SCRIPT m04_patterns.py)

WORKED PATTERN · SM ILLUSTRATION 3 (RATES)

Machine hours 96,230 → ₹1.724 an hour; orders 8,760 ÷ 30 = ₹292; set-ups 21,400 ÷ 50 = ₹428; spare parts 44,690 ÷ 36 = ₹1,241.39; handling 25,545 ÷ 81 = ₹315.37 → factory cost P 25.14, Q 28.17, R 60.40, S 55.08. [SM 266–268]

SM ILLUSTRATION 4 (BATCH = DEC'24 LAYOUT)

Rates 527.27 · 367.65 · 798.07 · 115.48 · 195.56 · 30 → batch overheads ₹1,79,436 + prime cost ₹3,75,000 = **₹5,54,436**. [SM 268–270]

JUN'26 = JUN'25 Q4(a) PASN (OUR WORKING) — LEARN THIS ONE

Pool (machine 63,000 → 4 : 3 : 2)	₹	Driver	Rate
Set-up 20,000 + 28,000	48,000	96 runs (units ÷ 24)	500
Store 15,000 + 21,000	36,000	200 requisitions	180
Inspection 10,000 + 14,000	24,000	96 runs	250
Handling	2,592	192 orders (units ÷ 12)	13.50

Per unit: A 32,310 ÷ 720 = **44.875** · B 28,425 ÷ 600 = **47.375** · C 24,540 ÷ 480 = **51.125** · D 25,317 ÷ 504 = **50.232**; total 1,10,592 = all overheads ✓.

DEC'24 Q4(a) ANTOX (OUR WORKING)

- Overheads 51,79,300 ÷ prime cost 3,01,39,000 → on the batch's prime cost 30,13,900: cost **₹235.46** a unit.
- Rates: ₹1,500 an order · ₹190.53 a maintenance hour · ₹304.22 a set-up · ₹189.96 an inspection → batch overheads 2,43,246 → **₹217.14** a unit under ABC.

DEC'23 Q4(a) ADF BANK (OUR WORKING)

Rates: ATM ₹0.50 · computer ₹0.40 · statement ₹1.60 · enquiry ₹0.60 a minute → checking accounts 15,80,000 ÷ 30,000 = **52.67**; personal loans 2,14,000 ÷ 5,000 = **42.80**; Gold Visa 4,66,000 ÷ 10,000 = **46.60**.

PRACTISE THESE (MOST LIKELY FIRST)

J26 = J25, D24, D23 Q4(a) · PTP Q4(a) · SM Illus. 1–8, solved cases 1–3 (SM 263–281), Illus. 9 (when ABC fits) · MCQs J23 Q1(vii), J24 Q1(viii), D24 Q1(viii), D25 Q1(iv), J26 Q1(iv), MQP / PTP Q1(iv) · **ICMAI Practice Workbook Ch2 illus. 1, 2, 5–7** · MCQ bank Q40–Q44, Q190, Q193, Q202, Q215, Q238.

C Throughput accounting · Q4(a), MCQs 4.3

PROBLEMS BOX · THROUGHPUT (RECOMPUTED BY SCRIPT)

WORKED PATTERN · SM ILLUSTRATION 15 (THE SIX ASKS = DEC'25)

- (i) TFC = all costs except material = **₹78,250**; (ii) ÷ 31,300 minutes = **₹2.50** a minute. [SM 299]
- (iii) Return a minute X (35 − 20) ÷ 5 = ₹3; Y (35 − 17.5) ÷ 10 = ₹1.75; (iv) TA X **1.20**, Y **0.70**. [SM 300]
- (v) Standard minutes 30,250 × 2.50 = **₹75,625**; (vi) efficiency 75,625 ÷ 78,250 = **96.6%**. [SM 300]

Dec'25 Q4(a) MOBN (our working): TFC = labour 5,40,000 + variable OH 8,50,000 + fixed 4,50,000 = **₹18,40,000**; ÷ 2,30,000 h = **₹8**; return S ₹12, T ₹11; TA S **1.5**, T **1.375**; throughput cost 2,20,000 h × 8 = **₹17,60,000**; efficiency **95.65%**.

⚠ SM SLIP · ILLUSTRATION 15

The comment calls Y's TA ratio 0.75; the working gives 0.70. Illustrative 12 writes "5 hours" for 5 minutes.

SM ILLUSTRATION 13 (RANK AND MIX = JUN'24 TYPE)

Return an hour A 12, B 10, C 15 → C 40,000 (1,20,000 h), A 30,000 (1,50,000 h), B 12,500 with the last 50,000 h. [SM 297–298]

Jun'24 Q4(a) BIVON (our working): per machine hour VN 500, XN 375, DN 250 → VN 3,000, XN 2,000, DN 2,000 → profit **₹30,00,000**. Court order DN 2,500 first: VN 3,000, XN 1,250 → **₹26,25,000** → the order costs **₹3,75,000**.

SM ILLUSTRATION 18 (TA RATIO MCQ)

Cost ₹2.95 a minute; per minute X 2.8, Y 3, Z 2.5 → TA **0.95, 1.02, 0.85** → push Y. [SM 305–306]

Theory of constraints: identify → exploit → subordinate → elevate → repeat. More output from a non-bottleneck only builds stock (J23 MCQ).

Practise: D25, J24 Q4(a) · postal Q6 · SM Illus. 12–18 (SM 296–306) · MCQs J23 Q1(iv), D23 Q1(vii), D24 Q1(iv), J25 Q1(vi), postal Q1(viii) · **WB Ch2 illus. 8–10** · MCQ bank Q47–Q50, Q184, Q221, Q277.

D JIT, Kanban, backflush · MCQ (xii), Q4 4.2, 4.4, 4.5

WORKED PATTERN · SM ILLUSTRATION 10 (JIT FINANCIAL IMPACT = MQP Q4(a))

Costs: interest 15% on ₹10,00,000 + running 1,08,000 + stock-outs 77,000 = **₹3,35,000**; benefits: 15% on stock released (₹40,00,000 − ₹10,00,000) + two salaries 1,20,000 + rent 33,000 + taxes 22,000 = **₹6,25,000** → net **₹2,90,000** → adopt JIT. [SM 287]

- **JIT**: goods received only as needed — a **demand-pull** system; aims: less inventory, faster turnover. [SM 283]
- **Kanban**: a visual signal to replenish stock — ensures continuous supply (D25, J26 MCQ (xii)). [SM 283]
- **Backflush costing**: costs are recorded after production ends — one entry from the bill of materials; suits JIT, little or steady WIP, fast lead times (J25 MCQ). [SM 307]

Practise: MQP Q4(a), J23 Q4(b) (JIT purchasing) · SM Illus. 10, 11 (SM 286–289), 19, 20 (backflush, SM 310–313) · MCQs D25, J26 Q1(xii), J25 Q1(iii) · **WB Ch2 illus. 3, 4, 11** · MCQ bank Q45, Q46, Q51–Q54, Q199, Q206, Q220.