CERTIFIED PUBLIC ACCOUNTANT
OPERATIONAL LEVEL EXAMINATION
FM2.3 FINANCIAL MANAGEMENT
DATE: THURSDAY 27, AUGUST 2026

SECTION A

Answer key (2 marks each)

Question	Correct answer
Question 1	**A and C**
Question 2	**A**
Question 3	**B**
Question 4	**D**
Question 5	**C**
Question 6	**B**
Question 7	**A**
Question 8	**D**
Question 9	**C**
Question 10	**B**
Question 11	**A**
Question 12	**C**
Question 13	**D**
Question 14	**C**
Question 15	**A**

Detailed answers

QUESTION ONE
Correct answer: A and C. Statements 1 and 3 (select all that apply)

Statement 1 is correct: a grant-funded hospital's overriding objective is best service delivery within resource constraints, and the 3 Es (Economy, Efficiency, Effectiveness) capture how well inputs convert into health outcomes: something a surplus/profit figure cannot meaningfully measure for a non-profit-seeking body.

Statement 3 is correct: independent VFM audit gives external, comparable accountability to government/taxpayers, performing a role analogous to that played by reported profit and ROCE for shareholders of a commercial company.

Why the other options are incorrect:

- B. IPSAS prohibits profit reporting: IPSAS does not prohibit public bodies from reporting a surplus/deficit figure; many public sector entities do report a financial result. The 3 Es are adopted because profit is not a meaningful primary objective for a service-delivery body, not because reporting a surplus is legally banned.
- D. 3 Es as a revenue-growth substitute: The 3 Es framework is adopted because service delivery (not revenue growth) is the hospital's objective. The size of cost-recovery income is irrelevant to why a non-financial performance framework is used — even a hospital with 50% cost recovery would still be assessed primarily on economy, efficiency and effectiveness.

QUESTION TWO
Correct answer: A. Shareholders and employees

The redundancies and the special dividend funded from asset disposal proceeds directly transfer wealth to shareholders at the direct expense of employees' jobs and benefits; the

declined wage subsidy removes an alternative that could have preserved those jobs, sharpening the conflict.

Why the other options are incorrect:

- B. Overseas supplier and local government: Becoming a connected stakeholder through a supply contract does not make a party's interests align 'exactly' with government's, nor does it eliminate scope for conflict; the claim is an overstatement, not a description of the most severe conflict here.
- C. Existing local suppliers and lenders; Lenders hold a fixed, generally secured claim on the company as a whole and are not exposed to supply-chain changes in the same way as a terminated supplier; the two groups do not share an 'identical risk position'.
- D. Customers and local government; Being classified as 'external stakeholders' does not mean two parties always experience outcomes in the same direction, customers and government can readily be affected in opposite ways by the same decision (e.g. job losses vs. continued product supply).

QUESTION THREE
Correct answer: B. FRW2,310

Qd = 900 − 6P, Qs = −150 + 9P. FRW10/unit tax on suppliers; FRW5/unit subsidy to consumers. Find government net revenue.

- ✓ Adjust demand for subsidy (reduces price paid by consumer): Qd = 900 − 6(P − 5)
- ✓ Adjust supply for tax (reduces price received by supplier): Qs = −150 + 9(P − 10)
- ✓ Equilibrium: set adjusted Qd = adjusted Qs, solve for P and Q
- ✓ Government net revenue = Tax collected − Subsidy paid = (10 × Q) − (5 × Q)

1. Effective demand: Qd = 900 − 6(P−5) = 900 − 6P + 30 = 930 − 6P
2. Effective supply: Qs = −150 + 9(P−10) = −150 + 9P − 90 = −240 + 9P
3. Set equal: 930 − 6P = −240 + 9P

   1,170 = 15P

   P = FRW78

4. **Quantity: Q = 930 − 6(78) = 930 − 468 = 462 units**
5. Tax revenue = 10 × 462 = FRW4,620
6. Subsidy cost = 5 × 462 = FRW2,310

Net government revenue = 4,620 − 2,310 = FRW2,310

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Why the other options are incorrect:

- A. FRW2,220, Arises from applying the tax to shift the supply curve correctly, but forgetting that the subsidy also shifts the demand curve (i.e. using the original Qd = 900 − 6P). This gives P = FRW76, Q = 444 units, and net revenue = 5 × 444 = FRW2,220 — understating both price and quantity.
- C. FRW2,460, Does not correspond to a single, cleanly identifiable calculation error; substituting nearby equilibrium prices into the correct model does not reproduce this figure exactly, suggesting a compounded arithmetic slip in solving the simultaneous equations rather than one specific conceptual mistake.

- D. FRW4,620: Uses the correct equilibrium (P = 78, Q = 462) but counts only the gross tax collected (10 × 462 = 4,620) without deducting the FRW5 per-unit subsidy paid to consumers, overstating the government's net revenue position by exactly the subsidy cost.

QUESTION FOUR
Correct answer: D. FRW10,100

Output	**100**	**150**	**200**	**250**	**300**	**350**
TR	14,800	18,900	20,400	19,100	16,500	13,200
TC	(11,200)	(12,300)	(13,950)	(15,200)	(17,500)	(20,100)
Profit@ Output	3,600	6,600	6,450	3,900	(1,000)	(6,900)
Additional Step Cost @250					(2,500)	(2,500)
Profit/Loss	**3,600**	**6,600**	**6,450**	**3,900**	**(3,500)**	**(9,400)**

- ✓ **150 units: 18,900 − 12,300 = 6,600 (highest profit)**
- ✓ **300 units: (16,500 − 17,500) − 2,500 = −1,000 − 2,500 = −3,500**
- ✓ 350 units: (13,200 − 20,100) − 2,500 = −6,900 − 2,500 = −9,400
- ✓ The profit-maximizing output is 150 units (profit = 6,600), NOT 300 as the sales director assumed (TR was still rising, but TC was rising faster after the step cost).
- ✓ **Profit lost by producing 300 instead of 150 = 6,600 − (−3,500) = FRW10,100**

Why the other options are incorrect:

- A. FRW9,950, Benchmarks the 300-unit loss (−3,500) against the profit at 200 units (6,450) instead of the true maximum at 150 units (6,600): 6,450 − (−3,500) = 9,950.
- This assumes, incorrectly that 200 units is the profit-maximising output.
- B. FRW7,600; Ignores the FRW2,500 step cost altogether when evaluating the 300-unit output, comparing the true maximum (6,600) against the unadjusted 300-unit profit of −1,000: 6,600 − (−1,000) = 7,600. This misses the whole point of the question — that the step cost is what makes 300 units unattractive.
- C. FRW7,400, Benchmarks the (correctly step-adjusted) 300-unit loss of −3,500 against the profit at 250 units (3,900) instead of the true maximum at 150 units: 3,900 − (−3,500) = 7,400. This assumes 250 units — the last output before the step cost applies — is the profit-maximising point.

QUESTION FIVE
Correct answer: C. 4.75%

Open-economy multiplier k = 1 / [1 − c(1−t) + m] = 1 / [1 − 0.75(0.80) + 0.10] = 1 / 0.50 = 2.

Autonomous demand change = ΔG − c·ΔT + ΔX = 50 − 0.75(30) + 20 = 50 − 22.5 + 20 = FRW47.5 million.

ΔY = k × 47.5 = 2 × 47.5 = FRW95 million; % change in GDP = 95 / 2,000 **= 4.75%.**

Why the other options are incorrect:

- A. 5.94%, Uses the closed-economy multiplier, 1/[1−c(1−t)] = 1/[1−0.75(0.80)] = 2.5, instead of the correct open-economy multiplier of 2 — i.e. forgets to add the import propensity (m) to the denominator. 2.5 × 47.5 / 2,000 = 5.94%.
- B. 2.75%, Uses the correct multiplier of 2 but omits the FRW20 million export increase from the autonomous demand change: 2 × (50 − 22.5) / 2,000 = 2.75%. This treats the trade-deal-driven export rise as if it had no effect on national income.
- D. 4.00%, Uses the correct multiplier of 2 but treats the full FRW30 million autonomous tax rise as reducing autonomous demand directly (ΔG − ΔT + ΔX), rather than only its induced effect on consumption via c×ΔT: 2 × (50 − 30 + 20) / 2,000 = 4.00%. This overstates the drag from the tax increase, since only the portion of income lost to consumption (75%) actually reduces spending.

QUESTION SIX
Correct answer: B. 3 years 9 months

Year	-	1	2	3	4
Cash Flow (FRW)		95,000	140,000	160,000	185,000
Initial Investment	(380,000)				
Working Capital	(50,000)	(20,000)			70,000
Cash Flow (FRW)	(430,000)	75,000	140,000	160,000	255,000
DF @ 10%	1	0.909	0.826	0.751	0.683
PV of Cash flow	(430,000)	68,175	115,640	120,160	174,165
Cum. PV (FRW)	(430,000)	(361,825)	(246,185)	(126,025)	48,140

Discounted payback Period = **3year +** $\frac{126{,}025}{174{,}165} * 12$ Months = **3 Year and 8 Month and 20 Days**

Why the other options are incorrect:

- A. 3 years 7 months; Omits deducting the FRW20,000 Year-2 working capital injection from the Year-1 cash flow, while still recovering the full FRW70,000 cumulative working capital at the end of Year 4, effectively treating the extra working capital as a pure benefit that is never paid out. This overstates the cash flows and shortens the payback to roughly 7.4 months into Year 4, i.e. 3 years 7 months.

- C. 3 years 8 months: Ignores the additional FRW20,000 working-capital requirement altogether, neither deducting the Year-2 injection nor including it in the Year-4 recovery (only the original FRW50,000 is recovered). This gives a payback of roughly 8.1 months into Year 4, i.e. 3 years 8 months.
- D. 3 years 11 months, Recovers only the original FRW50,000 working capital at the end of Year 4, forgetting to also recover the further FRW20,000 injected at the start of Year 2, while still correctly deducting that FRW20,000 as an outflow. Understating the Year-4 recovery drags the payback out to nearly the full year (≈11.96 months), rounding to 3 years 11 months.

QUESTION SEVEN
Correct answer: A. FRW121,336

Cashflow			0	1	2	3	4
Operating cash inflow	6%		318,000	318,000	337,080	357,305	-
Tax paid	30%	32%			(95,400)	(101,124)	(114,338)
PAT				318,000	241,680	256,181	(114,338)
Tax saving on TAD					48,750	36,563	88,200
Net Operating Cashflow				**318,000**	**290,430**	**292,743**	**-26,138**
Initial investment			(650,000)				
Scrap Value			-	-	-	90,000	-
Total cashflow			(650,000)	318,000	290,430	382,743	-26,138
Discount the cash flows at 12%			1	0.893	0.797	0.712	0.636
PV			**(650,000)**	**283,974**	**231,473**	**272,513**	**-16,623**
NPV			**121,336**				

Year	**Cost/ RB**	**Depr Rate**	**Depreciation/CA**	**Tax rate**	**Tax saving**
1	650,000	25%	162,500	30%	48,750
2	487,500	25%	121,875	30%	36,563
3	365,625	25%	**275,625**	32%	88,200
Salvage Value	90,000				
Balance Figure	**275,625**				

Why the other options are incorrect:

- B. FRW122,375: Uses a flat 30% tax rate for all three years, ignoring the newly enacted 32% rate that applies specifically to Year 3's taxable profit. The lower tax charge in Year 3 increases the after-tax cash flow and overstates the NPV.
- C. FRW115,793: Uses a flat 32% tax rate for all three years, applying the new Year-3 rate retrospectively to Years 1 and 2 as well. The higher tax charge in Years 1–2 reduces the after-tax cash flow and understates the NPV.
- D. FRW109,384: Pays tax in the same year the related profit is earned, instead of one year in arrears as specified. Bringing the tax cash outflows forward by one year increases their present value (since they are discounted less), reducing NPV to FRW109,384.

QUESTION EIGHT
Correct answer: D. 819 units

Post-tax annual operating cash flow = (Sales − VC − FC) × (1 − T) + CA × T,

where CA = 1,200,000/4 = 300,000 p.a. (straight line) = 600Q − 112,500.

Setting NPV = 0 using the 4-year 10% annuity factor (3.170): 600Q − 112,500 = 1,200,000 / 3.170 = 378,549

Q = 818.4, rounded up to 819 units.

Why the other options are incorrect:

- A. 786 units: Ignores tax entirely, using pre-tax cash flows (800Q − 250,000) to solve for NPV = 0. Without the CA tax shield, a smaller unit volume appears sufficient (786 units), which understates the true breakeven volume once the 25% tax charge on profits is correctly included.
- B. 944 units: Correctly applies 25% tax to operating profit but forgets to add back the tax shield from the capital allowance (300,000 × 25% = 75,000 per year). Without this shield, a higher unit volume is needed to reach NPV = 0, overstating the answer to 944 units.
- C. 828 units: Does not correspond to a clean single-error variant; substituting 828 units into the correct discounted cash flow model does not give an NPV of exactly zero, confirming it is inconsistent with the specified tax and capital-allowance treatment.

QUESTION NINE
Correct answer: C.

Take the 2% discount (paying within 10 days): net benefit of FRW2,599

Blended annual financing rate (effective) = 0.70 × 11.5% + 0.30 × 15% = 12.55%; daily effective rate = (1.1255)^(1/365) − 1.

2% discount option: amount financed = 650,000 × 0.98 = 637,000, for 50 days (60 − 10): financing cost ≈ FRW10,401; net benefit = 13,000 − 10,401 **= FRW2,599.**

1% discount option: amount financed = 643,500 for 35 days (60 − 25): financing cost exceeds the FRW6,500 discount, giving a net cost (FRW837) the inferior choice.

Why the other options are incorrect:

- A. FRW2,049, Computes the financing cost using simple interest (amount × rate × days/365) rather than compounding daily over the 50-day period. Simple interest slightly understates the true cost of the funds, overstating the net benefit to FRW2,049.

- B. FRW1,502, Compounds daily using the nominal rate divided by 365 (rate/365) as the daily rate, instead of first converting the blended 12.55% to a true daily-compounding equivalent via (1+12.55%)^(1/365)−1. This slightly overstates the financing cost, understating the net benefit to FRW1,502.
- D. FRW837 (1% discount, net cost) — This is not a calculation error — it is the correctly computed outcome of choosing the alternative (1%, 25-day) discount, which turns out to be a net cost rather than a benefit. It is shown as a distractor to test whether candidates correctly identify the 2% option as superior, not because the FRW837 figure itself is wrong.

QUESTION 10
Correct answer: B. 13.76%

Ungear X Ltd's equity beta to an asset beta (debt beta = 0): $\beta a = 1.6 \times 80/[80 + 20(0.72)] = 1.356$.

Re-gear to Omega Ltd's structure (E=60, D=40, $\beta d=0.1$): $\beta e(\text{Omega}) = 1.959$.

Ke = 6% + 1.959 × 7% = 19.71%; Kd (after tax) = (6% + 0.1×7%) × 0.72 = 4.82%.

WACC = 19.71%×(60/100) + 4.82%×(40/100) = 13.76%.

Why the other options are incorrect:

- A. 14.51%, Uses the pre-tax cost of debt (6.7%) directly in the WACC calculation, omitting the tax shield on interest: 19.71%×0.6 + 6.7%×0.4 = 14.51%. This overstates the WACC by ignoring debt's tax deductibility.
- C. 14.74%, Regears the ungeared asset beta to Omega's structure using (E+D) in the denominator instead of the correctly tax-adjusted (E+D(1−T)), i.e. forgets to tax-adjust the debt component specifically at the regearing step. This inflates the derived equity beta and hence Ke, giving a WACC of 14.74%.
- D. 12.27%, Uses equal 50/50 weights for equity and debt in the WACC formula instead of the correct 60/40 market-value weights (E=60m, D=40m): 19.71%×0.5 + 4.82%×0.5 = 12.27%. This understates the weight on the more expensive equity component.

QUESTION 11
Correct answer: A. FRW54.45 million

Weighted average personal tax rate on debt = (0.40 × 0%) + (0.60 × 30%) = 18%.

Miller's gain to leverage = D × [1 − (1−Tc)(1−Tpe)/(1−Tpd)] = 20 × [1 − (0.75×0.85)/0.82] = FRW4.451 million.

Value of Q Ltd = 50 + 4.451 = FRW54.45 million.

Why the other options are incorrect:

- B. FRW55.51 million: Inverts the weighting of the two debt-holder groups — using 60% tax-exempt/40% taxable instead of the correct 40% tax-exempt/60% taxable — which understates the effective personal tax rate on debt (Tpd) and overstates the gain to leverage, giving FRW55.51 million.
- C. FRW55.00 million, Applies the classical Modigliani-Miller-with-tax formula (VL = VU + D×Tc = 50 + 20×0.25 = 55.00), ignoring personal taxes on equity and debt income entirely. This is the wrong model for a question that explicitly asks for Miller's theory, which incorporates personal tax differentials.

- D. FRW51.71 million: Assumes all of Q Ltd's debt is held by taxable individual investors at 30% (Tpd = 30%), ignoring the 40% held by tax-exempt pension funds. The higher assumed personal tax rate on debt reduces the calculated gain to leverage, understating the value to FRW51.71 million.

QUESTION 12

Correct answer: C. Order in batches of 2,000 units: net benefit of FRW60,233

EOQ= $\sqrt[2]{\frac{2*D*Co}{Ch}} = \sqrt[2]{\frac{2*24{,}000*100}{1.5}} = \sqrt[2]{3,200,000} =$

Ordering Cost = $\frac{D}{EOQ}$ *** Co=** $\frac{24{,}000}{1789}$ *** 100 = 1,342**

Holding Cost = $\frac{Eoq}{2}$ *** Co=** $\frac{1{,}789}{2}$ *** 1.5 = 1,342**

D: Annual Demand = 24,000 Unit
Purchase Price= FRW 15
Co: Ordering Cost= FRW 100
Ch: Holding Cost= 10% of Purchase Price = 10% * 15 =FWR 1.5

Purchase Cost = Annual Demand * Purchase Price
Purchase Cost = 24,000 * 15 = FRW 360,000

Total Annual Cost = Purchase cost + Ordering cost + Holding cost

If We Place order of 800 Unit @ Purchase Price of FRW 13.5

Ordering Cost = $\frac{D}{Q}$ * Co= $\frac{24{,}000}{800}$ * 100 = FRW 3,000

Holding Cost = $\frac{Q}{2}$ * Co= $\frac{800}{2}$ * 1.35 = FRW 540

Holding Cost = FRW 13.5 *10% = FRW 1.35

Purchase Cost = Annual Demand * Purchase Price
Purchase Cost = 24,000 * 13.5 = **FRW 324,000**
If We Place order of 1,886 Unit @ Purchase Price of FRW 12.5

Ordering Cost = $\frac{D}{Q}$ * Co= $\frac{24{,}000}{1{,}886}$ * 100 = FRW 1,272.5

Holding Cost = $\frac{Q}{2}$ * Co= $\frac{1{,}886}{2}$ * 1.35 = FRW 1,273.05

Holding Cost = FRW 13.5 *10% = FRW 1.35

Purchase Cost = Annual Demand * Purchase Price
Purchase Cost = 24,000 * 13.5 = **FRW 324,000**

If We Place order of 2,000 Unit @ Purchase Price of FRW 12.5

Ordering Cost = $\frac{D}{Q}$ * Co= $\frac{24,000}{2000}$ * 100 = FRW 1,200

Holding Cost = $\frac{Q}{2}$ * Co= $\frac{2,000}{2}$ * 1.25 = FRW 1,250

Holding Cost = FRW 12.5 *10% = FRW 1.25

Purchase Cost = Annual Demand * Purchase Price
Purchase Cost = 24,000 * 12.5 = **FRW 300,000**

Step 2: Compare total annual costs

Policy	**Quantity**	**Unit price**	**Purchase cost**	**Ordering cost**	**Holding cost**	**Annual relevant cost**	**Benefit**
Full price	1,789	FRW 15	360,000	1,342	1,342	362,694	
13.50 discount	800	FRW13.50	324,000	3,000	540	327,540	35,154
13.50 discount	1,886	FRW 13.5	324,000	1,272	1,273	326,545	36,149
12.50 discount	**2,000**	**FRW12.50**	**300,000**	**1,200**	**1,250**	**302,450**	**60,244**

Why the other options are incorrect:

- A. FRW59,983; At the 2,000-unit order quantity, computes the annual holding cost using the original undiscounted price of FRW15.00 (10% × 15.00) instead of the actual discounted price of FRW12.50 that applies at that order size. The resulting slightly higher total cost understates the net benefit to FRW59,983.
- B. FRW36,138; Compares the baseline cost against the recalculated EOQ of 1,886 units (at the FRW13.50 price band) rather than checking whether jumping to the 2,000-unit price-break quantity gives an even lower total cost. Since 2,000 units is in fact cheaper, benchmarking against 1,886 units understates the achievable benefit.
- D. FRW59,183; Does not correspond to a single, clearly identifiable error; it is close to, but not exactly reproducible from, the holding-cost or ordering-cost variants tested, and likely reflects a compounding of minor rounding differences.

QUESTION 13
Correct answer: D. FRW26,709

- ✓ **Spread = 3 × [(3 × Transaction cost × Variance) / (4 × daily interest rate)] ^(1/3)**
- ✓ **Return Point = Lower limit + (1/3) × Spread**

1. Effective annual rate = (1 + 0.08/4) ^4 − 1 = (1.02) ^4 − 1 = 8.24%
2. Daily interest rate i = (1.0824) ^ (1/365) − 1 = 0.02169% (0.0002169)
3. Variance = $SD^2 = 3{,}000^2 = 9{,}000{,}000$
4. Spread = 3 × [(3×150×9,000,000) / (4×0.0002169)] ^ (1/3) = 3 × [4,050,000,000 / 0.0008676] ^ (1/3) = 3 × 16,709**= 50,127**
5. **Return Point = 10,000 + (1/3) ×50,127 = 10,000 + 16,709 = FRW26,709**

Why the other options are incorrect:

- A. FRW26,655; Converts the nominal 8% (compounded quarterly) rate into a daily rate by simple division (0.08/365) instead of first compounding it to an effective annual rate and then converting that to a true daily-compounding equivalent. This slightly understates the interest rate used, giving FRW26,655.
- B. FRW26,489; Correctly converts the nominal rate to an effective annual rate (8.243%) but then divides that annual rate by 365 (simple daily rate) instead of properly compounding it down to a daily rate via (1+8.243%)^(1/365)−1. This gives FRW26,489.
- C. FRW16,655; Repeats the same simple-daily-rate error as option A, and also omits the FRW10,000 lower cash limit from the return-point formula, reporting only the spread/3 component (FRW16,655) rather than lower limit + spread/3.

QUESTION 14
Correct answer: C. FRW43.34

Historical Growth from Year to 5

G= $\sqrt[n]{\frac{Dividend\ for\ Year\ 5}{Dividend\ for\ Year\ 1}}$ **-1** **G=** $\sqrt[4]{\frac{2.85}{1.80}}$ **-1= 12.17%**

Dividend Growth	
Historical Growth (1 to 5)	12.17%
Year (6 to 7) for Future Dividend	15%
Year 8 (Simple Average of simple average of 15% and the long-run growth rate 12.17%)	13.59%
Year 9 onward	12.17%

Three-Stage Dividend Discount Model		HISTORICAL Dividend					Year 6	Year 7	Year 8
Year		1	2	3	4	5	1	2	3
Expect Future Dividend		1.80	2.05	2.25	2.50	2.85	3.28	3.77	4.28
DF	20%						0.833	0.694	0.579
PV future Dividend							**2.731**	**2.618**	**2.48**

Terminal Value $= \frac{D8\,(1+g)}{Ke-G}$

PV Total Cash Flow from 6 to 8			**7.83**
Terminal Value			
Dividend @ 9 Year		4.80	
Expected Return	20%		
Year 9 onward	12.17%		
Expected Return - Growth from Year 9 Onward		7.83%	
Terminal Value		**61.33**	
Discount Factor at Year 8 to GET PV		0.579	
PV of Terminal Value			35.49
Total Market Value of Dividend			43.32

Why the other options are incorrect:

- A. FRW43.41; Uses the simple arithmetic average of the four annual dividend growth rates (Years 1 to 5) instead of the compound (geometric) growth rate as the long-run rate. The two rates are very close numerically (12.19% vs 12.17%), but using the arithmetic mean is methodologically incorrect for a compound-growth series and gives FRW43.41.
- B. FRW42.87; Treats the model as a two-stage (not three-stage) dividend discount model, skipping the Year-8 transitional growth rate altogether and reverting straight from the 15% high-growth rate to the long-run rate after Year 7. This changes the timing and amount of the terminal-value dividend, giving FRW42.87.
- D. FRW37.42; Discounts the terminal value one period too far — treating it as if it were measured at the end of Year 9 rather than the end of Year 8 (i.e. applying an extra year's discount factor). This materially understates the present value of the terminal value, giving FRW37.42.

QUESTION 15

Correct answer: A.

The absence of any exploitable pattern in past prices is consistent with weak form efficiency, but the continued post-announcement drift is inconsistent with semi-strong form efficiency, since a semi-strong efficient market would impound new information fully and instantly rather than drifting for ten further days, a pattern often called post-earnings-announcement drift.

No exploitable pattern in historical prices supports weak-form efficiency (technical analysis cannot generate abnormal returns).

A truly semi-strong efficient market impounds all publicly available information immediately into price; a ten-day continued drift is evidence against semi-strong efficiency and is a documented anomaly post-earnings-announcement drift.

Why the other options are incorrect:

- B. Confirms strong form efficiency; Strong-form efficiency is specifically about whether even insiders/privileged information users can earn abnormal returns; nothing in the scenario provides evidence about insider trading, so this cannot be concluded from the facts given.
- C. Drift consistent with semi-strong efficiency (two-week window); There is no such concept as an allowed 'two trading week adjustment window' in the semi-strong form definition — semi-strong efficiency requires prices to adjust fully and (near) instantly to new public information, not gradually over ten days.
- D. Contradicts weak form efficiency; Weak-form efficiency is about the absence of predictive patterns in past price data; it does not claim investors earn zero return at all (including the normal required return); it only says technical analysis cannot earn abnormal returns. The absence of a pattern is evidence FOR, not against, weak-form efficiency.

SECTION B

Marking Guide (3 × 10 marks = 30 marks)

Task	Correct answer
Q16a	**D**
Q16b	**B**
Q16c	**A**
Q16d	**D**
Q16e	**D**
Q17a	**A**
Q17b	**C**
Q17c	**D**
Q17d	**B**
Q17e	**A**
Q18a	**B**
Q18b	**A**
Q18c	**D**
Q18d	**C**
Q18e	**A**

QUESTION 16

Q16a) Accounting Rate of Return (average-investment basis)
Correct answer: D. 28.4%

Reducing-balance rate reducing FRW10,000,000 to FRW1,000,000 over 5 years: r = 1 − (0.1) ^(1/5) = 36.90%.

Book values (start, then end of Years 1–5): 10,000,000; 6,309,573; 3,981,072; 2,511,886; 1,584,893; 1,000,000. Average of all 6 = FRW4,231,237.

Average annual accounting profit = 3,000,000 − 1,800,000 (average depreciation) = FRW1,200,000; ARR = 1,200,000/4,231,237 = 28.4%.

Why the other options are incorrect?

- A. 24.6%, Averages only the five opening (start-of-year) book values for Years 1–5 (10,000,000; 6,309,573; 3,981,072; 2,511,886; 1,584,893), omitting the final year-5 closing residual value of FRW1,000,000 from the 6-value average.
- B. 21.8%, Uses the simple straight-line average investment, (Initial + Residual)/2 = (10,000,000+1,000,000)/2 = 5,500,000, instead of correctly averaging the actual reducing-balance book values.
- C. 39.0%, Averages only the five year-end book values (6,309,573 through 1,000,000), omitting the initial FRW10,000,000 book value at the start of the project from the average.

Q16b) Net-of-tax total shareholder return
Correct answer: B. 18.9%

Dividend per share = 10% × FRW65 par value = FRW6.50; net of 15% withholding tax = FRW5.525.

Capital gain = 168 − 146 = FRW22. Total return = (5.525+22)/146 = **18.9% of the opening share price.**

Or

Gross dividends: 65*10% =Frw 6.5

Net dividends: 6.5*(1-15%) = Frw 5.525

Capita Gain: 168-146= Frw 22

Total net return: 5.525+22= Frw 27.525

Hence, **Total Shareholder Return= 27.525/146 = 18.85%**

Why the other options are incorrect:

- A. 19.5%, Uses the gross dividend (FRW6.50) rather than the net-of-withholding-tax dividend (FRW5.525): (6.50+22)/146 = 19.5%.
- C. 16.6%, Uses the closing share price (FRW168) rather than the opening share price (FRW146) as the denominator, with the correctly net-of-tax dividend: (5.525+22)/168 = 16.4%, close to the 16.6% shown.
- D. 22.0%, Does not correspond to a single, clearly identifiable calculation error found by testing the standard alternative treatments of the dividend and price bases.

Q16c) Real GDP at the end of the year
Correct answer: A. FRW187.71 billion

Nominal GDP at year end = 180bn × 1.095 = FRW197.1 billion.

Annual inflation from the quarterly rate: (1.01227)^4 − 1 = 4.999%.

Real GDP (end of year) = 197.1bn / 1.04999 = FRW1817.71 billion.

Why the other options are incorrect?

- B. FRW187.88 billion — Annualises the quarterly inflation rate by simple multiplication (4 × 1.227% = 4.908%) instead of compounding it via (1.01227)^4 − 1 = 4.999%, giving a slightly lower deflator and a real GDP of FRW187.88 billion.
- C. FRW188.10 billion — Uses the Fisher approximation (real growth ≈ nominal growth − inflation = 9.5% − 5.0% = 4.5%) rather than the precise compounding relationship (1+nominal)/(1+inflation) − 1, overstating real GDP slightly to FRW188.10 billion.
- D. FRW189.00 billion — Applies the annual inflation rate to the starting nominal GDP as if it alone represented the real GDP relationship (180bn × 1.05 = 189.00bn), effectively ignoring the actual 9.5% nominal GDP growth figure given in the question.

Q16d) Net treasury bill interest
Correct answer: D. FRW28,955

FV = 500,000 × (1 + 0.08/365) ^270 = FRW530,479. Gross interest = FRW30,479.

Net of 5% withholding tax = 30,479 × 0.95 **= FRW28,955.**

Why the other options are incorrect:

- A. FRW30,479 — This is the gross interest earned before withholding tax; it forgets to deduct the 5% withholding tax that applies to the interest income.

- B. FRW29,369 — Uses a 360-day year convention for the daily compounding instead of the 365-day year specified in the question, which changes the effective daily rate and slightly understates the interest earned.
- C. FRW28,110 — Uses simple interest (P × rate × days/365) instead of daily compounding over the 270-day holding period, which understates the interest earned relative to the correct compounding method.

Q16e) Shortage in the packaging input market

Correct answer: D. 16,000 units

Item	**Price used**	**Quantity (000s)**
Consumer price	70+3=73	
Quantity demanded	1,200−8(73)	**616**
Supplier price	70+5=75	
Quantity supplied	−300+12(75)	**600**
Shortage		**16,000 units**

Why the other options are incorrect:

- A. 40,000 units — Ignores the FRW3 sales tax on the consumer side, using the ceiling price alone (70) for demand: Qd = 1,200−8(70) = 640; with supply correctly at 600, the shortage becomes 640−600 = 40 thousand units.
- B. 60,000 units — Does not correspond to a single, cleanly identifiable calculation error found among the standard combinations of applying/omitting the tax and subsidy to each side of the market.
- C. 76,000 units — Ignores the FRW5 production subsidy on the supplier side, using the ceiling price alone (70) for supply: Qs = −300+12(70) = 540; with demand correctly at 616, the shortage becomes 616−540 = 76 thousand units.

QUESTION 17
Q17a) IRR by linear interpolation

Correct answer: A. 15.4%

NPV when Discounting Factor equal to 15%

Year		0	1	2	3	4	5
Initial Investment		**(380,000)**					
Net Operating Cash Flow		**(380,000)**	**80,000**	**100,000**	**120,000**	**140,000**	**160,000**
Discount Factor	15%	1.000	0.870	0.756	0.658	0.572	0.497
Present Value		**(380,000)**	**69,565**	**75,614**	**78,902**	**80,045**	**79,548**
Net Present Value		**3,675**					

NPV when Discounting Factor equal to 20%

Year		0	1	2	3	4	5
Initial Investment		**(380,000)**					
Net Operating Cash Flow		**(380,000)**	**80,000**	**100,000**	**120,000**	**140,000**	**160,000**
Discount Factor	20%	1.000	0.833	0.694	0.579	0.482	0.402
Present Value		**(380,000)**	**66,667**	**69,444**	**69,444**	**67,515**	**64,300**
Net Present Value		**(42,629)**					

$$\textbf{IRR= LDF} + \frac{\text{NPV @ LDF}}{\text{NPV @ LDF} - \text{NPV @ HDF}} (\text{HDF} - \text{LDF})$$

$$\textbf{IRR= 15\%} + \frac{\mathbf{3{,}756}}{\mathbf{3{,}756 - (-42{,}629)}} \textbf{(20\% – 15\%) =15.4\%}$$

Why the other options are incorrect:

- B. 17.6%; Does not reproduce from the correct NPVs at 15% and 20% under standard interpolation-formula errors tested (e.g. swapped numerator, or anchoring from the 20% end with an incorrect sign); the correct interpolation from the two NPVs given is the only value consistent with the data.
- C. 19.9% As above not reproducible from a single clean variant of the interpolation formula; substituting this rate into the discounted cash flows does not give an NPV close to zero, confirming it is inconsistent with the project's cash flow profile.
- D. 20.9% As above well beyond the range where the NPV changes sign (between 15% and 20%), and is inconsistent with the given NPVs at those two rates.

Q17b) Lease vs buy (PV comparison)
Correct answer: C. Buying is cheaper than leasing by FRW34,921

Lease vs Buy, Present Value Comparison

Year			1	2	3	4
Lease Rental Payment		`	**(135,000)**	**(135,000)**	**(135,000)**	**(135,000)**
Maintenance Cost	5%		**(10,000)**	**(10,500)**	**(11,025)**	**(11,576)**
Non-Refundable deposit		**(50,000)**				
Total Cost		**(50,000)**	**(145,000)**	**(145,500)**	**(146,025)**	**(146,576)**
Discount Factor (8%)	8%	1.000	0.926	0.857	0.794	0.735
PV of Lease Rental Cost		**(50,000)**	**(134,259)**	**(124,743)**	**(115,919)**	**(107,738)**
Total PV of Lease Rental Cost		**(532,659)**				

		BUY DECISION				
Year		0	1	2	3	4
Cost of Machine		**(450,000)**				
Maintenance Cost				**(20,000)**	**(20,000)**	**(20,000)**
Total Purchase Cost		**(450,000)**	**0**	**(20,000)**	**(20,000)**	**(20,000)**
Discount Factor (8%)	8%	1.000	0.926	0.857	0.794	0.735
Present Value of Purchase		**(450,000)**	**0**	**(17,147)**	**(15,877)**	**(14,701)**
Total PV of Purchase Cost		**(497,724)**				

Difference = 532,659 − 497,724 = FRW34,935

Why the other options are incorrect?

- A. Buying cheaper by FRW32,520, Uses a flat FRW10,000 lease maintenance cost every year, ignoring the 5% annual escalation specified in the question, while otherwise treating the deposit and warranty exemption correctly. The lower (unescalated) lease maintenance cost narrows the gap to FRW32,520.
- B. Buying cheaper by FRW16,401, Correctly escalates the lease maintenance cost but incorrectly includes the buy-option's FRW20,000 maintenance from Year 1 onward, ignoring the stated manufacturer's warranty exemption in Year 1. This raises the buy-side cost and narrows the gap to FRW16,401.
- D. Leasing cheaper by FRW15,079, Omits the FRW50,000 non-refundable lease deposit from the lease PV calculation entirely. Removing this substantial upfront cost flips the conclusion, making leasing appear FRW15,079 cheaper than buying instead of more expensive.

Q17c) TERP and placing disadvantage
Correct answer: D.

TERP = FRW33.88; a placing would dilute existing shareholders' proportional ownership since the new shares are not offered to them pro-rata, whereas the rights issue preserves it.

Theoretical Ex-Rights Price (TERP)
4,500,000 shares @ FRW35.80; 3-for-10 rights issue @ FRW27.50.
TERP = (Value of shares held before + Value of new shares subscribed) / Total shares after issue

	Number Of shares	Value of share	Total Value of share
Ordinary share Before Right issue	4,500,000	35.8	161,100,000
Right issue share	1,350,000	27.5	37,125,000
Total	**5,850,000**		**198,225,000**
TERP			**33.88**

TERP = FRW33.88; a placing dilutes existing shareholders' proportional ownership, whereas a rights issue preserves it

A placing is not offered pro-rata to existing shareholders, so it dilutes their proportional ownership; a rights issue preserves it — the key disadvantage of a placing.

Why the other options are incorrect:

- A. TERP = FRW31.65 (+ correct placing reasoning) The TERP figure of FRW31.65 is simply the arithmetic average of the cum-rights market price (35.80) and the rights issue price (27.50) a common shortcut that does not correctly weight the two prices by the number of shares involved, rather than the proper value-weighted TERP formula.
- B. TERP = FRW29.42 (+ correct placing reasoning) Arises from inverting the rights ratio — treating the offer as 10 new shares for every 3 held, instead of the correct 3 new shares for every 10 held which issues far more shares at the discounted price and pulls the TERP down to FRW29.42.
- C. TERP = FRW33.88 (+ incorrect placing reasoning) The TERP figure is correct, but the accompanying statement that a placing must always be priced at a smaller discount to the market price than a rights issue is not a general rule of capital-raising; the true key disadvantage of a placing is the dilution of existing shareholders' proportional ownership, which this option fails to identify.

Q17d) After-tax cost of debt
Correct answer: B. 9.2%

After-Tax Cost of Redeemable Debt (IRR method)

FRW3,200,000 nominal loan notes;
After Tax coupon 8% (Yr1-2), = (100 *8%) * (1-28%) = 5.76 per annum
coupon 10% (Yr3-5); = (100 *10%) * (1-28%) = 7.2
redeemed at 105 (end Yr5);
market price 93;
tax 28%.

Year		0	1	2	3	4	5
Market Value of Debt		**(93)**					
Coupon received			**5.76**	**5.76**	**7.2**	**7.2**	**7.2**
Redemption Value							**105.0**
Total Cashflow		**(93)**	**5.76**	**5.76**	**7.20**	**7.20**	**112.20**
Discount Factor (8%)	8%	1.000	0.926	0.857	0.794	0.735	0.681
Net Present Value of Cashflow		(93)	5.33	4.94	5.72	5.29	76.36
Net PV of Total Cashflow		**4.64**					

Total Cashflow		**(93.00)**	**5.76**	**5.76**	**7.20**	**7.20**	**112.20**
Discount Factor (10%)	10%	1.000	0.909	0.826	0.751	0.683	0.621
PV of		**(93.00)**	**5.24**	**4.76**	**5.41**	**4.92**	**69.67**
Net PV of Total Cashflow		**(3.01)**					

$$\textbf{IRR= LDF} + \frac{\text{NPV @ LDF}}{\text{NPV @ LDF} - \text{NPV @ HDF}} (\text{HDF} - \text{LDF})$$

$$\textbf{IRR= 8\%} + \frac{4.64}{4.64-(-3.01)} (10\% - 8\%) = 9.2\%$$

Why the other options are incorrect:

- A. 8.3%: Uses the par redemption value (FRW100) instead of the FRW105 premium redemption specified for Year 5, understating the total return to bondholders and hence the cost of debt to the company.
- C. 8.4%: Uses a flat 8% coupon rate throughout all five years, ignoring the specified step-up to 10% in Years 3–5. The lower assumed coupon understates the true after-tax cost of debt.
- D. 7.4%: Uses the par value (FRW100) as the current market price instead of the loan notes' actual trading price of FRW93. Since the bonds trade below par, using the higher par price as the 'cost' of the investment understates the yield investors actually require, and hence the cost of debt.

Q17e) Change in market-value gearing after IFRS 16 capitalisation
Correct answer: A. Increases by 6.1 percentage points

Impact of IFRS 16 Lease Capitalization on Gearing
Equity FRW130m; Debt FRW42m (excludes FRW15m lease liabilities to be capitalized under IFRS 16).

- ✓ Market-value gearing = Debt / (Debt + Equity)
- ✓ Before Capitalization (pre-IFRS16) gearing = 42 / (42+130) = 42/172 = **24.42%**
- ✓ After Capitalization (post-IFRS16) **debt = 42+15 = 57**m; gearing = 57 / (57+130) = 57/187 = **30.48%**
- ✓ **Change = 30.48% − 24.42% = 6.06% round to 6.1%, an INCREASE**

Why the other options are incorrect:

- B. 3.8 percentage points; Appears consistent with only partially capitalizing the FRW15 million lease liability (broadly around 60% of its full value) rather than adding the full amount to debt, which understates the increase in gearing.
- C. 11.5 percentage points; Computes the change on a debt-to-equity (D/E) basis, 15/130 = 11.5%, rather than the standard debt-to-total-capital (D/(D+E)) gearing measure the question calls for, which overstates the apparent change.
- D. Decreases by 2.0 percentage points; Adds the FRW15 million lease liability to the equity base instead of the debt base the opposite of what IFRS 16 capitalization actually requires which produces a (incorrect) fall in the calculated gearing ratio.

QUESTION 18
Q18a) Cash conversion cycle
Correct answer: B. 49 days

VAT Exclusive for:

1. Purchases excl. VAT = 6,200,000/1.18 = FRW5,254,237;
2. Credit sales excl. VAT = 17,228,000/1.18 = FRW14,600,000

Inventory Days (Raw Material) = $\frac{\text{Averages Raw Material inventory}}{\text{Annual Purchase}} * 365 \text{ days} = \frac{620,000}{5,254,237} * 365 \text{ days} = 43.07 \text{ days}$

Inventory Days (Work In progress) = $\frac{\text{Averages WIP}}{\text{Cost of sales}} * 365 \text{ days} = \frac{\mathbf{410,000}}{\mathbf{9,125,000}} * 365 \text{ days} = 16.40$ days

Inventory Days (Finished Goods) = $\frac{\text{Averages inventory}}{\text{Cost of sales}} * 365 \text{ days} = \frac{\mathbf{430,000}}{\mathbf{9,125,000}} * 365 \text{ days} =$ 76.67 days

Account receivable Days= $\frac{\text{Trade Receivables}}{\text{Credit sales revenue}} * 365 \text{ days} = \frac{[(\mathbf{1,650,000+1,950,000})/2]}{\mathbf{14,600,000}} * 365 \text{ days} = 45 \text{ days}$

Account payable days= $\frac{\text{Average trade payables}}{\text{Purchase or cost of sale}} * 365 \text{ days} = \frac{\left[\frac{\mathbf{980,000+1,120,000}}{\mathbf{2}}\right]}{\mathbf{5,254,237}} * 365 \text{ days} =$ 72.94 days

CCC = Raw Material days + WIP days + Finished Goods days + Receivables days − Payables days
Cash conversion Cycle = 76.67 + 45.0 − 72.94= 49 days

Why the other options are incorrect?

- A. 48 days, Consistent with rounding the correct 48.7-day result down to the nearest whole day (truncation) rather than to the nearest whole day (which rounds up to 49).
- C. 53 days Uses the VAT-inclusive receivables and payables figures directly (FRW17,228,000 and FRW6,200,000) instead of stripping out the 18% VAT first, while correctly keeping the inventory-day calculations on a purchases/COGS basis. This gives a cash conversion cycle of approximately 53 days.
- D. 42 days, Does not correspond to a single, cleanly identifiable error found among the standard alternative treatments of the inventory-stage bases (purchases vs. COGS) tested.

QUESTION 18 B) answer was **A**

Net Annual Benefit of Factoring

Receivables=FRW2,400,000;
80% advance;
fee 2.5%;
interest 13% nominal p.a. compounded monthly, for 50 days; saves FRW48,000 credit-control cost; eliminates bad debts (1.5% of credit sales excl. VAT).

Net benefit = (Bad debts saved + Credit-control cost saved) − (Factor's fee + Interest on funds advanced)

Benefit of Factoring

1. Credit sales excl. VAT = 17,228,000/1.18 = FRW14,600,000
2. Bad debts saved = 1.5% × 14,600,000 (credit sales excl. VAT) = FRW219,000
3. Total benefits = 219,000 + 48,000(credit control saved) = **FRW 267,000**

Cost of Factoring

1. Factor's fee = 2.5% × 2,400,000 **= FRW 60,000**
2. Amount advanced = 80% × 2,400,000 = FRW1,920,000
3. Monthly rate = 13%/12 = 1.0833%;
4. Interest= Amount advanced×[(1+0.1380)^50/365 −1]= 13.80%
5. Interest for 50 days = 1,920,000 × 13.80%= FRW **34,310**
6. **Total costs = 60,000 + 34,310 = FRW94,310**

Net annual benefit = 267,000 − 94,310= **FRW172,689**

Why the other options are incorrect?

- A. FRW172,808 net benefit Calculates the interest cost on the advance using Simple Interest of 13%.
- C. FRW164,111 net benefit Correctly bases the factoring fee on the full receivables value (FRW2,400,000), but calculates the interest cost on the full receivables balance (rather than just the 80% advance actually funded by the factor) using monthly compounding, substantially overstating the financing cost.
- D. FRW184,689 net benefit Bases the factoring fee on the 80% advance amount (FRW1,920,000) rather than the total value factored (FRW2,400,000) — understating the fee combined with a monthly-compounded interest calculation, together giving a net benefit of FRW184,689.

Q18c) Why the monthly cash budget is more useful than the annual profit forecast

Correct answer: D.

The cash budget shows exactly which month the FRW3,200,000 shortfall occurs in, and that this shortfall exceeds the current overdraft limit. The profit forecast gives only one total figure for the whole year and cannot reveal either the timing or the size of the financing gap, even though the year as a whole is profitable.

Profit is an accruals measure and says nothing about the timing of cash receipts and payments within the year; a company can be profitable overall yet run out of cash in a specific month if outflows are front-loaded.

Only the monthly cash budget reveals the month, size, and that the shortfall breaches the existing overdraft limit — information the bank needs to size and time any additional facility.

Why the other options are incorrect:

- A. Depreciation-based, non-cash, self-reversing deficit — There is no basis in the scenario for treating the shortfall as a depreciation-driven, non-cash item — the deficit relates to

fitting out and stocking new stores, which are genuine cash outflows (capital expenditure and inventory purchases), not accounting depreciation.

- B. IAS 7 requires monthly cash flow disclosure — IAS 7 (Statement of Cash Flows) requires an annual cash flow statement in the published financial statements, not a monthly breakdown — the bank genuinely needs a separate, forward-looking monthly cash budget that published accounts would not provide.
- C. Profitability means timing doesn't matter — This is the precise misconception the question is testing: a business can be profitable for the year as a whole while still facing a cash shortfall in a specific month that exceeds its available financing — profit and cash timing are not the same thing.

Q18d) Dividend cover
Correct answer: C. 1.21 times

- ✓ Ordinary Share available at start= 5,600,000 shares
- ✓ 1-for-20 bonus (1 April) = $\frac{5{,}600{,}000 \text{ shares}}{20}$ * 1= 280,000 share
- ✓ Shares after bonus (1 Apr) = 5,600,000 +280,000 share = 5,880,000 share
- ✓ Shares after scrip issue (1 Oct) = 5,880,000 + 400,000 = 6,280,000 shares
- ✓ Net profit FRW18,000,000.

1. Dividend cover = $\frac{\text{Net profit after tax}}{\text{Total ordinary dividends}}$ or $\frac{\text{EPS}}{\text{DPS}}$ or
2. Interim dividend = 5,880,000 × 0.60 = FRW3,528,000 (paid on post-bonus, pre-scrip base)
3. Final dividend = 6,280,000 × 1.80 = FRW11,304,000 (paid on full year-end share count)
4. Total dividends = 3,528,000 + 11,304,000 = FRW14,832,000
5. **Dividend cover = 18,000,000 / 14,832,000 = 1.21 times**

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Why the other options are incorrect:

- A. 1.25 times Forgets to apply the 1-for-20 bonus issue to the share count, using the original 5,600,000 shares plus only the October scrip shares (6,000,000 in total) for both dividends, giving total dividends of 6,000,000 × 2.40 = FRW14,400,000 and a cover of 1.25 times.
- B. 1.27 times Uses the interim share count (5,880,000, i.e. after the bonus but before the October scrip issue) for BOTH the interim and final dividend calculations, instead of correctly using the fuller 6,280,000 share count for the final dividend, understating total dividends to FRW14,112,000.
- D. 1.32 times Does not correspond to a single, cleanly identifiable error found among the standard alternative share-count treatments tested for the interim/final dividend bases.

Q18e) Additional shares from the scrip dividend election

Correct answer: A. 465 shares

Additional Shares Under Scrip Dividend Election

- ✓ Shareholder held 4,300 shares before the April bonus;

- ✓ elects to take their FULL YEAR cash dividend entitlement as scrip, at a 3% discount to the FRW24 share price.
- ✓ Additional shares = Total cash dividend entitlement (interim+final) / Scrip issue price
- ✓ Shares after bonus of 1 for 20 share= 4,300 × 1.05 = 4,515 shares (this shareholder's entitlement base for both interim and final dividends)
- ✓ Total dividend entitlement = 4,515 × (0.60+1.80) = 4,515 × 2.40 = **FRW10,836**
- ✓ Scrip issue price = 24 × (1−0.03) = FRW23.28

Additional shares = FRW 10,836 / 23.28= 465.5 share

Why the other options are incorrect:

- B. 452 shares Applies the bonus issue correctly (4,515 shares) but calculates the scrip price without the 3% discount (using the flat FRW24 market price instead of FRW23.28), understating the number of new shares issued to 452.
- C. 443 shares Forgets to apply the 1-for-20 bonus issue, using the shareholder's original 4,300-share holding (rather than the post-bonus 4,515 shares) with the correctly discounted scrip price, giving 443 shares.
- D. 432 shares Does not correspond to a single, cleanly identifiable error; it is close to (but not exactly reproducible from) both the 'no bonus' and 'no discount' variants tested together, suggesting a compounding of minor rounding differences.

SECTION C

QUESTION 19

Marking Guide

Sub question	Details	Total Marks
(a)	Correctly inflating selling Revenue nominal (money) terms for each year **(0.5 March Each Maximum, 2 Marks)**	2
	Correct inflating variable cost, for each year **(0.5 March Each Maximum, 2 Marks)**	2
	Correct inflating Fixed cost, for each year **(0.5 March Each Maximum, 2 Marks)**	2
	Correct tax payable at 28%, correctly lagged one year in arrears	1
	Correct tax Saving on Capital allowance lagged one year in arrears	1
	Initial Investment	0.5
	Correct incremental working capital introduced at the start of each relevant year (10% of following year's revenue growth)	2
	Salvage value	0.5
	Correct money (nominal) discount rate via the Fisher formula (1.10 x 1.05 - 1 = 15.5%) and correct discounting of all cash flows	0.5
	Correct final NPV figure (FRW124,478) with a clearly stated accept/reject conclusion	0.5
Subtotal (a)		**12**
(b)	Correct NPV recalculated at 25% (FRW80,927)	0.5
	Correct linear interpolation between the 15.5% rate from (a) and 25%, giving IRR (21.3%)	0.5
Subtotal (b)		**1**
	Correct identification of the year in which the cumulative discounted cash flow turns positive	1
	Correct interpolation within that year to months (3 years 7 months)	1
Subtotal (c)		**2**
(d)	Correct weights and individual costs of capital (including after-tax cost of debt: 9% x (1-0.28) = 6.48%)	2
	Correct weighted average calculation (13.2%)	1
Subtotal (d)		**3**
(e)	One valid, well-explained limitation of NPV, well-explained limitation of IRR	1
	with a reasoned view on which technique is more reliable for KML	1
Subtotal (e)		**2**
TOTAL		**20**

Detailed Model Answer

Approach: because selling price, variable cost and fixed overheads are each expected to inflate at different rates, the cash flows are inflated year by year in nominal (money) terms and discounted using the money discount rate. Money rate = (1 + real rate)(1 + general inflation) - 1 = (1.10 x 1.05) - 1 = 15.5%. This 15.5% rate is the discount factor obtained in part (a) and is carried forward into parts (b) and (c) as instructed.

(a) Net Present Value (NPV)

Step 1: Inflate selling price, variable cost and fixed overheads to nominal terms:

Year	Selling price/unit (FRW)	Variable cost/unit (FRW)	Fixed overheads (FRW)
1	620 x 1.07 = 663.40	280 x 1.05 = 294.00	45,000 x 1.06 = 47,700
2	620 x 1.07^2 = 709.84	280 x 1.05^2 = 308.70	45,000 x 1.06^2 = 50,562
3	620 x 1.07^3 = 759.53	280 x 1.05^3 = 324.14	45,000 x 1.06^3 = 53,596
4	620 x 1.07^4 = 812.69	280 x 1.05^4 = 340.34	45,000 x 1.06^4 = 56,811

Step 2: Operating cash flow before tax and capital allowances each year (units: 800 in Year 1, 1,000 in Years 2-4):

Year	Revenue (FRW)	Total variable cost (FRW)	Fixed overheads (FRW)	Operating cash flow (FRW)
1	663.40 x 800 = 530,720	294.00 x 800 = 235,200	47,700	247,820
2	709.84 x 1,000 = 709,838	308.70 x 1,000 = 308,700	50,562	350,576
3	759.53 x 1,000 = 759,527	324.14 x 1,000 = 324,135	53,596	381,796
4	812.69 x 1,000 = 812,694	340.34 x 1,000 = 340,342	56,811	415,541

Step 3: Capital allowances (25% reducing balance) and the balancing charge on disposal:

Year	WDV b/f (FRW)	Allowance (FRW)	WDV c/f (FRW)
1	900,000	225,000	675,000
2	675,000	168,750	506,250
3	506,250	126,563	379,688
4 (disposal)	379,688	Balancing charge = 420,000-379,688 = 40,313	-

(A balancing charge of FRW40,313 arises because the FRW420,000 disposal proceeds exceed the FRW379,688 tax written-down value; this charge is added to Year 4's taxable profit. Total net allowances over the project = 225,000+168,750+126,563-40,313 = FRW480,000, which equals cost FRW900,000 less proceeds FRW420,000, confirming consistency.)

Step 4: Taxable profit and tax payable (28%, paid one year in arrears):

Year	Op. cash flow (FRW)	Capital allowance/(charge) (FRW)	Taxable profit (FRW)	Tax @28% (FRW)	Tax paid in year
1	247,820	225,000	22,820	6,390	2
2	350,576	168,750	181,826	50,911	3
3	381,796	126,563	255,233	71,465	4

Year	Op. cash flow (FRW)	Capital allowance/(charge) (FRW)	Taxable profit (FRW)	Tax @28% (FRW)	Tax paid in year
4	415,541	(40,313)	455,853	127,639	5

Step 5: Incremental working capital (10% of the following year's projected sales revenue, introduced at the start of the year to which it relates; full closing balance recovered at end of Year 4):

Point in time	Working capital movement (FRW)
Start of Year 1 (T0)	10% x 530,720 = 53,072 (invested)
Start of Year 2 (T1)	10% x (709,838-530,720) = 17,912 (invested)
Start of Year 3 (T2)	10% x (759,527-709,838) = 4,969 (invested)
Start of Year 4 (T3)	10% x (812,694-759,527) = 5,317 (invested)
End of Year 4 (T4)	Full closing balance of 10% x 812,694 = 81,269 (recovered)

Step 6: Net cash flows and NPV at the money discount rate of 15.5%:

Time	0	1	2	3	4	5
Machinery cost	(900,000)	-	-	-	-	-
Operating cash flow	-	247,820	350,576	381,796	415,541	-
Disposal proceeds	-	-	-	-	420,000	-
Working capital	(53,072)	(17,912)	(4,969)	(5,317)	81,269	-
Tax	-	-	(6,390)	(50,911)	(71,465)	(127,639)
Net cash flow	(953,072)	229,908	339,218	325,568	845,344	(127,639)
Discount factor @15.5%	1.000	0.866	0.750	0.649	0.562	0.487
Present value	(953,072)	199,055	254,281	211,298	475,013	(62,097)

NPV = -953,072+199,055+254,281+211,298+475,013-62,097 = FRW124,478 (positive).

Conclusion: Since the NPV is positive (approximately FRW124,478), the project is expected to increase shareholder wealth and should be ACCEPTED.

Tabula Format

Year		0	1	2	3	4	5
Sale REVENUE			530,720	709,838	759,527	812,694	
Variable Cost			(235,200)	(308,700)	(324,135)	(340,342)	
Contribution			**295,520**	**401,138**	**435,392**	**472,352**	
Fixed Costs			(47,700)	(50,562)	(53,596)	(56,811)	
Profit Before Tax			**247,820**	**350,576**	**381,796**	**415,540**	
Tax	28%			(69,390)	(98,161)	(106,903)	(116,351)
After-Tax Profit			**247,820**	**281,186**	**283,635**	**308,637**	**(116,351)**
Add: Tax Saving				63,000	47,250	35,438	-11,288
Operating Cashflow			**247,820**	**344,186**	**330,885**	**344,075**	**(127,639)**
Initial Investment		**(900,000)**					
Working Capital		**(53,072)**	**(17,912)**	**(4,969)**	**(5,317)**	**81,269**	
Salvage Value						420,000	
Net Cash Flow		**(953,072)**	**229,908**	**339,218**	**325,568**	**845,344**	**(127,639)**
Discount Factor	15.50%	1.000	0.86580	0.750	0.649	0.562	0.487
Present Value		**(953,072)**	**199,055**	**254,281**	**211,298**	**475,013**	**(62,097)**
Net Present Value		**124,478**					

NPV When Candidate round Discounting Factor to Nearest Number (16%)

Discount Factor	16%	1.000	0.862	0.743	0.641	0.552	0.476
Present Value		**(953,072)**	**198,197**	**252,094**	**208,578**	**466,876**	**(60,770)**
Net Present Value		**111,902**					

Year	Cost/ RB	Depr Rate	Depreciation / CA	Tax rate	Tax saving
1	900,000	25%	225,000	28%	63,000
2	675,000	25%	168,750	28%	47,250
3	506,250	25%	126,563	28%	35,438
4	379,688	25%	-40,313	28%	-11,288
Salvage Value	420,000				
Reducing Balance	**-40,313**				

Working 1

Year		0	1	2	3	4
Unit sold			**800**	**1,000**	**1,000**	**1,000**
Selling Price Per Unit	7%	620	663.40	709.84	759.53	812.69
Sale REVENUE			**530,720**	**709,838**	**759,527**	**812,694**

Working 2

Year		0	1	2	3	4
Unit sold			**800**	**1,000**	**1,000**	**1,000**
VC Per Unit	5%	280	294	315	337	360
Variable Cost			**235,200**	**314,580**	**336,601**	**360,163**

Working 3

Year		0	1	2	3	4
Incr. FIXED COST	**6%**	**45,000**	**47,700**	**50,562**	**53,596**	**56,811**

Working 4

Year		0	1	2	3	4
Working Capital	**10%**	0	**53,072**	**70,984**	**75,952.67**	**81,269**
Incr. in Working Capital		**53,072**	**17,912**	**4,969**	**5,317**	**81,269**

By Using Fisher Formula	(1+r) = (1+r)* (1+i)		
Real Cost of Capital	**10%**	1.10	
General Inflation Rate	**5%**	1.05	
Normal Rate			**15.5%**

(b) IRR by linear interpolation, using the discount rate from (a) [15.5%] and 25%

Net Cash Flow		(953,072)	229,908	339,218	325,568	845,344	(127,639)
Discount Factor (13%)	25%	1.000	0.800	0.640	0.512	0.410	0.328
Present Value		(953,072)	183,927	217,099	166,691	346,253	(41,825)
Net Present Value		(80,927)					

IRR= LDF + $\frac{\text{NPV @ LDF}}{\text{NPV @ LDF} - \text{NPV @ HDF}}$ (HDF – LDF), **IRR= 15.5% +** $\frac{124{,}478}{124{,}478 + 80{,}927}$ **(25% – 15.5%) = 21.3%**

IRR When Candidate round Discounting Factor to Nearest Number (16%), IRR= 16% + $\frac{111{,}902}{111{,}902 + 80{,}927}$ **(25% – 16%) = 21.22%**

Note: linear interpolation over this wide a range gives only an approximation - the IRR obtained by iterative/exact calculation is approximately 20.9% - but 21.3% is the figure expected from the interpolation method specified in the question, using the 15.5% and 25% discount rates. Either way, the IRR clearly exceeds KML's 15.5% money cost of capital, confirming the accept decision reached in part (a).)

(c) Discounted payback period, using the discount rate from (a) [15.5%]

Using the discounted cash flows from the NPV table above, the cumulative discounted cash flow is:

Time (Year)	Discounted cash flow (FRW)	Cumulative (FRW)
0	(953,072)	(953,072)
1	199,055	(754,017)
2	254,281	(499,736)
3	211,298	(288,438)
4	475,013	186,575

The cumulative discounted cash flow turns positive during Year 4.

Discounted payback Period = **3year** + $\frac{\mathbf{288{,}438}}{\mathbf{475{,}013}} * 12$ Months = **3 Year and 7 Months**

(d) Weighted Average Cost of Capital (WACC)

Source of finance	Market value (FRW)	Weight	Cost	Weighted cost
Ordinary shares	7,500,000	0.682	16.00%	10.91%
Preference shares	1,000,000	0.091	9.00%	0.82%
Loan notes (after tax: 9% x (1-0.28) = 6.48%)	2,500,000	0.227	6.48%	1.47%
Total / WACC	11,000,000	1.000	-	13.20%

KML's Weighted Average Cost of Capital (WACC) is approximately 13.2% per year.

(e) One limitation each of NPV and IRR, and advice to the directors

- NPV limitation: NPV requires an accurate discount rate (cost of capital) to be identified in advance; using an incorrect rate, or applying the company's average cost of capital to a project of different risk, can lead to a wrong accept/reject decision even when the cash flow forecasts themselves are sound.

- IRR limitation: IRR can give misleading or multiple results for projects with non-conventional cash flows (where the cash flow sign changes more than once). KML's project has this feature - an outflow at Time 0, inflows in Years 1-4, and a further outflow (the arrears tax payment) at Time 5 - so the single IRR calculated above should be interpreted with some caution.

Advice: NPV is generally the more reliable and theoretically sound technique because it directly measures the increase in shareholder wealth in monetary terms, is consistent with the objective of maximising shareholder wealth, and does not suffer from the multiple/undefined IRR problem that can arise with non-conventional cash flows such as this project's. The directors of KML should treat the positive NPV of approximately FRW124,478 as the primary basis for accepting the project, using the IRR as supporting information only.

QUESTION 20

Marking Guide

Subquestion	Details	Total Marks
(a)	Correct raw materials period	1
	Correct work-in-progress period	1
	Correct finished goods period	1
	Correct receivables collection period	1
	Correct payables payment period	1
	Correct cash conversion cycle formula and final figure (51.4 days)	1
Subtotal (a)		**6**
(b)	Correct EOQ formula and computation (775 units)	1.5
	Correct lead-time usage computation	0.5
	Correct safety stock computation	0.5
	Correct reorder level (1,447 units)	1.5
Subtotal (b)		**4**
(c)	Correct cost of equity via CAPM (14.0%)	2
	Correct dividend growth rate (9.33%)	1
	Correct application of the Dividend Growth Model formula	0.5
	Correct final theoretical share value (FRW70.25)	0.5
Subtotal (c)		**4**
(d)	Correct total dividends for the year (FRW24,000,000)	0.5
	Correct dividend cover (1.73 times)	0.5
	Correct dividend payout ratio (57.7%)	0.5
	Correct dividend yield (9.2%)	0.5
Subtotal (d)		**2**
(e)	Any three relevant, well-explained factors influencing dividend policy (1 mark each)	3
	Reasoned advice on the sustainability of NTL's current payout, referencing the figures calculated in (d)	1
Subtotal (e)		**4**
TOTAL		**20**

Detailed Model Answer

(a) Inventory days, receivables/payables periods and cash conversion cycle

Inventory Days (Raw Material) = $\frac{\text{Averages Raw Material inventory}}{\text{Annual Purchase}} * 365 \text{ days} = \frac{\mathbf{520{,}000}}{\mathbf{6{,}200{,}000}} * 365 \text{ days} = 30.6 \text{ days}$

Inventory Days (Work In progress) = $\frac{\text{Averages WIP}}{\text{Cost of sales}} * 365 \text{ days} = \frac{\mathbf{340{,}000}}{\mathbf{9{,}125{,}000}} * 365 \text{ days} = 13.6$ days

Inventory Days (Finished Goods) = $\frac{\text{Averages inventory}}{\text{Cost of sales}} * 365 \text{ days} = \frac{\mathbf{600{,}000}}{\mathbf{9{,}125{,}000}} * 365 \text{ days} =$ 24 days

Account receivable Days= $\frac{\text{Trade Receivables}}{\text{Credit sales revenue}} * 365 \text{ days} = \frac{\mathbf{1{,}800{,}000}}{\mathbf{14{,}600{,}000}} * 365 \text{ days} = 45 \text{ days}$

Account payable days= $\frac{\text{Average trade payables}}{\text{Purchase or cost of sale}} * 365 \text{ days} = \frac{\mathbf{1{,}050{,}000}}{\mathbf{6{,}200{,}000}} * 365 \text{ days} = 62 \text{ days}$

Summary

Item	**Calculation**	**Days**
Raw materials period	520,000/6,200,000 x 365	30.6
Work-in-progress period	340,000/9,125,000 x 365	13.6
Finished goods period	600,000/9,125,000 x 365	24.0
Receivables collection period	1,800,000/14,600,000 x 365	45.0
Payables payment period	1,050,000/6,200,000 x 365	61.8

Cash conversion cycle

Inventory days **(The average time that raw materials remain in inventory)**	30.6 days
Plus: **The time taken to produce the goods**	13.6 days
Plus: Time taken for Finished Good in stock before sold out	24 days
Plus: Account receivable days **(The time taken by customers to pay for the goods)**	45 days
Less: account payable days **(the time taken to pay suppliers)**	(62 days)
	51.4 Days

Cash conversion cycle = Raw materials + WIP + Finished goods + Receivables - Payables

(Raw materials and payables periods are based on purchases; work-in-progress and finished goods periods are based on cost of sales; the receivables period is based on credit sales - the standard, most defensible basis for each ratio.)

(b) Economic Order Quantity (EOQ) and reorder level

EOQ= $\sqrt{\frac{2*D*Co}{Ch}} = \sqrt{\frac{2*24{,}000*75}{6}}$ **= 774.6 Unit**

Average Daily USED= $= \frac{\text{Annual Demand}}{\text{365 Days}} = \frac{\text{24,000 Unit}}{\text{365 Days}}$ **= 65.75 Unit/ Daily**

Lead time usage = 65.75 x 12 days = 789 units.

Safety stock = 65.75 x 10 days = 658 units.

Reorder level = Lead time usage + Safety stock = 789+658 = approximately 1,447 units.

(c) Theoretical share value - CAPM and Dividend Growth Model

Expected Return= Risk Free rate + Be (Market Return – Risk Free rate)
Expected Return= 6% + 1.3 (12.15% –6%) = 14%

Year 1	**2.10**
Year 2	**2.35**
Year 3	**2.6**
Year 4	**2.8**
Year 5	**3**

Growth in Dividend = $\left(\sqrt[4]{\frac{\text{Dividend In Year 5}}{\text{Dividend In Year 1}}} - 1\right) = \left(\sqrt[4]{\frac{3}{2.1}} - 1\right)$ **= 9.33%**

THEORETICAL VALUE OF ONE SHARE FOR NTL

MPS= $\frac{Do\,(1+g)}{Ke-G} = \frac{3\,(1+9.33\%)}{14\%-9.33\%}$ **= FRW 70.25**

Alternatively, in steps

Step 1 - Cost of equity (CAPM): Ke = Rf + Beta x (Rm-Rf) = 6% + 1.3 x (12.15%-6%) = 6%+7.995% = approximately 14.0%.

Step 2 - Dividend growth rate: g = (D5/D1)^(1/4)-1 = (3.00/2.10)^(1/4)-1 = approximately 9.33% per year.

Step 3 - Dividend Growth Model: P0 = D0(1+g)/(Ke-g) = 3.00 x 1.0933/(0.14-0.0933) = 3.28/0.0466 = approximately FRW70.25 per share.

(This theoretical value of approximately FRW70.25 is well above NTL's current market price of FRW32.50; markers should accept the calculation on its merits - the divergence may reflect model limitations (constant-growth assumption, sensitivity to a small Ke-g denominator) rather than genuine mispricing.)

(d) Total dividends, dividend cover, payout ratio and dividend yield

DIVIDEND COVER= $\frac{\text{EPS}}{\text{DPS}} = \frac{5.20}{3}$ = 1.73 Times

DIVIDEND Payout Ratio= $\frac{\text{DPS}}{\text{EPS}} = \frac{3}{5.20}$ = 57.69%

DIVIDEND Yield= $\frac{\text{DPS}}{\text{Market Price}} * 100\% = \frac{3}{32.50}$ = 9.23%

Measure	Calculation	Result
Total dividends for the year	FRW3.00 per share x 8,000,000 shares	FRW24,000,000
Dividend cover	EPS/DPS = 5.20/3.00	**1.73 times**
Dividend payout ratio	DPS/EPS = 3.00/5.20	**57.7%**
Dividend yield	DPS/Share price = 3.00/32.50	**9.2%**

(e) Factors influencing dividend policy, and advice on sustainability

Factors a company should consider when formulating its dividend policy include:

- Liquidity and cash position - dividends are paid in cash, so the company must have sufficient free cash, not just accounting profit, to pay them.
- Investment opportunities and financing needs - a growing company (such as NTL, which is expanding) may prefer to retain more earnings to fund growth rather than raise external finance.
- Legal and contractual constraints - e.g. distributable reserves rules, and any restrictions imposed by loan covenants.
- Shareholder expectations, clientele effects and signalling - a stable or steadily growing dividend is valued by many shareholders (e.g. income-seeking investors), and unexpected dividend cuts are often read by the market as a negative signal about future prospects.
- Taxation - the relative tax treatment of dividends versus capital gains for the company's shareholder base.
- Access to capital markets - a company with easy access to external finance has more freedom to maintain dividends even while investing heavily.

Advice on sustainability: NTL's dividend per share has grown steadily at approximately 9.3% per year over the last five years, comfortably covered by earnings (dividend cover of 1.73 times, i.e. a payout ratio of 57.7%), which leaves retained earnings of over 40% of profit to help fund the company's expansion. On the figures given, the current payout appears broadly sustainable in the short term. However, as NTL continues to expand, the directors should monitor whether operating cash flow and working capital requirements (see part (a)) keep pace with both the growth in the business and the continued growth in dividends, and should be prepared to moderate the rate of dividend growth if internally generated funds become insufficient to finance both the expansion and a continually rising dividend.