# CERTIFIED PUBLIC ACCOUNTANT
# OPERATIONAL LEVEL EXAMINATION
# FM2.3 FINANCIAL MANAGEMENT
# DATE: THURSDAY 28, MAY 2026

# SECTION A

**MARKING GUIDE**

| Qn | Answer | Brief Working / Reason |
|---|---|---|
| Q1 | A | GDP (Expenditure) = C+I+G+(X-M) = 6,400+1,850+2,200+(1,600-1,950) = FRW 10,100 billion |
| Q2 | B | Value for Money = Economy, Efficiency and Effectiveness in use of resources |
| Q3 | C | Corporate investments are an injection into the circular flow of income |
| Q4 | A | Units = 40,000; VC/unit = FRW 150; Contribution = FRW 90/unit; Profit = FRW 1,600,000 |
| Q5 | A | Current account = (-650)+(350)+(-190)+380 = FRW -110 billion deficit |
| Q6 | A | Nominal rate ≈ 13.42%, Use fisher formula; NPV = 470,138 |
| Q7 | C | Discounted payback: cumulative PV hits FRW 250,000 between Y4 and Y5 ≈ 4.4 years |
| Q8 | D | IRR = 10% + [186,000/(186,000+112,500)] × 8% ≈ 14.98% ≈ 14.9% ≈ 15% |
| Q9 | B | ARR = 105,000 / [(900,000+100,000)/2] = 105,000/500,000 = 21.0% |
| Q10 | B | ke = 4+1.75×7 = 16.25%; kd = 9×0.7 = 6.3%; WACC = 0.8×16.25 + 0.2×6.3 = 14.26% |
| Q11 | A | Asset beta = 2.20×66/(66+30.8) = 1.50; Re-geared = 1.50×(50+17.5)/50 = 2.025 ≈ 2.03 |
| Q12 | C | Bonds MV=9.2M; Pref MV=4.0M; Equity=70M; Gearing=(13.2/83.2)×100 = 15.9% |
| Q13 | C | EOQ=4,899 units; Total cost at EOQ (incl. purchase) = FRW 5,444,091; With discount at 7,500 units = FRW 5,312,306 (Accept discount) |
| Q14 | A | Spread = 3×((3×400×250,000)/(4*0.00025))^(1/3) = 20,083; Return point = L+1/3*Z=800,000+ (1/3)*20,083 = FRW 806,694; Upper = 800,000+20,083 = FRW 820,083 |
| Q15 | C | ke (CAPM) = 5+1.5×7 = 15.5%; g = 0.40×0.16 = 6.4%; P0 = 2.80×1.064/(0.155-0.064) = FRW 32.74 |

**Marks for each correct answer: 2 Marks Total Marks: 30 Marks**

**DETAILED MODEL ANSWERS**

**Question 1 - Correct answer: A (FRW 10,100 billion)**

The expenditure approach to GDP includes only actual expenditure on final goods and services by each sector:

GDP = C + I + G + (X - M)

GDP = 6,400 + 1,850 + 2,200 + (1,600 - 1,950) = **FRW 10,100 billion**

**Note:** Government transfer payments (FRW 480B) and Depreciation (FRW 320B) are NOT included. Transfer payments are not purchases of goods/services, and depreciation is a non-cash accounting charge.

**Why other options are wrong:**

B: FRW 10,580bn - incorrectly ADDED government transfer payments (480) to the correct answer. Transfer payments (pensions, subsidies) are NOT included in the GDP expenditure approach as they do not represent expenditure on goods/services.

C: FRW 9,780bn - incorrectly SUBTRACTED depreciation of capital stock (320) from the correct answer. Gross investment is used in the expenditure approach; depreciation adjustments lead to Net Domestic Product (NDP), not GDP.

D: FRW 10,260bn - incorrectly added transfer payments AND subtracted depreciation: 10,100+480-320=10,260. Both adjustments are wrong for GDP expenditure approach.

**Question 2 - Correct answer: B**

Value for Money (VfM) in non-profit organisations is achieved through the 3Es: Economy (acquiring resources at minimum cost), Efficiency (maximising output from given inputs), and Effectiveness (achieving the intended objectives).

**Why other options are wrong:**

A: 'Maximising profits while minimising costs' - NFP organisations do not have profit maximisation as their objective. This describes a for-profit company's partial objective.

C: 'Maximising shareholder wealth regardless of cost' - Completely inappropriate for NFP organisations which have no shareholders and focus on stakeholder/public benefit.

D: 'Minimising expenses to maximise surplus funds' - This describes only one aspect (economy) and misrepresents the purpose of VFM, which is NOT about hoarding surplus cash.

**Question 3 - Correct answer: C**

Injections into the circular flow of income are flows of money into the system from outside households. **Corporate investment** is an injection (funds from firms adding to productive capacity). Household savings

**Why other options are wrong:**

A: 'Household savings' - This is a WITHDRAWAL (leakage) from the circular flow, as it removes money from the spending cycle.

B: 'Import expenditure' - This is a WITHDRAWAL as it sends money out of the domestic economy to foreign producers.

D: 'Tax payments' - This is a WITHDRAWAL as it removes household income from the circular flow (though government spending that follows is an injection).

**Question 4 - Correct answer: A**

Units sold = FRW 9,600,000 / FRW 240 = 40,000 units

Variable cost per unit = FRW 6,000,000 / 40,000 = FRW 150 per unit

Contribution per unit = FRW 240 - FRW 150 = FRW 90 per unit

Profit = Total revenue - Total variable costs - Fixed costs = 9,600,000 - 6,000,000 - 2,000,000 = **FRW 1,600,000**

**Why other options are wrong:**

B: Contribution=150/unit - this is the variable cost per unit, NOT the contribution. Using it gives profit=FRW 1,400,000 (wrong).

C: Contribution=90/unit (correct) but profit=1,200,000 - this incorrectly deducts fixed costs AND variable costs again; arithmetic error.

D: Contribution=150/unit (incorrect - see B above); profit=1,600,000 happens to be numerically correct but derived from wrong contribution.

**Question 5 - Correct answer: A**

| **Item** | **FRW Billion** |
|---|---|
| Trade balance (Merchandise): 3,200 - 3,850 | (650) |
| Services balance: 1,100 - 750 | 350 |
| Investment income: 420 - 610 | (190) |
| Net current transfers | 380 |
| Current Account Balance | **(110)** |

A deficit of FRW 110 billion indicates Country XYZ spends more on imports of goods, services, and transfers than it earns, making it a net borrower internationally.

**Why other options are wrong:**

B: FRW +110bn surplus - simply reversed the sign; the net result is a deficit, not a surplus.

C: FRW -650bn - only looked at the merchandise trade balance and ignored services, income, and transfers.

D: FRW -190bn - only included goods trade and investment income balances; omitted services and current transfers.

**Question 6 - Correct answer: A**

Using the nominal cash flow approach:

Using Fisher formula, nominal (money) discount rate = (1.07 × 1.06) - 1 = 13.42%, approximated as 13% using PV tables.

Since the real cash flows are constant at FRW 700,000, we shall adjust the inflation effect by 6% each year by multiplying (1.06)^n to get nominal cashflows

| **Year** | | | **0** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|---|---|
| **Initial Investment** | | | (2,400,000) | | | | | |
| **Nominal CF** | 6% | 700,000 | | 742,000 | 786,520 | 833,711 | 883,734 | 936,758 |
| **Total** | | | **(2,400,000)** | **742,000** | **786,520** | **833,711** | **883,734** | **936,758** |
| Nominal Discount Factor (13.5%) | 13.42% | | 1 | 0.882 | 0.777 | 0.685 | 0.604 | 0.533 |
| **PV** | | | **(2,400,000)** | **654,206** | **611,407** | **571,409** | **534,027** | **499,090** |
| **NPV** | | | 470,138 | | | | | |

NPV = **FRW +470,138**

Since NPV > 0, accept the project.

**Why other options are wrong:**

B: + 37,039 - used the correct nominal discount rate (but applied on cashflows not inflated).

C: + 548,655 - used the wrong discount rate (6%-Inflation rate and apply to the cashflow not inflated)

D: + 183,262 - used the correct discount rate of 13.42% but on constant inflated cashflows of year 1 to year 5.

**Question 7 - Correct answer: C (4.1 years / approx. 4.4 years)**

| **Year** | **Cash Flow (FRW)** | **PV Factor @ 10%** | **Discounted CF (FRW)** | **Cumulative PV (FRW)** |
|---|---|---|---|---|
| 1 | 60,000 | 0.909 | 54,545 | 54,545 |
| 2 | 80,000 | 0.826 | 66,116 | 120,661 |
| 3 | 90,000 | 0.751 | 67,618 | 188,279 |
| 4 | 70,000 | 0.683 | 47,811 | 236,090 |
| 5 | 60,000 | 0.621 | 37,255 | 273,346 |

The initial investment of FRW 250,000 is recovered between Year 4 and Year 5.

DPB = 4 + (250,000 - 236,090) / 37,255 = 4 + 0.37 = **4.4 years**

**Why other options are wrong:**

A: 3.3 years - used undiscounted cash flows (simple payback), not discounted.

B: 5.0 years - treated the project as if it never pays back within 4 years; wrong cumulative tracking.

D: 'Never pays back' - wrong; cumulative discounted CF of 273,280 exceeds 250,000 by end of Year 5.

**Question 8 - Correct answer: D (14.98%)**

**IRR= LDF + (HDF-LDF) *** $\left(\frac{NPV\ @\ LDF}{NPV\ @\ LDF - NPV\ @\ HDF}\right)$

**IRR= 10% + (18%- 10%) * ($\frac{186,000}{186,000 -(-112,500)}$) = 14.98%**

**Why other options are wrong:**

A: 13.0% - appears to use only the 10% rate as base and applies wrong fraction.

B: 14.4% - small arithmetic error in the interpolation fraction.

C: 16.0% - uses the wrong interval; appears to work from 18% backwards.

**Question 9 - Correct answer: B (21.00%)**

**ARR:** $\frac{Estimated\ Average\ Anjual\ Accounting\ Profit}{Estimated\ Average\ Investment}$ * 100%= $\frac{105,000}{500,000}$ * 100%= 21%

**Estimated Average Investment:** $\frac{Cost\ of\ Capital+Disposal\ Value}{2}$= $\frac{900,000+100,000}{2}$ = 500,000

**Why other options are wrong:**

A: 11.67% - used initial investment only (900,000) in denominator instead of average investment: 105,000/900,000=11.67%.

C: 23.33% - incorrectly computed average as (900,000-100,000)/2=400,000 and 105,000/400,000≈26.25%, or different calculation error.

D: 10.50% - divided profit by total invested capital (1,000,000) rather than average: 105,000/1,000,000=10.5%.

**Question 10 - Correct answer: B (14.26%)**

Cost of equity (CAPM) = Rf + β(Rm - Rf) = 4% + 1.75 × (11% - 4%) = 4% + 12.25% = **16.25%**

Post-tax cost of debt = 9% × (1 - 0.30) = **6.30%**

| Sources of Finance | Amount | Weighting | Cost of Sources finance | Weighting * Cost of Sources of Finance |
|---|---|---|---|---|
| Equity | 80,000,000 | 80% | **16.25%** | 13.00% |
| Debt | 20,000,000 | 20% | **6.30%** | 1.26% |
| Total | 100,000,000 | 100% | WACC | **14.26%** |

Or

WACC = (80/100) × 16.25% + (20/100) × 6.30% = 13.00% + 1.26% = **14.26%**

**Why other options are wrong:**

A: 13.50% - used pre-tax cost of debt (9%) without the (1-t) tax adjustment: 0.8×16.25+0.2×9=14.80%… actually suggests rounding errors elsewhere.

C: 12.80% - likely used the risk-free rate (4%) plus market premium incorrectly, underestimating Ke.

D: 13.02% - small computational errors in weights or costs.

**Question 11 - Correct answer: A**

Step 1 - Asset beta (ungear proxy company):

Ba=Be* $\frac{Ve}{Ve+Vd(1-T)}$ = 2.20* $\frac{66}{66+44(1-30\%)}$ = 1.5 or **we use this formula**

Ba= $\frac{Be}{1+(1-T)\frac{VD}{VE}}$ = $\frac{2.20}{1+(1-0.3)\frac{44}{66}}$ **= 1.5**

**Then Re-Gearing Asset Beta to reflect Finance risk of Byose Tech Plc**

Be= Ba* $\frac{\boldsymbol{Ve+Vd(1-T)}}{\boldsymbol{Ve}}$ = 1.5* $\frac{50+25(1-30\%)}{50}$ = **2.025**

**Be= Ba*[1+(1-T)$\frac{\boldsymbol{D}}{\boldsymbol{E}}$]** = 1.5*[1+(1-0.3)$\frac{25}{50}$] **= 2.025**

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**Why other options are wrong:**

B: βa=1.54; βe=2.16 - slightly different asset beta suggests incorrect denominator in ungearing (e.g., used debt at book instead of market value, or wrong tax shield).

C: βa=1.47; βe=2.18 - asset beta below 1.50 suggests either wrong Ve or wrong tax adjustment in the Hamada formula.

D: βa=1.65; βe=2.30 - considerably higher asset beta suggests the proxy debt was incorrectly excluded from the denominator, overstating the ungearing.

**Question 12 - Correct answer: C (15.9%)**

Market values:

Ordinary shares: 20,000,000 × FRW 3.50 = FRW 70,000,000

Redeemable bonds: FRW 10,000,000 × 92/100 = FRW 9,200,000

Preference shares: FRW 5,000,000 × 80/100 = FRW 4,000,000

Total debt (bonds + pref) = FRW 13,200,000; Total capital = FRW 83,200,000

**Financial Gearing**= $\frac{Prior\ Charge\ Capital}{Total\ Capital\ Employed}$ = $\frac{13,200,000}{83,200,000}$ * 100%=**15.9%**

**Why other options are wrong:**

A: 17.6% - used nominal values rather than market values for debt; or used debt/equity (not debt/total capital) as the ratio.

B: 20.5% - used debt/equity ratio instead of debt/total capital: 13.2/70=18.9%… suggests different misidentification of the gearing formula.

D: 19.1% - possibly included only the bond (not preference shares) in debt at market value, or mixed nominal and market values.

**Question 13 - Correct answer: C (Accept discount; total cost = FRW 5,312,306)**

**EOQ=** $\sqrt{\frac{2*D*Co}{Ch}} = \sqrt{\frac{2*90,000*1,200}{9}}$ **= 4,899** units

**Ordering Cost=** $\frac{D}{EOQ}$ ***Co=** $\frac{90,000}{4,899}$ ***1,200= 22,045**
**Holding Cost=** $\frac{EOQ}{2}$ ***Ch=** $\frac{4,899}{2}$ ***9= 22,045**
**Purchase Cost: 90,000 *60= 5,400,000**

**Total Cost =** Purchase Cost+ Ordering Cost+ Holding Cost

**Total Cost =** 5,400,000+ 22,045+ 22,045**= 5,444,090**

**With Discount**

**Purchase Cost with Discount=** 60*(100%-2.5%) =**58.5*90,000= 5,265,000**

**Holding Cost =** 58.5*15%= 8.775

**Ordering Cost=** $\frac{D}{Q}$ ***Co=** $\frac{90,000}{7,500}$ ***1,200= 14,400**
**Holding Cost=** $\frac{EOQ}{2}$ ***Ch=** $\frac{7,500}{2}$ ***8.775= 32,907**

**Total Cost =** Purchase Cost+ Ordering Cost+ Holding Cost

**Total Cost =** 5,265,000+ 14,400+ 32,907= **5,312,307**
**Discount Have to be Accepted**
Since FRW 5,312,306 < FRW 5,440,416, accept the bulk purchase discount.

**Why other options are wrong:**
A: Accept the discount; total=5,409,000 - correctly decides to accept but makes arithmetic error (likely wrong holding cost calculation).
B: Reject; total=5,427,000 - wrong decision; the comparison figure of 5,427,000 approximates the EOQ total but the decision is incorrectly reversed.

D: Reject; total=5,454,000 - wrong decision and inflated EOQ total; may have incorrectly added the quantity discount saving to the EOQ cost rather than subtracted.

**Question 14 - Correct answer: C**
Miller-Orr model:

**Spread=3*** $\left( \sqrt[3]{\frac{3}{4} * \frac{Transaction\ Cost * Variance\ of\ Cashflows}{Daily\ Interest\ Rate}} \right)$

**Spread=3 *** $\left( \sqrt[3]{\frac{3}{4} * \frac{400 * 250{,}000}{0.00025}} \right)$ **= 3 *** $\left( \sqrt[3]{\frac{300{,}000{,}000}{0.001}} \right)$ **= 20,083**

**Return Point=** 800,000 + (1/3*20,083) **= 806,694**

**Upper Limit=** 800,000 + 20,083**= 820,083**

**Why other options are wrong:**

A: Return point = FRW 937,665; Upper Limit= FRW 759,834.02 - Due to wrong computation and interpretation of spread formula and upper limit computed using wrong formula (e.g., H=L-2Z),

B: Return point=806,694; Upper= FRW 860,248.97 - return point correct but upper limit computed using wrong formula (e.g., H=L-3Z).

D: Return point=937,665 incorrect but Upper=820,083 – difference due to wrong formula on return point but correct upper limit computed using.

**Question 15 - Correct answer: C (FRW 32.74)**

Step 1 - Cost of equity using CAPM:

ke = Rf + β(Market risk premium) = 5% + 1.50 × 7% = 5% + 10.5% = 15.5%

Step 2 - Sustainable growth rate:

g = Retention ratio × Return on equity = 0.40 × 16% = 6.4%

Step 3 - Dividend Growth Model:

D1 = D0 × (1 + g) = FRW 2.80 × 1.064 = FRW 2.9792

P0 = D1 / (ke - g) = 2.9792 / (0.155 - 0.064) = 2.9792 / 0.091 = **FRW 32.74**

**Why other options are wrong:**

A: FRW 52.50 - used the wrong growth rate or cost of equity; possibly g=7% (risk-free rate) and Ke=12% which gives 2.80×1.07/(0.12-0.07)=59.92, or different inputs.

B: FRW 47.73 - may have used Ke=15.5% but g=3% (e.g., 40%×16%÷2 or wrong b): 2.80×1.03/(0.155-0.03)=23.07… different error path.

D: FRW 30.77 - close to correct but slightly lower, suggesting g was calculated slightly higher (reducing the denominator) or D1 calculated slightly differently.

## SECTION B

QUESTION 16 - Bugesera Agro-Processing Ltd

Marks for each correct MCQ answer: 2 Marks each

| Part | Answer | Key Calculation / Reason | Marks |
|---|---|---|---|
| Q16a | A | WDV after Y4: 8,000,000 × (0.75)^4 = FRW 2,531,250 | 2 |
| Q16b | A | After-tax op CF Y1-3 = (4,800,000-2,100,000-700,000) × (1-0.30) = FRW 1,400,000 | 2 |
| Q16c | B | Based on complete NPV model: NPV is negative - see detailed workings below | 2 |
| Q16d | A | Sensitivity = \|NPV\| / PV of after-tax revenues × 100% | 2 |
| Q16e | A | EV = 0.6×(4,500,000-2,000,000) + 0.4×(1,000,000-2,000,000) = FRW +1,100,000 | 2 |

**Detailed Workings - Q16a to Q16e**

| **NPV Analysis** | | Year | Year | Year | Year | Year | Year | Year |
|---|---|---|---|---|---|---|---|---|
| Details | | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| A. Sale Revenue | | | 4,800,000 | 4,800,000 | 4,800,000 | 4,200,000 | 4,200,000 | 4,200,000 |
| Less: Annual Variable Cost | | | (2,100,000) | (2,100,000) | (2,100,000) | (2,100,000) | (2,100,000) | (2,100,000) |
| Contribution | | | **2,700,000** | **2,700,000** | **2,700,000** | **2,100,000** | **2,100,000** | **2,100,000** |
| Incr. Fixed Cost | | | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) |
| **Profit Before Tax** | | | **2,000,000** | **2,000,000** | **2,000,000** | **1,400,000** | **1,400,000** | **1,400,000** |
| Tax | 30 % | | (600,000) | (600,000) | (600,000) | (420,000) | (420,000) | (420,000) |
| **Profit after Tax** | | | **1,400,000** | **1,400,000** | **1,400,000** | **980,000** | **980,000** | **980,000** |
| Add Tax Saving on CA | | | **600,000** | **450,000** | **337,500** | **253,125** | **189,844** | **419,531** |
| Initial Investment | | (8,000,000) | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Scrap Value | | | | | | | | 500,000 |
| Working capital | | (1,200,000) | | | | | | 1,200,000 |
| **Cashflow** | | **(9,200,000)** | **2,000,000** | **1,850,000** | **1,737,500** | **1,233,125** | **1,169,844** | **3,099,531** |
| D.F | 14 % | 1.000 | 0.877 | 0.769 | 0.675 | 0.592 | 0.519 | 0.456 |
| P.V Cashflow | | **(9,200,000)** | **1,754,386** | **1,423,515** | **1,172,763** | **730,109** | **607,580** | **1,412,105** |
| **NPV** | | **(2,099,542)** | | | | | | |

**Q16a: Capital Allowances schedule (25% reducing balance on FRW 8,000,000):**

| **Year** | **WDV b/f (FRW)** | **Capital Allowance (FRW)** | **WDV c/f (FRW)** | **Tax Saving @ 30% (FRW)** |
|---|---|---|---|---|
| 1 | 8,000,000 | 2,000,000 | 6,000,000 | 600,000 |
| 2 | 6,000,000 | 1,500,000 | 4,500,000 | 450,000 |
| 3 | 4,500,000 | 1,125,000 | 3,375,000 | 337,500 |
| 4 (Answer = A) | 3,375,000 | 843,750 | 2,531,250 | 253,125 |
| 5 | 2,531,250 | 632,813 | 1,898,438 | 189,844 |
| 6: Y6 CA+Balancing | 1,898,438 | 474,609+923,829=1,398,438* | 500,000 (=scrap) | 419,531 |

*Note: After Y6 regular CA, WDV = 1,423,828 > scrap 500,000, so balancing allowance = 923,828

**CORRECT: A FRW 2,531,250**

**Why other options are wrong:**

B: FRW 3,375,000 - this is the WDV at end of Year 3, not Year 4.

C: FRW 2,109,375 - this is the WDV at the end of Year 5 (after Year 5 regular CA), not Year 4.

D: FRW 1,898,438 - this is the WDV at end of Year 5 if using a different CA schedule.

**Q16b: After-tax operating cash flows:**

Years 1-3: Revenue (4,800,000) - Variable costs (2,100,000) - Fixed costs excl. depr. (700,000) = FRW 2,000,000 pre-tax

After tax = 2,000,000 × (1 - 0.30) = FRW 1,400,000 ✓ (Answer A)

Years 4-6: Revenue (4,200,000) - VC (2,100,000) - FC (700,000) = FRW 1,400,000 pre-tax
After tax = 1,400,000 × (1 - 0.30) = FRW 980,000
**CORRECT: A - FRW 1,400,000**

**Why other options are wrong:**
B: FRW 1,960,000 - appears to apply 70% to revenue only, ignoring costs.
C: FRW 1,330,000 - incorrect; possibly deducted depreciation before computing tax.
D: FRW 2,000,000 - this is the PRE-TAX operating cash flow; tax has not been deducted.

**Q16c: NPV Calculation at 14%:**

**Answer: B** -FRW 2,098,977→ Rejected

Full NPV calculation at 14%:
Initial outflows: (8,000,000 + 1,200,000) = (9,200,000)
After-tax operating CFs: Y1-3: 1,400,000; Y4-6: (4,200,000–2,100,000–700,000)×0.70 = 980,000
CA tax savings (Y1–Y6 as computed, with balancing allowance in Y6)
Working capital recovery: +1,200,000 in Y6
Scrap: +500,000 in Y6
PV of operating CFs Y1-3: 1,400,000 × AF(14%,3) = 1,400,000 × 2.322 = 3,250,800
PV of operating CFs Y4-6: 980,000 × [AF(14%,6) – AF(14%,3)] = 980,000 × [3.889–2.322] = 980,000 × 1.567 = 1,535,660

Terminal cash flows - Year 6

| | | | |
|---|---|---|---|
| Working capital recovery | 1,200,000 | 0.4556 | 546,720 |
| Scrap value | 500,000 | 0.4556 | 227,800 |

**Capital allowance tax savings**

| | | | | |
|---|---|---|---|---|
| CA tax saving - Y1 | 1 | 600,000 | 0.8772 | 526,320 |
| CA tax saving - Y2 | 2 | 450,000 | 0.7695 | 346,275 |
| CA tax saving - Y3 | 3 | 337,500 | 0.6750 | 227,813 |
| CA tax saving - Y4 | 4 | 253,125 | 0.5921 | 149,874 |
| CA tax saving - Y5 | 5 | 189,844 | 0.5194 | 98,615 |
| CA + balancing allowance - Y6 | 6 | 419,531 | 0.4556 | 191,146 |
| **Subtotal - CA tax savings** | | | | **1,540,043** |

**Q16c:** NPV = 3,250,800 + 1,535,660 + 1,540,043 + 227,800 + 546,720 - 9,200,000 = (FRW 2,099,000)

Overall NPV ≈ -FRW 2,098,977→ Rejected

**Q16d: Sensitivity to Sales Revenue:**

Sensitivity % = |NPV| / PV of after-tax revenues × 100

PV of after-tax revenues = (4,800,000×0.7×[PVFs Y1-3]) + (4,200,000×0.7×[PVFs Y4-6])

≈ 3,360,000×(0.877+0.769+0.675) + 2,940,000×(0.592+0.519+0.456) = FRW 12,407,768

Sensitivity ≈ 2,099,542 / 12,407,768 × 100 ≈ 16.9%

**CORRECT: A 16.9%**

**Why other options are wrong:**

B: 5.78% - used PV of gross revenues (pre-tax) rather than after-tax, or different NPV figure.

C: 3.08%

D: 4.14% - different NPV or different PV of revenue used in the denominator.

**Q16e: Real Option to Expand:**

EV of expansion = [0.60 × (FRW 4,500,000 - FRW 2,000,000)] + [0.40 × (FRW 1,000,000 - FRW 2,000,000)]

= [0.60 × 2,500,000] + [0.40 × (-1,000,000)] = 1,500,000 - 400,000 = FRW +1,100,000

Since the expected net gain is positive (FRW +1,100,000), the option is worth exercising. Answer A. ✓

**CORRECT: A - Option worth exercising; expected net gain = FRW 1,100,000**

**Why other options are wrong:**

B: Expected NPV = -200,000 (negative; do not exercise) - this is a computational error; correctly applying EV formula yields +1,100,000.

C: Expected gain = 700,000 - possibly used 50/50 probability instead of 60/40, or applied wrong scenario values.

D: 'Too much uncertainty' - qualitative dismissal without calculation; financial analysis requires EV comparison regardless of uncertainty.

**QUESTION 17 - Muhanga Textiles plc**

| Part | Answer | Key Calculation | Marks |
|---|---|---|---|
| Q17a | C | ke = 4.5% + 1.80 × 7.0% = 4.5% + 12.6% = 17.1% | 2 |
| Q17b | A | IRR = 5% + [1,488/(1,488+3,128)] × 5% = 5% + 1.61% = 6.61% | 2 |
| Q17c | B | WACC = (75/110.5)×17.1% + (28.5/110.5)×6.61% + (7/110.5)×8.57% = 13.85% | 2 |
| Q17d | B | Asset beta = 1.413; Re-gear = 1.413×(55+34.92)/55 = 2.31 | 2 |
| Q17e | A | Tax shield = FRW 20M × 28% = FRW 5,600,000; Trade-off theory | 2 |

**Detailed Workings - Q17**

**Q17a: CAPM Cost of Equity:**

ke = Rf + βe × (Market risk premium) = 4.5% + 1.80 × 7.0% = 4.5% + 12.6% = 17.1% (Answer C)

**CORRECT: C 17.1%**

**Why other options are wrong:**

A: 18.1% - added an extra 1% (possibly confused Rf=4.5% with 5.5%, or added a size premium not given).

B: 12.6% - this is ONLY the equity risk premium component (β×MRP), omitting the risk-free rate.

D: 9% - possibly calculated: Rf + β = 4.5+1.8×2.5 or some other wrong formula; does not match CAPM with given data.

**Q17b: Post-tax cost of redeemable bonds (IRR):**

Using linear interpolation: IRR = 5% + [1,488,000 / (1,488,000 + 3,128,000)] × (10% - 5%)

= 5% + [1,488,000 / 4,616,000] × 5% = 5% + 0.3224 × 5% = 5% + 1.61% = 6.61% (Answer A)

**CORRECT: A 6.61%**

**Why other options are wrong:**

B: 7.00% - incorrect interpolation; either wrong NPV values or wrong formula application.

C: 5.82% - underestimates; fraction numerator/denominator incorrectly set up.

D: 6.62% - extremely close to correct (rounding difference); full marks should be awarded for 6.61% or 6.62%.

**Q17c: WACC:**

Equity MV = FRW 75,000,000 at ke = 17.1%

Bonds MV = 30,000,000 × 95% = FRW 28,500,000 at kd = 6.61%

Preference shares MV = 10,000,000 × 70% = FRW 7,000,000 at kp = 6%/70% = 8.57%

Total capital = FRW 110,500,000

WACC = (75/110.5)×17.1% + (28.5/110.5)×6.61% + (7/110.5)×8.57%

= 11.61% + 1.70% + 0.54% = 13.85% (Answer B)

**CORRECT: B 13.85%**

**Why other options are wrong:**

A: 13.68% - slightly lower; may have used Ke=17.1% but different bond or preference share values.

C: 12.94% - significantly lower; likely used DGM cost of equity rather than CAPM, or understated the equity weight.

D: 13.28% - further error; incorrect combination of costs and weights.

**Q17d: Re-geared equity beta after capital restructuring:**

Step 1 - Find asset beta using old capital structure:

βa = 1.80 × [75 / (75 + 28.5 × 0.72)] = 1.80 × [75 / 95.52] = 1.413

Step 2 - Re-gear to new structure: Equity = FRW 55M, Debt = FRW 48.5M, tax = 28%

$\beta e = 1.413 \times [(55 + 48.5 \times 0.72) / 55] = 1.413 \times [(55 + 34.92) / 55] = 1.413 \times 1.635 = 2.31$ (Answer B)

**CORRECT: B 2.31**

**Why other options are wrong:**

A: 2.24 - lower re-geared beta; may have used total market debt (including preference shares) in the original ungearing, or different tax rate.

C: 2.10 - significantly lower; the asset beta was likely over-estimated, reducing the re-geared result.

D: 2.58 - over-estimated; possibly forgot to ungear first and simply applied new gearing to original equity beta.

**Q17e: MM Theory with Corporate Tax:**

Under Modigliani and Miller with corporate taxes, firm value increases by T×D when permanent debt is added.

Tax shield = Corporate tax rate × Amount of new debt = 28% × FRW 20,000,000 = FRW 5,600,000

The Trade-off Theory explains that while debt generates tax shields that increase firm value, beyond a certain level, financial distress costs (legal costs, agency costs, bankruptcy risk) begin to offset these benefits. The optimal capital structure balances these forces. (Answer A)

**CORRECT: A Tax shield = FRW 5,600,000; Trade-off theory**

**Why other options are wrong:**

B: Tax shield=5,600,000 (correct) but cites Pecking Order Theory - the Pecking Order theory (Myers & Majluf) is about financing hierarchy (retained earnings > debt > equity), NOT about the trade-off between tax shields and distress costs.

C: Tax shield=4,480,000 - incorrect; uses 22.4% implied rate; possibly applied wrong tax rate (24% or different). The correct tax rate is 28%.

D: Tax shield=4,480,000 with Trade-off theory - incorrect tax shield (see C above); the theory identification is correct but the shield calculation is wrong.

**QUESTION 18 - Cyangugu Consumer Goods Ltd**

| Part | Answer | Key Calculation | Marks |
|---|---|---|---|
| Q18a | A | Cycle = Inv days + Rec days - Pay days = 91.3 + 81.1 - 91.3 = 81.1 days | 2 |
| Q18b | B | EOQ = √(2×60,000×2,000/30) = 2,828 units; TARC = FRW 84,853 | 2 |
| Q18c | A | Annualised cost = (1.5/98.5)×(365/50)×100 = 11.1% < 12% borrowing rate → Accept | 2 |
| Q18d | A | P0 = 2.00×1.06/(0.14-0.06) = 2.12/0.08 = FRW 26.50; overvalued by FRW 13.50 | 2 |
| Q18e | D | EPS falls to 4.17 after bonus; rises to ≈4.42 after buyback; gearing increases | 2 |

**Detailed Workings - Q18**

**Q18a: Cash Operating Cycle:**

Account receivable Days= $\frac{Trade\ \ Receivables}{Credit\ sales\ revenue} * 365\ days = \frac{8{,}000{,}000}{36{,}000{,}000} * 365\ days = 81.1$ days

Inventory Days= $\frac{Averages\ inventory}{Cost\ of\ sales} * 365\ days = \frac{5{,}625{,}000}{22{,}500{,}000} * 365\ days = 91.25$ days

Account payable days= $\frac{Average\ trade\ payables}{Purchase\ or\ cost\ of\ sale} * 365\ days = \frac{4{,}500{,}000}{18{,}000{,}000} * 365\ days = 92.25$days

| | |
|---|---|
| Inventory days | 91.25 days |
| Plus: Account receivable days | 81.1 days |
| Less: account payable days | (91.25 days) |
| | **81.1 Days** |

**CORRECT: A - Cash cycle = 81.1 days**

**Why other options are wrong:**

B: Cash cycle = 91.3 days - added inventory days only and omitted receivables (or forgot to subtract payables).

C: Cash cycle = 172.4 days - added all three components without subtracting payables: 91.3+81.1+0=172.4 (gross conversion cycle, not net).

D: Different inventory days - used wrong denominator; inventory days based on sales (not CoS) gives 75.0 days, leading to cycle of 64.8 days.

**Q18b: Economic Order Quantity:**

EOQ = √(2 × D × Co / Ch) = √(2 × 60,000 × 2,000 / 30) = √(240,000,000 / 30) = √8,000,000 = 2,828 units

Total Annual Relevant Cost at EOQ = (D/EOQ)×Co + (EOQ/2)×Ch = (60,000/2,828)×2,000 + (2,828/2)×30

= 21.22 × 2,000 + 1,414 × 30 = 42,427 + 42,426 = FRW 84,853 (Answer B)

**CORRECT: B - EOQ = 2,828 units; Total relevant cost = FRW 84,853**

**Why other options are wrong:**

A: EOQ=3,162; total=94,868 - over-estimated EOQ; likely used different holding cost formula (e.g., Ch as % of price rather than per-unit amount).

C: EOQ=2,000; total=105,000 - arbitrary round number; not mathematically derived from EOQ formula.

D: EOQ=2,828 (correct) but total=90,000 - wrong total; may have included partial purchase cost or used different unit figures.

**Q18c: Early Settlement Discount Decision:**

Annualised cost of discount = [Discount% / (100 - Discount%)] × [365 / (Normal period - Discount period)]

= [1.5 / 98.5] × [365 / (60 - 10)] = 0.01523 × 7.30 = 11.12%

Since 11.12% < 12% (borrowing rate), it is cheaper to take the discount than to borrow. Accept the discount. (Answer A)

**CORRECT: A - Accept; annualised cost ≈ 11.2% < 12% borrowing rate**

**Why other options are wrong:**

B: Annualised cost=11.2% (correct calculation) but WRONG decision - accepts the cost but says it's too expensive. The logic is inverted: lower cost than borrowing means ACCEPT.

C: Annualised cost=13.9%; Reject - incorrect formula application, likely omitting (1-d) denominator: 0.015×365/50=10.95%... or different period calculation.

D: Cost=9.5%; Accept - wrong annualised cost calculation; likely used simple interest approximation without (1-d) adjustment.

**Q18d: DGM Theoretical Share Price:**

D0 = FRW 2.00 (current year dividend, just paid); g = 6%; ke = 14%

P0 = D0 × (1+g) / (ke - g) = 2.00 × 1.06 / (0.14 - 0.06) = 2.12 / 0.08 = FRW 26.50

Current market price = FRW 40.00. Since market price > theoretical price, the share is overvalued by FRW 13.50. (Answer A)

**CORRECT: A - Theoretical price = FRW 26.50; market price is OVERVALUED by FRW 13.50**

**Why other options are wrong:**

B: FRW 35.00; overvalued by 5.00 - either used D0 instead of D1, or wrong cost of equity (e.g., 12%): 2.12/(0.12-0.06)=35.33.

C: FRW 42.40; undervalued - wrong direction of conclusion OR used a lower Ke (e.g., 11%): 2.12/(0.11-0.06)=42.40. This would imply market price < intrinsic value, wrongly reversing the conclusion.

D: FRW 38.00; overvalued by 2.00 - close but wrong; possibly used D0 directly without growing: 2.00/(0.14-0.09)=40 or different g.

**Q18e: Bonus Issue + Share Repurchase:**

Current: 8,000,000 shares; total earnings = 8,000,000 × FRW 5.00 = FRW 40,000,000

After 1 for 5 bonus issue: new shares = 8,000,000 / 5 = 1,600,000; total = 9,600,000

EPS after bonus = 40,000,000 / 9,600,000 = FRW 4.17 (earnings unchanged, more shares)

After repurchase of 500,000 shares: remaining shares ≈ 9,050,000 (adj. for rounding)

EPS after repurchase = 40,000,000 / 9,050,000 ≈ FRW 4.42

Gearing: The share repurchase is funded from retained earnings, reducing equity reserves. If the company has any debt, the debt-to-equity ratio increases, raising financial gearing. (Answer D)

**CORRECT: D - EPS after bonus: FRW 4.17; after repurchase: FRW 4.42; gearing increases**

**Why other options are wrong:**

A: EPS after repurchase = 4.81 - wrong share count; may have divided by 8,300,000 instead of 9,100,000.

B: 'EPS unaffected by bonus issue' - incorrect; bonus issue increases share count without raising capital, so EPS falls.

C: EPS after repurchase = 4.42 and 'gearing unchanged' - EPS is similar but the gearing conclusion is wrong; repurchase reduces equity base, increasing gearing.

## SECTION C

**QUESTION 19 - Rugari Industrial Products Ltd (20 Marks)**

| Part | Requirement | Marks |
|---|---|---|
| (i) | Schedule of capital allowances and tax savings, including balancing adjustment in Year 5 | 4 |
| (ii) | Total Contribution cash flows for Years 1 to 5 | 2.5 |
| (ii) | Annual after-tax operating cash flows for Years 1 to 5 | 2.5 |
| (iii) | Positing of Scrap Value | 0.5 |
| (iii) | Correct posting of Initial Investment | 0.5 |
| (iii) | Correct Posting of Working Capital | 1 |
| (iii) | Correct Present Value of Cashflow for Years 1 to 5 0.5 Mark each | 2.5 |
| (iii) | Correct Net Present Value calculation | 0.5 |
| (iii) | Recommendation | 1 |
| (iv) | Sensitivity analysis on sales volume; percentage fall before NPV = 0; risk comment | 3 |
| (v) | NPV of expansion option and recommendation | 2 |
| | **TOTAL** | **20** |

**Model Answer - Q19**

**(i) Capital Allowances Schedule (25% reducing balance on qualifying cost FRW 18,000,000):**

Note: Installation and commissioning costs (FRW 1,500,000) do NOT qualify for capital allowances.

Year 5 balancing adjustment: WDV after Year 5 regular CA - Scrap proceeds = FRW 4,271,484 - FRW 1,200,000 = FRW 3,071,484 balancing allowance.

| Year | WDV b/f (FRW) | Capital Allowance (FRW) | WDV c/f (FRW) | Tax Saving @ 30% (FRW) |
|---|---|---|---|---|
| 1 | 18,000,000 | 4,500,000 | 13,500,000 | 1,350,000 |
| 2 | 13,500,000 | 3,375,000 | 10,125,000 | 1,012,500 |
| 3 | 10,125,000 | 2,531,250 | 7,593,750 | 759,375 |
| 4 | 7,593,750 | 1,898,438 | 5,695,313 | 569,531 |
| 5: Y5 reg CA + Balancing Allowance | 5,695,313 | 1,423,828 + 3,071,484 = 4,495,313 | 1,200,000 (=scrap) | 1,348,594 |

**(4 Marks - 0.5 marks per year for CA not exceed 1.5 Marks; 0.5 marks per year for tax saving not exceed 1.5 Marks; 1 mark for correct balancing adjustment)**

**(ii) Annual After-Tax Operating Cash Flows:**

Formula: After-tax operating CF = (Revenue - Variable costs - Fixed overheads) × (1 - Tax rate)

Note: Tax is calculated on operating profit BEFORE capital allowances (CAs are dealt with separately as tax savings).

| Year | Units | Contribution/unit (FRW) | Total Contribution (FRW) | Fixed OH (FRW) | Pre-tax CF (FRW) | Tax @ 30% | After-tax CF (FRW) |
|---|---|---|---|---|---|---|---|
| 1 | 40,000 | 920-540=380 | 15,200,000 | 5,800,000 | 9,400,000 | 2,820,000 | 6,580,000 |
| 2 | 55,000 | 950-560=390 | 21,450,000 | 6,200,000 | 15,250,000 | 4,575,000 | 10,675,000 |
| 3 | 65,000 | 970-575=395 | 25,675,000 | 6,500,000 | 19,175,000 | 5,752,500 | 13,422,500 |
| 4 | 60,000 | 960-570=390 | 23,400,000 | 6,300,000 | 17,100,000 | 5,130,000 | 11,970,000 |
| 5 | 45,000 | 940-555=385 | 17,325,000 | 5,900,000 | 11,425,000 | 3,427,500 | 7,997,500 |

**(5 Marks – 0.5 mark per year for correct contribution and 0.5 mark for after-tax cash flow)**

**(iii) Net Present Value Calculation:**

Initial outflows: Machinery = FRW 18,000,000; Installation = FRW 1,500,000; Working capital = FRW 2,500,000. Total Y0 outflow = FRW 22,000,000.

Additional WC of FRW 500,000 at beginning of Year 3 = discounted at Year 2.

Terminal Year 5: Scrap value FRW 1,200,000 + WC recovery FRW 3,000,000 (2,500,000 + 500,000)

| Year | After-tax Op CF | Tax Saving | WC / Scrap / Other | Net Cash Flow (FRW) | PVF @ 13% | PV (FRW) |
|---|---|---|---|---|---|---|
| 0 | | | (22,000,000) | (22,000,000) | 1.000 | (22,000,000) |
| 1 | 6,580,000 | 1,350,000 | | 7,930,000 | 0.885 | 7,018,050 |
| 2 | 10,675,000 | 1,012,500 | (500,000) WC | 11,187,500 | 0.783 | 8,759,813 |
| 3 | 13,422,500 | 759,375 | | 14,181,875 | 0.693 | 9,824,039 |
| 4 | 11,970,000 | 569,531 | | 12,539,531 | 0.613 | 7,686,742 |
| 5 | 7,997,500 | 1,348,594 | +4,200,000 | 13,546,094 | 0.543 | 7,354,529 |
| | | | | NPV | | 18,643,173 |

**NPV ≈ FRW +18,643,000**

**Recommendation:** Since the NPV is significantly positive (approximately FRW +18.6 million), the project should be accepted. The positive NPV represents value added to shareholders and exceeds the required 13% return on capital. The board should proceed with the investment in the industrial safety equipment product line.

**(6 Marks - 1 mark @PV; 0.5 mark NPV; 0.5 mark recommendation)**

**(iv) Sensitivity Analysis - Sales Volume:**

The sensitivity of NPV to sales volume measures by how much sales volumes can fall (uniformly across all years) before the NPV becomes zero.

Sensitivity % = |NPV| / PV of after-tax contributions × 100%

PV of after-tax contributions (tax-adjusted at 70%):

| Year | Units × CPU × 70% | PVF @ 13% | PV (FRW) |
|---|---|---|---|
| 1 | 40,000 × 380 × 0.70 = 10,640,000 | 0.885 | 9,416,400 |
| 2 | 55,000 × 390 × 0.70 = 15,015,000 | 0.783 | 11,756,745 |
| 3 | 65,000 × 395 × 0.70 = 17,972,500 | 0.693 | 12,453,803 |
| 4 | 60,000 × 390 × 0.70 = 16,380,000 | 0.613 | 10,041,054 |
| 5 | 45,000 × 385 × 0.70 = 12,127,500 | 0.543 | 6,585,233 |
| Total | | | 50,253,235 |

Sensitivity % = 18,643,173 / (50,253,235) × 100 = 37.1%

**Interpretation:** Sales volumes across all years would need to fall by approximately 37% before the project becomes unviable. This is a very large margin, indicating a LOW-RISK project with substantial

capacity to absorb volume reductions. Management can be confident about proceeding even under pessimistic volume scenarios.

**(3 Marks – 0.5 mark sensitivity formula; 2 mark calculation; 0.5 mark interpretation)**

**(v) NPV of Expansion Option:**

The expansion option can be exercised at the start of ;

Year 3 (t = 2): invest FRW 4,000,000.

Incremental after-tax contribution for ;

Years 3-5: FRW 1,800,000 × (1 - 0.30) = FRW 1,260,000 per year

NPV of expansion at t = 0 = -4,000,000 × 0.783 + 1,260,000 × (0.693 + 0.613 + 0.543)

= -3,132,000 + 1,260,000 × 1.849 = -3,132,000 + 2,329,740 = -FRW 802,260

**Recommendation:** The NPV of the expansion option is negative (approximately -FRW 802,000). The board should NOT exercise the expansion option unless future information changes the revenue or cost

projections favorably. The incremental contributions do not justify the additional FRW 4M investment at the 13% cost of capital.
**(2 Marks – 1.5 marks NPV calculation; 0.5-mark recommendation)**

All combined Working

| Year | | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| Unit sold | | | **40,000** | **55,000** | **65,000** | **60,000** | **45,000** |
| Selling Price Per Unit | | | 920 | 950 | 970 | 960 | 940 |
| Variable Cost per unit | | | (540) | (560) | (575) | (570) | (555) |
| Contribution Pert Unit | | | **380** | **390** | **395** | **390** | **385** |
| **Contribution** | | | **15,200,000** | **21,450,000** | **25,675,000** | **23,400,000** | **17,325,000** |
| Fixed Costs | | | (5,800,000) | (6,200,000) | (6,500,000) | (6,300,000) | (5,900,000) |
| Profit Before Tax | | | **9,400,000** | **15,250,000** | **19,175,000** | **17,100,000** | **11,425,000** |
| Tax @ 30% | 30% | | (2,820,000) | (4,575,000) | (5,752,500) | (5,130,000) | (3,427,500) |
| **After-Tax Profit** | | | **6,580,000** | **10,675,000** | **13,422,500** | **11,970,000** | **7,997,500** |
| Add: Tax Saving | | | 1,350,000 | 1,012,500 | 759,375 | 569,531 | 1,348,594 |
| Operating Cashflow | | | **7,930,000** | **11,687,500** | **14,181,875** | **12,539,531** | **9,346,094** |
| Installation | | **(1,500,000)** | | | | | |
| Initial Investment | | **(18,000,000)** | | | | | |
| Working Capital | | **(2,500,000)** | | **(500,000)** | | | **3,000,000** |
| Salvage Value | | | | | | | **1,200,000** |
| **Net Cash Flow** | | **(22,000,000)** | **7,930,000** | **11,187,500** | **14,181,875** | **12,539,531** | **13,546,094** |
| Discount Factor (13%) | 13% | 1.000 | 0.88496 | 0.783 | 0.693 | 0.613 | 0.543 |
| Present Value | | (22,000,000) | 7,017,699 | 8,761,454 | 9,828,751 | 7,690,729 | 7,352,277 |
| **Net Present Value** | | **18,650,910** | | | | | |

**QUESTION 20 - Kigali Premier Holdings plc (20 Marks)**

| Part | Requirement | Marks |
|---|---|---|
| (a)(i) | Ex-dividend shares price and dividend payout ratio | 2 |
| (a)(ii) | Cost of equity: CAPM and DGM, with comment on differences | 3 |
| (a)(iii) | Post-tax cost of redeemable bonds (IRR interpolation at 8% and 13%) | 1 |
| (a)(iv) | WACC using market-value weightings | 2 |
| (b)(i) | New shares issued / TERP or revised price - all three strategies | 2 |
| (b)(ii) | Revised EPS and DPS - all three strategies | 2 |
| (b)(iii) | Revised debt to capital ratio - all three strategies | 2 |
| (c) | Evaluate strategies; recommendation; reference to two dividend theories | 6 |
| | TOTAL | 20 |

**Model Answer - Q20**

**(a)(i) Ex-dividend share price and dividend payout ratio:**

Ex-dividend share price = Cum-dividend price - Dividend declared

= FRW 64.00 - FRW 2.40 = **FRW 61.60**

Dividend payout ratio = DPS / EPS = 2.40 / 4.80 **= 50%**

**(2 Marks – 0.5 mark for formula and 0.5 mark for final answer for each)**

**(a)(ii) Cost of Equity:**

**CAPM:** ke = Rf + βe × Equity Risk Premium = 5% + 1.55 × 8% = 5% + 12.4% **= 17.4%**

**Dividend Growth Model:** Using ex-dividend price of FRW 61.60 and D0 = FRW 2.40, g = 7%

D1 = 2.40 × 1.07 = FRW 2.568

ke (DGM) = D1/P0 + g = 2.568/61.60 + 0.07 = 0.04169 + 0.07 **= 11.17%**

**Comment:** The CAPM estimate (17.4%) is significantly higher than the DGM estimate (11.2%). This divergence likely reflects: (1) CAPM incorporates a systematic market-wide risk premium while DGM relies on the current market price and expected dividends; (2) DGM may understate the true cost of equity if dividend growth assumptions are conservative or the share is overvalued; (3) CAPM is more forward-looking and captures total market risk, while DGM is sensitive to current market price. A range-based approach or the CAPM may be more prudent for investment appraisal, given the assumptions embedded in the DGM.

**(3 Marks – 0.5 mark for formula and 0.5 mark on final answer for both CAPM & DGM; 1 mark quality comment on difference)**

**(a)(iii) Post-tax cost of redeemable bonds (IRR method):**

Annual after-tax coupon = 12% × FRW 100 × (1 - 0.30) = FRW 8.40 per FRW 100 nominal

At 8%: NPV = 8.40 × AF(8%, 8yr) + 100 × PVF(8%, 8yr) - 105

= 8.40 × 5.747 + 100 × 0.540 - 105 = 48.27 + 54.00 - 105 ≈ FRW -2.73 ≈ -3 per FRW 100 nominal

Total NPV at 8%: FRW 40,000,000 × (-3/100) ≈ FRW -1,200,000 per FRW 100 equivalent

At 13%: NPV = 8.40 × 4.799 + 100 × 0.376 - 105 = 40.31 + 37.60 - 105 ≈ FRW -27.09 per FRW 100

IRR (post-tax kd) = 8% + [(-3) / (-3 - (-27))] × (13% - 8%) = 8% + [3/24] × 5% = 8% + 0.63% ≈ 7.38% Or≈ 7.44%

**Note:** Using nominal totals provided in the question (if given as lump-sum NPVs), apply same interpolation. Approximately 7.44% post-tax cost of debt.

**(1 Mark – 05. Mark for the formula and 0.5 mark for correct interpolation answer≈** (7.38% ≈ 7.44**%)**

**(a)(iv) WACC using market-value weightings:**

Equity MV = 25,000,000 × FRW 61.60 = FRW 1,540,000,000

Bonds MV = FRW 40,000,000 × 105/100 = FRW 42,000,000

Preference shares MV = FRW 15,000,000 × 85/100 = FRW 12,750,000

Total MV = FRW 1,594,750,000

Cost of preference shares = 7% / 85% = 8.24% (perpetuity: coupon / market price)

WACC = (1,540/1,594.75)×17.4% + (42/1,594.75)×87.44% + (12.75/1,594.75)×8.24%

= 96.56%×17.4% + 2.63%×7.44% + 0.80%×8.24%

= 16.80% + 0.196% + 0.066% ≈ 17.06%

**Note:** Given the very high equity weight (>96%), WACC is close to the cost of equity. This reflects KPH's low leverage position.

**(2 Marks - 1 mark for market value weightings; 1 mark for correct WACC calculation)**

**(b) Comparison of Three Strategies:**

**Strategy 1: Rights Issue**

Ex-dividend price before rights = FRW 61.60; 20% discount = FRW 61.60 × 0.80 = FRW 49.28

1 for 5 rights: New shares = 25,000,000 / 5 = 5,000,000 shares

***Theoretical Ex-Rights Price (TERP) = [(5 × 61.60) + (1 × 49.28)] / 6 = [308.00 + 49.28] / 6 = FRW 59.55***

Total earnings = 25M × FRW 4.80 = FRW 120,000,000 (assumed unchanged)

***New EPS = 120,000,000 / 30,000,000 = FRW 4.00***

***DPS (maintain 50% payout): 4.00 × 50% = FRW 2.00 per share***

Debt: bonds + pref = FRW 42M + FRW 12.75M = FRW 54.75M; New equity at TERP = 30M × FRW 59.55 = FRW 1,786.5M

Debt-to-capital ratio = 54.75 / (1,786.5 + 54.75) × 100 ≈ **2.97%**

**(2 Marks – 0.5 mark for correct TERP, New EPS, DPS & D/E Ratio)**

**Strategy 2: New Debt (FRW 30M at 10%)**

No new shares issued; EPS affected by interest cost

*Annual interest (after-tax) = FRW 30,000,000 × 10% × (1-0.30) = FRW 2,100,000*

Net earnings = 120,000,000 - 2,100,000 = FRW 117,900,000

*EPS = 117,900,000 / 25,000,000 = FRW 4.72*

*DPS (40% payout): 4.72 × 40% = FRW 1.89 per share*

*New total debt = 42M + 12.75M + 30M = FRW 84.75M;*

Equity MV = 25M of shares*61.60 = FRW 1,540M (approx)

*Debt-to-capital ratio = 84.75 / (1,540 + 84.75) × 100* ***≈ 5.22%***

**(2 Marks – 0.5 mark for after tax interest, EPS, DPS & D/E Ratio)**

**Strategy 3: Retained Earnings + Scrip Dividend**

No external equity or debt raised; FRW 30M funded from FRW 18M cash + assumption of balance from internally generated funds

Scrip dividend: shareholders receive shares equivalent to FRW 2.40 per share instead of cash

Minimal new shares issued (scrip);

EPS essentially unchanged will changes from FRW 4.80 to Frw 4.62 as a result of change in shareholding from scrip shares (25,000,000*(2.40/61.6))=974,026, add up to 25,974,026 shares,

DPS = FRW 2.40 (scrip equivalent, same value as cash dividend);

New equity of = 61.60*25,974,026 = 1,600,000,002 Frw, increased from Frw 1,540,000,000.

Debt-to-capital ratio essentially unchanged ≈ 3.31% (equity increases slightly from scrip capitalization).

**(2 Marks – 0.5 mark for new shares/holding, EPS, new equity & D/E Ratio)**

**(c) Evaluation and Recommendation:**

**Strategy 1 - Rights Issue:** A rights issue maintains existing shareholder proportional ownership, is generally well-received by the market as it signals financial discipline without excessive leverage. However, EPS dilution (FRW 5.00 → FRW 4.00) and lower DPS (FRW 2.40 → FRW 2.00) may disappoint income-seeking shareholders. Under the Dividend Irrelevance Theory (Modigliani and Miller, 1961), a lower dividend has no bearing on intrinsic value, since shareholders receive the value through their rights entitlement. However, in practice, the signalling effect of a reduced DPS may be interpreted negatively by the market.

**Strategy 2 - New Debt:** While leverage increases, KPH's starting position is extremely low gearing (~3%), so the additional FRW 30M debt barely changes the risk profile. The cut in dividend payout to 40% reduces DPS significantly (FRW 2.40 → FRW 1.89), which could send a negative signal to the market (Dividend Signalling Theory - Lintner, 1956), implying financial difficulty or lower confidence in future earnings. However, Lintner's model also suggests firms prefer dividend stability; a cut may cause a more negative market reaction than warranted.

**Strategy 3 - Retained Earnings + Scrip Dividend:** This strategy maintains dividend value (FRW 2.40 per share, whether cash or scrip), preserves/slight decrease in EPS, and avoids any increase in leverage. The scrip dividend allows shareholders who prefer capital to cash to retain shares without dilution beyond their proportional stake. According to the Pecking Order Theory (Myers & Majluf, 1984), internal financing (retained earnings) is preferred over external debt or equity, as it avoids issuing signals to the market. This strategy is also consistent with maintaining financial flexibility for future strategic options.

**Recommendation:** Strategy 3 (Retained Earnings + Scrip Dividend) is recommended. It fully funds the expansion from internal sources and existing cash, preserves dividend stability consistent with signalling theory expectations, avoids any dilution or increased leverage, and aligns with the Pecking Order Theory of financing. Given KPH's strong cash position (FRW 18M) and access to FRW 20M additional borrowing capacity as a fallback, there is no compulsion to raise external funding. This strategy best balances shareholder value, financial risk, and market signalling.

**Dividend Theories Applied:**

- Dividend Signalling Theory (Lintner): Dividends convey information about management's confidence in future earnings. Strategy 2's dividend cut risks a negative market reaction, while Strategy 3 maintains the FRW 2.40 per share signal.
- Pecking Order Theory (Myers & Majluf): Firms prefer internal financing first, then debt, then equity. Strategy 3 aligns perfectly; Strategy 1 (rights issue) is last in the pecking order.

**(6 Marks - 1 mark per strategy evaluated; 1 mark for recommendation; 1 mark each for two dividend theories applied correctly)**

## End of marking guide and model answers