CERTIFIED PUBLIC ACCOUNTANT

ADVANCED LEVEL II EXAMINATION

A2.1: STRATEGY CORPORATE FINANCE

DATE: WEDNEDAY 26, AUGUST 2026

MARKING GUIDE AND MODEL ANSWERS

SECTION A

QUESTION ONE

Marking guide

a	**Description**	**Marks**
i	**Cost of equity**	
	Award 1 mark for computation of cost of equity	1
	Cost of redeemable loan notes	
	Award 1 marks NPV at lower rate	1
	Award 1 marks NPV at higher rate	1
	Award 1 marks correct cost of redeemable loan note by IRR	1
	Cost of bank term loan	
	Award 0.5 marks correct cost of bank term loan after tax	0.5
	Computation of WACC	
	Award 1 mark for correct market value of equity, 1 mark for redeemable loan notes and 1 mark for bank term loan	3
	Award 1 mark for correct final WACC.	1
	Forecasting of free cash flow	
	Revenue forecast (Award 0.5 marks from year 2 to 4)	1.5
	EBIT forecast (Award 0.5 marks from year 2 to 4)	1.5
	Tax computation (Award 0.5 marks from year 2 to 4)	1.5
	Add back depreciation (Award 0.5 marks from year 2 to 4)	1.5
	Less capital expenditure grow by 10% p.a (Award 0.5 marks from year 2 to 4)	1.5
	Less increase in Net working capital (Award 0.5 marks from year 2 to 4)	1.5
	Present values of free cash flow (Award 0.5 marks from year 1 to 4)	2
	Award 2 marks for correct Terminal value (1 mark for formula application and 1 mark for correct terminal value)	2
	Award 0.5 marks for correct value of the firm	0.5
	Computation of Equity Value of Target (NZIZA TECH)	
	Award 0.5 for correct deduction of Market value of 8% Loan Notes	0.5
	Award 0.5 for correct deduction of Bank Term Loan (at fair value = book value)	0.5
	Award 0.5 for correct equity value of NZIZA TECH	0.5
	Award 0.5 for correct number of shares	0.5
	Award 0.5 for correct Value per share	0.5
	Sub – Total	**26**
ii	Award 0.5 marks for correct value of 90% stake from DCF valuation	0.5
	Award 0.5 marks for correct market capitalization of 100%	0.5
	Award 2 marks for correct current market capitalization of 90% stake	2
	Award 2 marks for correct acquisition premium %	1
	Award 2 marks for advice: 1 mark for financial justification referencing DCF Valuation and 1 mark for correct advice	2
	Sub – Total	**6**

b	Award 1 mark for correct identified stage and 1 mark for each well justified referenced to scenario	6
c	Award 1 marks for correct source of finance appropriate to fund acquisition and 1 for well explanation (max 6 marks)	6
d	Award 1 marks professional presentation of Memo	1
	Award 2 marks for well description of financial case for the acquisition	2
	Award 2 marks for well description of key non-financial risk	2
	Award 1 marks for correct conclusion as advise	1
	Sub – Total	**6**
	Total	**50**

MODEL ANSWER

To:	The Board of Directors, Ikirezi Connect Ltd
From:	Strategic Financial Advisor
Date:	10 September 2026
Re:	Fair value, acquisition premium, VC financing stage and funding sources for the proposed acquisition of Nziza Tech Developers Plc

"Consulting firm" has been engaged by Ikirezi Connect Ltd to act as independent Strategic Financial Advisor in connection with its proposed acquisition of a 90% equity stake in Nziza Tech Developers Plc. This report has been prepared solely for the use of the Board of Directors of Ikirezi Connect in evaluating the proposed transaction and should not be relied upon by any other party for any other purpose.

In preparing this report, we have relied on financial and operational information provided by management of Ikirezi Connect and publicly available information on Nziza Tech, which we have not independently verified.

(a)(i) Fair Value per Share of Nziza Tech Developers Plc - NPV/DCF Valuation

As Ikirezi Connect (acquirer) bears no business/financial risk of Nziza Tech (target) pre-completion, the target's cash flows are discounted at the acquirer's own WACC. Full workings appear in Annex A.

Item	**Value**
WACC of Ikirezi Connect (grant excluded - not a financing instrument)	10.46%
Total enterprise value (PV of FCF Yr1- 4 + PV terminal value)	13,794,611
Less: MV of loan notes and bank loan	(807,200)
Equity value of Nziza Tech (100%)	**12,987,411**
÷ Shares in issue (240,000,000)	240,000,000
FAIR VALUE PER SHARE	**FRW 54.11**

see Annex A for full computation of Ke, Kd, WACC, FCF and DCF

(a)(ii) Value of 90% Stake, Acquisition Premium and Financial Justification

Item	**FRW '000 (unless stated)**
DCF equity value (100%)	12,987,411
Value of 90% stake (12,994,611 * 90%)	11,688,670

Total shares	240,000,000
Current share price	FRW 38 per share

Market capitalization (100%)	9,120,000
Market cap of 90% stake (9,120,000 * 90%)	**8,208,000**
Implied acquisition premium = (11,688,670 - 8,208,000) / 8,208,000	42.41%

The DCF model implies an acquisition premium of approximately 42.41% over the current market price, reflecting the value of synergies and the intrinsic growth potential identified in the valuation.

(b) Stage of Venture Capital Financing

IKIREZI CONNECT Ltd is currently at the Expansion (Growth) Stage of venture capital financing.

This conclusion is supported by the following evidence from the scenario:

- The company was incorporated in 2018 and commenced commercial operations in 2019, confirming that the seed and start-up stages have been successfully completed.
- The company currently serves over 85,000 residential and corporate clients, demonstrating a proven, scalable product with validated market demand consistent with an expansion-stage profile.
- EAST AFRICA VENTURE PARTNERS (EAVP) invested FRW 600,000,000 in 2021 for a 25% stake. EAVP's role extended beyond capital (board representation, client access, strategic guidance), which is characteristic of expansion-stage VC involvement.
- SAVANA TECH HOLDINGS subsequently invested FRW 2,800,000,000 in 2022 for a 35% stake, a substantially larger institutional investment used to develop the fibre backbone and obtain regulatory licences consistent with late-expansion or pre-IPO capital.
- The company generates positive EBITDA and has a clear path to profitability but has not yet undertaken an IPO, which places it firmly in the later expansion / pre-exit stage.

(c) Alternative Sources of Finance for the Acquisition

1. Private Equity / Strategic Co-investor

Given the size of the transaction, IKIREZI CONNECT could invite an additional private equity investor or a strategic co-investor (such as a regional telecoms group) to co-finance the acquisition. This preserves IKIREZI CONNECT's debt capacity while sharing execution risk. It is appropriate given the company's established PE investor base (EAVP and SAVANA) and the precedent of prior equity rounds.

2. Acquisition Finance / Leveraged Loan from a Commercial Bank

A medium-term acquisition loan (term loan or revolving credit facility) from a commercial bank or development finance institution (e.g., BRD, Afreximbank) would allow IKIREZI CONNECT to finance the acquisition without diluting equity. This is appropriate given the company's positive EBITDA, its ability to service debt from combined cash flows, and the fact that NZIZA TECH's assets and cash flows can serve as collateral support.

3. Vendor Finance (Seller Financing / Deferred Consideration)

IKIREZI CONNECT could negotiate for the sellers of the 90% NZIZA TECH stake to defer a portion of the purchase consideration (e.g., an earn-out arrangement linked to NZIZA TECH's post-acquisition performance). This reduces the immediate cash requirement, aligns the interests of the sellers with post-acquisition performance, and is particularly useful given the uncertainty over

synergy realisation. It is appropriate given the openness of NZIZA TECH's board to a strategic transaction.

Conclusion

Based on the DCF valuation, the intrinsic value of NZIZA TECH's equity per share is approximately FRW 54.114, which is significantly above the current market price of FRW 38. This suggests that the market is undervaluing NZIZA TECH relative to its projected cash flows when synergies are incorporated.

This means the acquisition therefore appears financially justified: IKIREZI CONNECT would be acquiring company worth more than its current price. However, management must exercise caution given the significant premium involved (42.41%). This increases risk, and the expected synergies must be realised in full to justify that higher price paid.

ANNEX A - SUPPORTING WORKINGS

Working 1: WACC of IKIREZI CONNECT Ltd

The acquisition is a case where IKIREZI CONNECT (the predator) is not exposed to the business or financial risk of NZIZA TECH (the target). In this scenario, the appropriate discount rate for the DCF valuation of the target is the predator's own WACC, reflecting the predator's risk profile.

Market values of each capital component

The governmentgrant (FRW 1,200,000 '000) appears in the capital structure. However, a grant is NOT a source of finance with an associated cost of capital it carries no interest, no dividend, and no return obligation. It is government assistance, not a financing instrument. Therefore, the grant is excluded from the WACC computation. Including it would artificially inflate the denominator and reduce the WACC, distorting the valuation.

Capital Component	Market Value (FRW '000)
Equity most recent arm's-length transaction (SAVANA 35% for FRW 2,800,000 '000 total equity = 2,800,000 / 0.35)	8,000,000
8% Redeemable Loan Notes market value: 500 notes * FRW 960/1,000 = 480,000	480,000
Bank Term Loan at book value (approximates fair value)	320,000
Government Grant EXCLUDED (no cost of capital see explanation above)	
TOTAL MARKET VALUE (V)	8,800,000

Cost of each component

Cost of Equity (Ke): IKIREZI CONNECT is unlisted. The cost of equity is estimated using NZIZA TECH's listed equity as a proxy (same industry/market risk), applying the Gordon Growth Model:

$Ke = D_1 / P_0 + g = (2.10 * 1.05) / 38 + 0.05 = 2.205 / 38 + 0.05 = 5.80\% + 5.00\% = 10.80\%$

Cost of Loan Notes (Kd after tax): Using linear interpolation (IRR method):

8% loan notes: Par FRW 1,000; redeemable at par in 5 years; current market price FRW 960; tax rate 30%.
After-tax annual coupon= FRW 1,000*8%*(1-0.30) = FRW 56 per note

Year	**Cash flow (FRW)**	**PVIF @ 6%**	**PV @ 6%**	**PVIF @ 7%**	**PV @ 7%**
0	(960)	1.000	(960)	1.000	(960)
1 - 5 (annuity)	56	4.212	236	4.100	230
5 (redemption)	1,000	0.747	747	0.713	713
NPV			**22.87**		**(17.40)**

IRR= LDF+ [HDF-LDF]* $\frac{NPV@LDF}{NPV@LDF-NPV@HDF}$

IRR= 6%+ [7%-6%]* $\frac{22.87}{22.87-(17.4)}$ = 6.57%

Post-tax cost of redeemable loan note (Kd) = 6.57% (accept 6.5% to 6.6%)

Alternatively

Cost of redeemable loan notes

Current market value = FRW 960, Annual interest = 8% of FRW 1,000 = FRW 80, Redeemable at par after 5 years

Use approximate redemption yield formula:

$$K_d = \frac{I\,(1-T) + \frac{RV - MV}{n}}{\frac{RV + MV}{2}}$$

Where:

- Kd is the cost of redeemable debt (loan notes)
- I is interest, I = FRW 80
- RV is redemption value, RV = FRW1,000
- MV is the current market value, MV = FRW 960
- N is the number of years, n = 5 years
- T is tax rate, T = 30%

$$K_d = \frac{80\,(1-0.3) + \frac{1{,}000-960}{5}}{\frac{1{,}000+960}{2}}$$

Kd = 6.53%

Cost of Bank Loan (after tax) = Kd (bank) * (1 - T) = 7.70% = 11% * (1 - 0.30) = 7.70%

Compute WACC

Component	**Market Value (FRW '000)**	**Weight**	**Cost**	**Weighted Cost**
Equity	8,000,000	90.91%	10.80%	9.82%
Redeemable Loan Notes	480,000	5.45%	6.57%	0.36%
Bank Term Loan	320,000	3.64%	7.70%	0.28%
Government Grant		Excluded	Nil	
Total / WACC	8,800,000	100%		**10.46%**

WACC of IKIREZI CONNECT Ltd: 10.46% (use 10.5% in discounting below)

For learning purpose: Why the Grant is Excluded

A government grant is a form of government assistance, not a financial instrument. The RURA grant carries no coupon, no dividend, no redemption obligation and no required return. Including it in the WACC denominator (while assigning it a cost of zero) would reduce the WACC without any compensating benefit to providers of capital this would be incorrect. The WACC is a weighted average of the returns required by those who have provided finance; the State, as grantor, requires no financial return. Students who include the grant in the denominator and assign it a zero cost will receive partial credit but will be penalized for an incorrect WACC.

Step 2: DCF Valuation of NZIZA TECH DEVELOPERS Plc

Working 2: Free Cash Flows (Years 1-4)

Free Cash Flow = EBIT * (1 - Tax Rate) + Depreciation & Amortization - Capital Expenditure - Increase in Net Working Capital

Item (FRW '000)	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Revenue	8,450,000	8,872,500	9,316,125	9,781,931
EBIT (@ 15.00% of revenue*)	1,267,500	1,330,875	1,397,419	1,467,290

Tax @ 30%	(380,250)	(399,263)	(419,226)	(440,187)
EBIT (1 - t) = NOPAT	887,250	931,612	978,193	1,027,103
Add: Depreciation & Amortization	312,000	312,000	312,000	312,000
Less: Capital Expenditure (grow by 10% p.a.)	(180,000)	(198,000)	(217,800)	(239,580)
Less: Increase in Net Working Capital	(95,000)	(95,000)	(95,000)	(95,000)
FREE CASH FLOW	924,250	950,612	977,393	1,004,523

* EBIT margin = 1,267,500 / 8,450,000 = 15.0% (held constant per instructions)

Working 3: Terminal Value (end of Year 4)

Year 5 FCF = Year 4 FCF * (1 + g) = 1,004,523 * 1.04 = FRW 1,044,704

Terminal Value = Year 5 FCF / (WACC - g) = 1,044,704 / (0.105 - 0.04) = 1,044,704 / 0.065 = FRW 16,072,369

Working 4: Discount all cash flows at WACC = 10.5%

Year	**Cash Flow (FRW '000)**	**Discount Factor (10.5%)**	**Present Value (FRW '000)**
Year 1	924,250	$1/ (1.105)^{1} = 0.9050$	836,446
Year 2	950,612	$1/ (1.105)^{2} = 0.8190$	778,551
Year 3	977,393	$1/ (1.105)^{3} = 0.7412$	724,604
Year 4 Operating FCF	1,004,523	$1/ (1.105)^{4} = 0.6707$	673,683
Year 4 Terminal Value	16,072,369	0.6707	10,781,327
TOTAL ENTERPRISE VALUE/value of the firm			**13,794,611**

Working 5: Compute Equity Value

Item	**FRW '000**
Total Enterprise Value (from DCF)	13,794,611
Less: Market value of 8% Loan Notes (320,000 * 960/1,000)	(307,200)
Less: Bank Term Loan (at fair value = book value)	(500,000)

EQUITY VALUE OF NZIZA TECH	12,987,411
Number of ordinary shares in issue	240,000,000
VALUE PER SHARE	**FRW 54.114**

Fair Value per share = 12,987,411,000 / 240,000,000 = FRW 54.114 per share

(d) Memorandum to the Board of Directors

TO: Board of Directors, IKIREZI CONNECT Ltd

FROM: Chief Financial Officer

DATE: Exam date

SUBJECT: Proposed Acquisition of 90% Stake in NZIZA TECH DEVELOPERS Plc Financial Summary

Financial Case for the Acquisition

Using a Discounted Cash Flow (DCF) valuation, the intrinsic value of each NZIZA TECH share is estimated at approximately FRW 54.114, compared to the current market trading price of FRW 38. This implies that the market is currently undervaluing NZIZA TECH by approximately 42.5%.

A 90% equity stake in NZIZA TECH is estimated to be worth approximately FRW 11,688,670,000 compared to a market value of FRW 8,208,000,000 for the same stake. The premium we would be paying over market price is approximately 42.41%. This premium is justified only if the identified synergies including cost savings from shared infrastructure and cross-selling revenue are fully realized. Management should rigorously scrutinize the synergy assumptions before committing.

On balance, the acquisition appears financially justified: we are acquiring an asset at a price below its DCF-derived intrinsic value, and the combined entity stands to generate significantly stronger cash flows than either business could independently.

Key Non-Financial Risks

Risk 1 Integration and Cultural Risk

IKIREZI CONNECT is an internet connectivity business; NZIZA TECH is a software and IT solutions company. Merging two organizations with different operating models, management cultures and technical teams create significant integration risk. Failure to integrate effectively could erode the synergies on which the financial case depends.

Risk 2 Competitive and Market Risk

NZIZA TECH is already experiencing margin pressure from South African and Kenyan IT firms entering the Rwandan market. If this competitive pressure intensifies post-acquisition, the projected revenue growth and EBIT margins embedded in the DCF model may not be achievable, reducing the realized value of the acquisition.

We recommend that the Board approve further due diligence before a binding offer is made.

Regards,

Chief Financial Officer

SECTION B
QUESTION TWO

Marking Guide

Q4	CRITERIA	Marks
a)	Expected Return when weightings of 0% in the Equity Fund	0.5
	Portfolio Risk when weightings of 0% in the Equity Fund	0.5
	Expected Return when weightings of 25% in the Equity Fund	0.5
	Portfolio Risk when weightings of 25 % in the Equity Fund	0.5
	Expected Return when weightings of 50% in the Equity Fund	0.5
	Portfolio Risk when weightings of 50% in the Equity Fund	0.5
	Expected Return when weightings of 100% in the Equity Fund	0.5
	Portfolio Risk when weightings of 100% in the Equity Fund	0.5
	The minimum-variance portfolio	
	Formula for minimum variance weighting	1
	Computation for minimum variance weighting	1
	Expected Return when weightings is 8% in the Equity Fund	1
	Portfolio Risk when weightings of 8% in the Equity Fund	1
	Title of the graph	0.5
	Each point indicated of the graph award 0.5 marks each	2.5
	Indication of the vertical and horizontal axes 0.5 marks each	1
	Comment	1
	Sub – Total	**13**
b)	Award 0.5 marks for correct identification of correct form of EMH.	1.5
	Award 1 mark for each explanation on each option	3
	Award 0.5 marks for rejecting option 3, 0.5 marks for rejection also Option 1 and 2. And 0.5 marks recommending option 4	1.5
	Sub – Total	**6**
c)	Optimum Capital Structure and WACC for the EV Taxi Project	
	Cost of Equity (CAPM) (Award 0.5 for each Weighting)	2
	WACC (Award 0.5 for each Weighting)	2
	Optimum Capital structure Graph	1
	Optimal Capital Structure: Justification	1
	Sub – Total	**6**
	Total marks	**25**

Model answer

a)

	Expected Return	Std. Deviation (Risk)	Correlation (Equity, Bond)
Equity Fund	14%	20%	
Bond Fund	6%	8%	**ρ = 0.20**

Weightings of 0% in the Equity Fund

	Expected Return	Weighting	Portfolio return
Equity Fund	14%	0%	0%
Bond Fund	6%	100%	6%
			6%

Portfolio Risk= $\sqrt{(we^2 * sde^2) + (wb^2 * sdb^2) + (2 * we * wb * sde * sdb * P_{eb})}$

Portfolio Risk= $\sqrt{(0^2 * 0.2^2) + (100^2 * 0.08^2) + (2 * 100 * 0 * 20 * 8 * 0.20)}$ **= 8%**

Weightings of 25% in the Equity Fund

	Expected Return	Weighting	Portfolio return
Equity Fund	14%	25%	3.50%
Bond Fund	6%	75%	4.50%
			8.00%

Portfolio Risk= $\sqrt{(we^2 * sde^2) + (wb^2 * sdb^2) + (2 * we * wb * sde * sdb * P_{eb})}$

Portfolio Risk= $\sqrt{(25^2 * 0.2^2) + (75^2 * 0.08^2) + (2 * 25 * 75 * 0.2 * 0.08 * 0.20)}$

Portfolio Risk= $\sqrt{25 + 36 + 12}$ **= 8.48**

Weightings of 50% in the Equity Fund

	Expected Return	Weighting	Portfolio return
Equity Fund	14%	50%	7.00%
Bond Fund	6%	50%	3.00%
			10.00%

Portfolio Risk= $\sqrt{(we^2 * sde^2) + (wb^2 * sdb^2) + (2 * we * wb * sde * sdb * P_{eb})}$

Portfolio Risk= $\sqrt{(50^2 * 0.2^2) + (50^2 * 0.08^2) + (2 * 50 * 50 * 0.2 * 0.08 * 0.20)}$

Portfolio Risk= $\sqrt{100 + 16 + 16}$ **= 11.49%**

Weightings of 100% in the Equity Fund

	Expected Return	Weighting	Portfolio return
Equity Fund	14%	100%	14.00%
Bond Fund	6%	0%	0.00%
			14.00%

Portfolio Risk= $\sqrt{(\boldsymbol{we^2 * sde^2}) + (\boldsymbol{wb^2 * sdb^2}) + (\boldsymbol{2 * we * wb * sde * sdb * P_{eb}})}$

Portfolio Risk= $\sqrt{(\boldsymbol{100^2 * 0.2^2}) + (\boldsymbol{0^2 * 0.08^2}) + (\boldsymbol{2 * 100 * 0 * 0.2 * 0.08 * 0.20})}$

Portfolio Risk= $\sqrt{\boldsymbol{400 + 0 + 0}}$ **= 20%**

Minimum-Variance Weight in Equity Portfolio

(Pr)²= $(\boldsymbol{we^2 * sde^2}) + (\boldsymbol{wb^2 * sdb^2}) + (\boldsymbol{2 * we * wb * sde * sdb}$***Peb)**

Since we only have two assets, We = (1−Wb)
Step 1: Minimize - take the derivative with respect to We and set to zero
Step 2: Simplify (divide through by 2 and expand)
Step 3: Collect all w_1 terms on one side
Step 4: Solve for w_1 (this is the Minimum-Variance Weight formula)

We= $\frac{sdb^2-(Peb*Sde*Sdb)}{sde^2+sdb^2-(2*Peb*Sde*Sdb)}$

Were

1. Sde= Standard deviation of Equity Fund
2. Sdb: Standard deviation of Bond Fund
3. Peb: Coefficient of Correlation Between Equity and Bond
4. We= Weighting of Equity Fund
5. Wb= Weighting of Bond Fund

We = $\frac{0.08^2-(0.2*0.08*0.20)}{(0.2^2+0.08^2)-(2*0.2*0.08*0.20)} = \frac{0.0032}{0.0464-0.0064}$ = **0.08 = 8%**

Optimum Mix will be Achieved on mix of 8% of Equity Fund and 92% OF BOND fund

weightings of 8% in the Equity Fund

	Expected Return	Weighting	Portfolio return
Equity Fund	14%	8%	1.12%
Bond Fund	6%	92%	5.52%
			6.64%

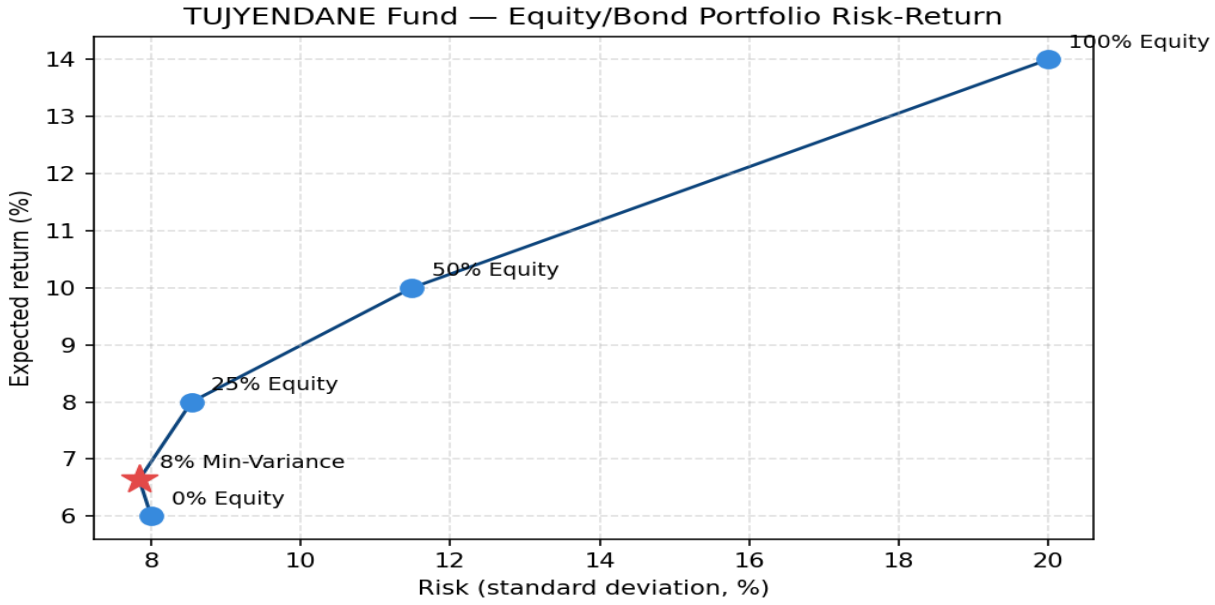
Portfolio Risk= $\sqrt{(we^2 * sde^2) + (wb^2 * sdb^2) + (2 * we * wb * sde * sdb * P_{eb})}$

Portfolio Risk= $\sqrt{(0.08^2 * 0.2^2) + (0.92^2 * 0.08^2) + (2 * 0.08 * 0.92 * 0.2 * 0.08 * 0.20)}$

Portfolio Risk= 7.84%

Weight in Equity	**Portfolio Return**	**Portfolio Risk (σ)**
0% (100% Bond)	6.00%	8.00%
8% (Minimum Variance)	**6.64%**	**7.84%**
25%	8.00%	8.54%
50%	10.00%	11.49%
(100% Equity)	14.00%	20.00%

Risk-Return Graph



The 8% Equity / 92% Bond mix minimizes portfolio risk (7.84%) but yields a modest return of 6.64%. For a moderate-risk investor, the 50% Equity / 50% Bond mix (return 10.00%, risk 11.49%) offers a stronger, well-balanced trade-off between risk and return, consistent with TUJYENDANE Fund's Safety, Liquidity, and Good Return philosophy. Trustees seeking a more conservative moderate position may instead prefer the 25% Equity weighting (return 8.00%, risk 8.54%), which sits closer to the minimum-variance point while still improving on it.

b) Efficient Market Hypothesis and Abnormal Returns

Option 1 - Fundamental Analysis (semi-strong-form EMH): Semi-strong-form EMH holds that share prices already fully reflect all publicly available information, including annual reports, financial ratios, and industry data. If this form holds - as most empirical evidence for developed markets suggests - then Option 1's analysts are searching for mispricings using information the market has already priced in. Any "undervalued" shares identified are more likely a reflection of analyst error or unrewarded risk than genuine abnormal return opportunities, especially after accounting for research costs and fees. Sustainable abnormal returns from this strategy are therefore unlikely.

Option 2 - Technical Analysis (weak-form EMH): Weak-form EMH holds that prices already reflect all historical price and volume data, meaning price patterns and momentum indicators (moving averages, RSI, MACD, etc.) carry no genuine predictive power beyond chance. Since weak-form efficiency is the most strongly and consistently supported form in empirical studies, technical analysis is very unlikely to deliver sustainable abnormal returns, and trading costs from frequent buy/sell signals would further erode any apparent gains.

Option 3 - Trading on Insider Information (strong-form EMH): Strong-form EMH holds that prices reflect all information, public and private, implying even insiders couldn't earn abnormal returns. In reality, strong-form efficiency is consistently rejected - insiders acting on material non-public information typically do generate abnormal returns before the information becomes public. So while Option 3 would likely be "successful" in generating abnormal returns, it is only possible because markets are not strong-form efficient.

Recommendation to Trustees

Reject Option 3 outright - regardless of its return potential, acting on insider information constitutes illegal insider trading, exposing the Fund and its trustees to severe legal, regulatory, and reputational risk. This is a governance/legal veto, not a cost-benefit decision**.**

Reject or heavily scale back Options 1 and 2 - given weak-form and semi-strong-form efficiency broadly hold, neither active fundamental nor technical analysis is likely to reliably beat the market net of research costs, fees, and trading costs.

Adopt Option 4 - a low-cost passive index-tracking fund is the strategy most consistent with EMH evidence, delivering market returns without the unrewarded costs and risks of active management or the legal exposure of Option 3.

c) Optimum Capital Structure and WACC for the EV Taxi Project

Initial investment: FRW 1,000,000,000 (EV fleet acquisition)
Constant annual EBIT: FRW 250,000,000
Corporate tax rate: 30%
Market return: 10%
Risk-free rate: 5%
Market Premium= 10%-5%= 5%

Cost of Equity (CAPM)

$Ke = Rf + \beta(Rm - Rf) = 5\% + \beta(10\% - 5\%) = 5\% + 5\beta$

Rf	**Equity Beta (βe)**	**Markt Premium**	**Cost of Equity**
5%	1.4	5%	12.00%
5%	1.6	5%	13.00%
5%	2	5%	15.00%
5%	2.8	5%	19.00%

Cost of Debt

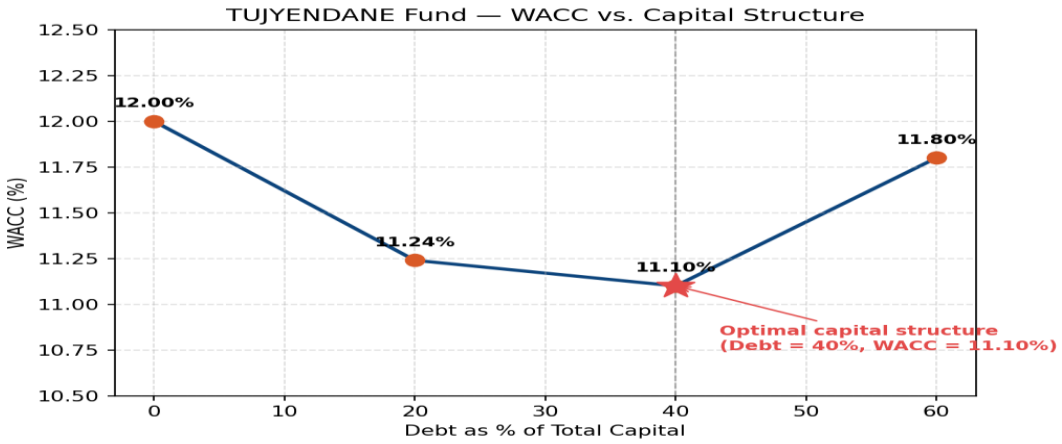
Kd (pre-tax)	**Kd(1−T) = Kd × 0.7**
-	-
6.00%	4.20%
7.50%	5.25%
10.00%	7.00%

WACC Calculations

Debt = 0%	**Cost of Sources of Finance**	**weighting**	**Cost of sources of Finance * Weighting**	**WACC**
Equity	12.00%	100%	12.00%	
Debt	0	0%	0.00%	
				12.00%
Debt = 20%	**Cost of Sources of Finance**	**weighting**	**Cost of sources of Finance * Weighting**	**WACC**
Equity	13.00%	80%	10.40%	
Debt	4.20%	20%	0.84%	

				11.24%
Debt = 40%	**Cost of Sources of Finance**	**weighting**	**Cost of sources of Finance * Weighting**	**WACC**
Equity	15.00%	60%	9.00%	
Debt	5.25%	40%	2.10%	
				11.10%
Debt = 60%	**Cost of Sources of Finance**	**weighting**	**Cost of sources of Finance * Weighting**	**WACC**
Equity	19.00%	40%	7.60%	
Debt	**7.00%**	60%	4.20%	
				11.80%

Optimum Capital structure Graph



Optimal Capital Structure: Justification

WACC follows a U-shape: it falls from 12.00% at 0% debt to a minimum of 11.10% at 40% gearing, then rises to 11.80% at 60% debt. Up to 40% gearing, tax-adjusted savings from cheaper debt outweigh the rising cost of equity; beyond 40%, the sharp increase in equity beta (from 2.0 to 2.8) and the higher cost of debt (10%) drive WACC back up as financial risk increase.

The Board should adopt a 40% debt / 60% equity capital structure for the EV taxi project, as this minimizes WACC (11.10%) and maximizes the value of the investment. Gearing should not be

pushed beyond 40% for this venture, as the firm's financial risk increases faster than the financing cost benefit beyond that point.

QUESTION THREE

Marking guide

Q3	CRITERIA	Marks
a)	**Receivables** - For leading	
	90% of the receivable less discount	0.5
	Converted to FRW	0.5
	Invested for 3 months at Rwanda's lending rate	1
	10% of the receivable at forward at the 3-month forward Buy rate	0.5
	Combined 10% and 90%	1
	For forward market	0.5
	Money Market Cover	
	Amount to borrow in USD now	1
	Convert to FRW today at spot Buy rate	0.5
	Invest this FRW amount for 3 months at Rwanda's lending rate	1
	Conclusion	0.5
	Payables - Leading	
	Cost today at the spot Sell rate	0.5
	Financed by a 3-month FRW loan at Rwanda's borrowing rate	1
	Forward Market Cover	0.5
	Money Market Cover	
	USD amount to deposit now	1
	Cost to buy this USD today at spot Sell rate	0.5
	Financed by a 3-month FRW loan at Rwanda's borrowing rate	1
	Conclusion	0.5
	Sub – Total	**12**
b)	**Step 1: Identify the trade Exchange**	
	Buy exchange (lowest ask)	0.5
	Sell exchange (highest bid)	0.5
	Step 2: Total Gross profit before fees	0.5
	Step 3: Correct buy trading fee calculation and total buy cost	1
	Step 4: Net BTC received Transfer BTC from A to B	1
	Step 5: Net sale proceeds of selling on Exchange B	1
	Step 6: NET ARBITRAGE PROFIT / (LOSS)	0.5
	Sub – Total	**5**

c)	Award 2 marks each for the exposure related to the case study	6
d)	Award 1 mark each, Maximum 2	2
		25

Model Answers

Hedging the Export Receivable - $840,000 due from MC COFFEE STORE in 3 months

a) 1 Leading (reflecting the 90%/10% customer split)

UBUMANZI offers a 0.1% discount for each full month a customer settles ahead of the due date, and 90% of customers are reported to take up this option. Modelling the 90% as settling immediately (3 months early, earning the full 0.3% discount) and the remaining 10% as settling at the normal 3-month due date:

- 90% of the receivable = $756,000 nominal, collected today at a 0.3% discount: $756,000 × (1 − 0.3%) = $753,732
- Converted to FRW at the spot Buy rate (1,462): $753,732 × 1,462 = FRW 1,101,956,184
- Invested for 3 months at Rwanda's lending rate (2.5%/quarter) so it is comparable at the 3-month horizon: FRW 1,101,956,184 × 1.025 = FRW 1,129,505,089
- 10% of the receivable = $84,000, still outstanding at 3 months, is separately covered forward at the 3-month forward Buy rate (1,572): $84,000 × 1,572 = FRW 132,048,000
- Combined outcome in 3 months = FRW 1,129,505,089 + FRW 132,048,000 = FRW 1,261,553,089

2 Forward Market Cover

UBUMANZI sells the full $840,000 receivable forward to the bank today at the 3-month forward Buy rate of 1,572, locking in the FRW proceeds regardless of how the spot rate or customer payment timing behaves:

- $840,000 × 1,572 = FRW 1,320,480,000 - guaranteed, receivable in 3 months

3 Money Market Cover

UBUMANZI borrows USD today against the certain future receivable, converts the loan proceeds to FRW immediately, and invests the FRW; the receivable from MC COFFEE STORE is used in 3 months to clear the USD loan.

- Amount to borrow in USD now (so principal + interest at the US borrowing rate of 3%/quarter equals $840,000 in 3 months): $840,000 ÷ 1.03 = $815,533.98
- Convert to FRW today at spot Buy rate (1,462): $815,533.98 × 1,462 = FRW 1,192,310,680
- Invest this FRW amount for 3 months at Rwanda's lending rate (2.5%/quarter): FRW 1,192,310,680 × 1.025 = FRW 1,222,118,447

Strategy	**FRW Received**	**Rank**
Forward Market Cover (full $840,000)	1,320,480,000	**1st (Best)**

Leading - realistic 90%/10% blend	1,261,553,089	2nd
Leading - hypothetical 100% early payment	1,255,005,654	3rd
Money Market Cover (full $840,000)	1,222,118,447	4th

Even after realistically incorporating the 90% early-payment take-up, a full forward sale of the entire $840,000 still produces the highest guaranteed FRW receipt.

Hedging the Import Payable - $100,000 due to LENO INC. in 3 months

This liability relates to four AI-automated production machines (USD 25,000 each) purchased by the Rwandan parent for installation at the Argentina subsidiary. The USD payable itself is a transaction exposure of UBUMANZI GROUP (Rwanda) and is hedged in exactly the same way as any other USD import liability.

1 Leading

Leading on the payable side means UBUMANZI itself pays LENO INC. immediately rather than waiting 3 months, funding the payment by borrowing FRW today at the domestic borrowing rate:

- Cost today at the spot Sell rate (1,472): $100,000 × 1,472 = FRW 147,200,000
- Financed by a 3-month FRW loan at Rwanda's borrowing rate (3.75%/quarter): FRW 147,200,000 × 1.0375 = FRW 152,720,000 repayable in 3 months

No early-payment discount from LENO INC. is indicated, so leading offers no discount benefit here - only the (uncertain) avoidance of further USD appreciation, at the cost of Rwanda's relatively high borrowing rate.

2 Forward Market Cover

UBUMANZI buys $100,000 forward from the bank at the 3-month forward Sell rate of 1,582, fixing the FRW cost of the payable today:

- $100,000 × 1,582 = FRW 158,200,000 - fixed cost, payable in 3 months

3 Money Market Cover

UBUMANZI borrows FRW today, converts it to USD at spot, and places the USD on deposit so that it grows to exactly $100,000 in 3 months to settle LENO INC.; the FRW loan is then repaid.

- USD amount to deposit now (so principal + interest at the US lending rate of 2%/quarter equals $100,000 in 3 months): $100,000 ÷ 1.02 = $98,039.22
- Cost to buy this USD today at spot Sell rate (1,472): $98,039.22 × 1,472 = FRW 144,313,726
- Financed by a 3-month FRW loan at Rwanda's borrowing rate (3.75%/quarter): FRW 144,313,726 × 1.0375 = FRW 149,725,490 repayable in 3 months

Strategy	**FRW Cost**	**Rank**
Money Market Cover	149,725,490	**1st (Best/Cheapest)**
Leading (borrow and pay now)	152,720,000	2nd

Forward Market Cover	158,200,000	3rd (Most expensive)

The money market hedge remains cheapest because the USD deposit rate (8% p.a.) is well below the FRW borrowing rate (15% p.a.).

b) To arbitrage across exchanges, the desk must buy where the ask price is lowest and sell where the bid price is highest:

Step 1:	**Identify the trade Exchange**	**USDT**
	Buy exchange (lowest ask)	A – Bin @ 61,510
	Sell exchange (highest bid)	B – Kra @ 61,620
	Trade size	2 BTC
Step 2:	**Gross profit before fees**	
	Sell exchange (highest bid)	61,620
	Buy exchange (lowest ask)	61,510
	Gross profit per BTC	**110**
	Number of Traded BTC	2
	Total Gross profit	**220**
Step 3:	**Cost of buying on Exchange A**	
	Buy exchange (lowest ask)	61,510
	Number of Traded BTC	2
	Buy value = 61,510 × 2	123,020
	Trading Fees	0.10%
	Buy trading fee (0.10% × 123,020)	**123.02**
	Total buy cost	**123,143.02**
Step 4:	**Transfer BTC from A to B**	
	BTC withdrawn	2
	Less: withdrawal fee (Exchange A)	(0.0002)
	Net BTC received on Exchange B	**1.9998**
Step 5:	**Proceeds of selling on Exchange B**	
	BTC received on Exchange B	**1.9998**
	Sell exchange (highest bid)	61,620
	Sale value = 1.9998 × 61,620	**123,228**
	Trading Fees	0.16%
	Less: sell trading fee (0.16% × 123,227.68)	**197**
	Net sale proceeds	**123,031**
Step 6:	**Net arbitrage result**	
	Net sale proceeds	123,031
	Less: total buy cost	(123,143)

	NET ARBITRAGE PROFIT / (LOSS)	**(112.51)**

or

Step 6: **Step 5: Net Arbitrage Profit**

Item	**Amount (USDT)**
Gross profit	220
Less: Buy-side trading fee	(123.02)
Less: Sell-side trading fee	(197)
Less: Withdrawal fee (BTC → USDT)	(12)
Net Arbitrage Profit/(Loss)	**(112.48)**

Conclusion: Although a gross spread of 220 USDT appears profitable, once buy-side trading fees, sell-side trading fees, and the withdrawal fee (paid in BTC and priced out of the transferred quantity) are deducted, the trade produces a net LOSS of approximately 112.51 USDT on a 2 BTC round trip. The apparent arbitrage opportunity is therefore not economically viable at this trade size and fee structure the combined cost of trading fees (320 USDT) exceeds the gross spread (220 USDT).

c) Classification of Foreign Exchange Exposure

Three distinct types of foreign exchange exposure are evident in UBUMANZI GROUP's transactions:

Transaction exposure

This arises when a company has entered into a contractual, foreign-currency-denominated cash flow that has not yet settled. Two clear examples are present:

- The USD 840,000 receivable from MC COFFEE STORE, contractually due in 3 months - UBUMANZI has already delivered the coffee and has a fixed USD amount to collect and convert, so the FRW value it ultimately realises depends entirely on the USD/FRW rate on the settlement date.
- The USD 100,000 payable to LENO Inc. for the four machines, also payable in 3 months - a fixed, contracted USD obligation whose FRW cost is similarly uncertain until settlement.

Both are classified as transaction exposure because they are committed, single, identifiable cash flows arising from transactions already agreed, with a known amount and a known settlement date - precisely the situation the Board's concern about "fluctuations... during the three-month credit period" describes.

Translation (accounting) exposure

This arises on consolidation, when the financial statements of a foreign subsidiary are translated into the parent's reporting currency (FRW) for the Group accounts. UBUMANZI's newly established Argentina subsidiary will hold assets - including the imported AI-automated production machines - denominated in a currency other than FRW. At each reporting date, the subsidiary's balance sheet (and the USD 100,000 of machinery specifically) must be translated into FRW, generating a translation gain or loss that affects consolidated net assets and equity without necessarily involving any cash movement at the time it is recognised.

Economic (operating) exposure

This is the longer-term effect of exchange-rate movements on the value of the Group's future operating cash flows and competitive position, rather than on a single contract. UBUMANZI's strategic expansion into the South American tea market through the Argentina subsidiary creates this type of exposure: the subsidiary's future revenues, its input costs (including machinery purchased in USD), and its competitiveness against local and other foreign producers will all move with the FRW/USD and FRW/ARS exchange rates over the life of the investment, well beyond any single transaction. Because it affects the present value of the whole venture rather than one identifiable receivable or payable, it cannot be hedged with a single forward contract in the way the coffee receivable can.

d) Factors to Consider Before Hedging via the Foreign Currency Markets

Before committing to any hedge, the Board should weigh:

1. **Materiality of exposure:** is $840,000/$100,000 significant relative to UBUMANZI's cash flows and risk tolerance?
2. **Cost of hedging vs. expected benefit**: forward margins, money-market borrowing/lending spreads, and any bank fees must be less than the expected loss from remaining unhedged.
3. **Netting opportunities**: the payable ($100,000) partly offsets the receivable ($840,000); only the net exposure truly needs hedging, reducing transaction costs.
4. **Certainty of cash flow timing and amount:** both the receivable and payable are firm, contracted, 3-month exposures, making forward and MMC hedges straightforward (as opposed to uncertain/anticipated exposures, which are harder to hedge precisely).
5. **Interest rate and exchange rate differentials**: covered interest rate parity should roughly align forward and MMC outcomes; large divergences (as shown above) may signal arbitrage or higher transaction costs baked into one market.

QUESTION FOUR
Marking guide

Q4	Description	Marks
a)	Award 0.5 marks for each calculated Net CF	1.5
	Award 0.5 marks for each NPV	1.5
	Award 0.5 marks for the formula of EAC	0.5
	Award 0.5 marks for computation of each EAC	1.5
	Award 1 mark for conclusion	1
	Sub – Total	**6**
b)	**Replace Immediately**	
	Award 2 marks for calculating net cash flow at year 0	2
	Award 0.5 marks for each year operating cash flow	2.5
	Award 1 mark for terminal value at year 5	1
	Award 0.5 marks for NPV	0.5
	Defer Replacement 2 Years: Total Cash Flows	
	Award 2 marks for calculating net cash flow at year 2	2
	Award 0.5 marks for each year operating cash flow	1.5
	Award 1 mark for terminal value at year 5	1
	Award 0.5 marks for NPV	0.5
	Net Benefit of Replacement	
	For immediate replacement	
	Award 0.5 marks for Pv of each year	3
	Award 0.5 marks for net benefit (total PV)	0.5
	For defer Replacement 2 Years	
	Award 0.5 marks for Pv of each year	2.5
	Award 0.5 marks for total PV	0.5
	Comparison (Award 1 mark) and Conclusion (Award 0.5 marks)	1.5
	Sub – Total	**19**
	TOTAL	**25**

Marking Guide

PART (a) - Optimal Replacement Year Using EAC

Method

- Net annual operating cash flow = (Available hours × Contribution margin/hr) − Maintenance cost
- NPV(n) = PV(net CF, Years 1→n) + PV(disposal value at year n) − Current disposal value forgone (25,000)
- EAC(n) = NPV(n) ÷ Annuity factor (n, 10%)

Workings

Year (t)	Downtime	Available hrs	Contribution @350/hr	Maintenance	Net CF
1	180	1,820	637,000	5,000	**632,000**
2	270	1,730	605,500	6,500	**599,000**
3	360	1,640	574,000	8,200	**565,800**

EAC computation

DFs @10%: 0.9091, 0.8264, 0.7513, 0.6830, 0.6209

N	Cum. PV net CF	PV disposal MV at n	Total PV	Less MV forgone	NPV(n)	Annuity factor	EAC(n)
1	574,546	18,182	592,727	(25,000)	567,727	0.9091	**624,500**
2	1,069,586	12,397	1,081,983	(25,000)	1,056,983	1.7355	**609,024**
3	1,494,680	7,513	1,502,194	(25,000)	1,477,194	2.4869	**594,002**

Conclusion

EAC is highest (net cost lowest) in Year 1 and declines every year after. Recommendation: replace as early as possible - after Year 1 - since retention only dilutes average annual value; there is no large amortised acquisition cost to offset the rising maintenance/downtime/falling resale value, so the result is monotonic.

PART (b) - Full Replacement Evaluation

Approach: Net Benefit of Replacement (Incremental / Differential Cash-Flow Analysis)

Rather than simply comparing the total NPV of each scenario in isolation, the more decision-relevant technique is to isolate the value attributable specifically to the replacement decision. This is done by comparing each scenario against a baseline of "doing nothing" (continuing to operate the existing machine as-is for its remaining 5-year life) and discounting only the incremental (differential) cash flows. This strips out the large amount of value the business earns regardless of which machine is used, and shows clearly whether replacement itself creates or destroys value.

(i) Common workings

- Existing machine: cost 80,000; 5 yrs elapsed; dep. 8,000 p.a.; TWV at Year 0 = 40,000
- New machine (immediate, cost 110,000): dep. = 22,000 p.a.; available hrs Y1–5 = 1,830/1,740/1,650/1,560/1,470; resale value Y1–5 = 66,000/39,600/23,760/14,256/8,553.6;

WC = 30,000

- New machine (deferred, cost 132,000 = 110,000 × 1.20): dep. = 26,400 p.a.; resale value (own life) Yr1–3 = 79,200/47,520/28,512

(ii) Baseline - "Do Nothing": Continue Operating the Existing Machine

Yr	Avail. hrs	Contrib.	−Maint.	−Dep. (8,000)	=Taxable profit	−Tax	=After-tax profit	+Dep.	Baseline CF
1	1,820	637,000	5,000	8,000	624,000	187,200	436,800	8,000	444,800
2	1,730	605,500	6,500	8,000	591,000	177,300	413,700	8,000	421,700
3	1,640	574,000	8,200	8,000	557,800	167,340	390,460	8,000	398,460
4	1,550	542,500	10,400	8,000	524,100	157,230	366,870	8,000	374,870
5	1,460	511,000	13,000	8,000	490,000	147,000	343,000	8,000	351,000

By Year 5 the existing machine is fully depreciated (TWV = 0) and its market value is also 0 - no disposal gain/loss, no cash effect at exit.

(iii) Option 1 - Replace Immediately: Total Cash Flows

Year 0:

Item	FRW '000
Sale of old machine (proceeds)	25,000
Tax saving on disposal loss (40,000 TWV − 25,000 = 15,000 loss × 30%)	4,500
Net disposal inflow	29,500
Purchase of new machine	(110,000)
Increase in working capital	(30,000)
Net Year 0 cash flow	(110,500)

Years 1–5 (new machine operating):

Yr	Avail. hrs	Contrib.	+Fixed saving	−Dep.	=Taxable profit	−Tax	=After-tax profit	+Dep.	Operating CF
1	1,830	640,500	1,000	22,000	619,500	185,850	433,650	22,000	455,650
2	1,740	609,000	1,000	22,000	588,000	176,400	411,600	22,000	433,600
3	1,650	577,500	1,000	22,000	556,500	166,950	389,550	22,000	411,550
4	1,560	546,000	1,000	22,000	525,000	157,500	367,500	22,000	389,500
5	1,470	514,500	1,000	22,000	493,500	148,050	345,450	22,000	367,450

Year 5 terminal: disposal 8,553.6 (TWV = nil, so entire amount is a taxable balancing charge) → tax 2,566.1 → net 5,987.5; plus WC recovery 30,000. Total Year 5 CF = 367,450 + 5,987.5 + 30,000 = 403,437.5

Option 1 total cash flows: Y0 = (110,500); Y1 = 455,650; Y2 = 433,600; Y3 = 411,550; Y4 = 389,500; Y5 = 403,437.5

NPV (Option 1, stand-alone) ≈ FRW 1,487,815 thousand - shown for reference; used to derive the increment below.

(iv) Option 2 - Defer Replacement 2 Years: Total Cash Flows

Years 1–2 (existing machine continues - identical to the baseline above): CF: Y1 = 444,800; Y2 (operating only, before transition) = 421,700

Year 2 - transition:

Item	FRW '000
Sale of old machine (Year-2 market value)	15,000
Tax saving on disposal loss (TWV 24,000 − 15,000 = 9,000 loss × 30%)	2,700
Net disposal inflow	17,700
Purchase of new machine (110,000 × 1.20)	(132,000)
Increase in working capital	(30,000)
Net Year 2 transition cash flow	(144,300)

Total Year 2 cash flow = 421,700 − 144,300 = 277,400

Years 3–5 (new machine, own life Years 1–3; dep. = 26,400 p.a.):

Yr	Own yr	Avail. hrs	Contrib.	+Fixed saving	−Dep.	=Taxable profit	−Tax	=After-tax profit	+Dep.	Operating CF
3	1	1,830	640,500	1,000	26,400	615,100	184,530	430,570	26,400	456,970
4	2	1,740	609,000	1,000	26,400	583,600	175,080	408,520	26,400	434,920
5	3	1,650	577,500	1,000	26,400	552,100	165,630	386,470	26,400	412,870

Year 5 terminal (notional, new machine has 2 years of life remaining): TWV = 132,000 − (3×26,400) = 52,800; notional MV = 28,512 → loss 24,288 → tax saving 7,286.4 → net disposal 35,798.4; plus WC recovery 30,000. Total Year 5 CF = 412,870 + 35,798.4 + 30,000 = 478,668.4

Option 2 total cash flows: Y0 = 0; Y1 = 444,800; Y2 = 277,400; Y3 = 456,970; Y4 = 434,920; Y5 = 478,668.4

NPV (Option 2, stand-alone) ≈ FRW 1,571,220 thousand - shown for reference; used to derive the increment below.

(v) Net Benefit of Replacement - Incremental (Differential) Analysis

Incremental cash flow of REPLACING IMMEDIATELY (Option 1 − Baseline)

Year	Opt 1 CF	Baseline CF	Incremental	DF @10%	PV
0	(110,500)	0	(110,500)	1.0000	(110,500)
1	455,650	444,800	10,850	0.9091	9,864
2	433,600	421,700	11,900	0.8264	9,835

Year	Opt 1 CF	Baseline CF	Incremental	DF @10%	PV
3	411,550	398,460	13,090	0.7513	9,835
4	389,500	374,870	14,630	0.6830	9,993
5	403,437.5	351,000	52,437.5	0.6209	32,560

Net benefit (NPV) of replacing immediately ≈ FRW (38,415) thousand

Incremental cash flow of DEFERRING 2 YEARS (Option 2 − Baseline)

Year	Opt 2 CF	Baseline CF	Incremental	DF @10%	PV
0	0	0	0	1.0000	0
1	444,800	444,800	0	0.9091	0
2	277,400	421,700	(144,300)	0.8264	(119,256)
3	456,970	398,460	58,510	0.7513	43,959
4	434,920	374,870	60,050	0.6830	41,015
5	478,668.4	351,000	127,668.4	0.6209	79,272

Net benefit (NPV) of deferring 2 years ≈ FRW +44,990 thousand

matches the gap between the two stand-alone NPVs computed in (iii)/(iv) (1,571,220 − 1,487,815 = 83,405) - confirming internal consistency between the two methods.

(vi) Comparison, Recommendation and Reconciliation

	Replace Immediately	Defer 2 Years
Net benefit of replacement (incremental NPV, FRW '000)	≈ (38,415)	≈ +44,990

Recommendation: The incremental analysis shows that replacing the machine immediately actually destroys value relative to simply continuing with the existing machine - its net benefit of replacement is negative. The existing machine's contribution margin is strong enough that the new machine's only quantified advantages (less downtime, zero maintenance, FRW 1,000/yr fixed-cost saving) generate only around FRW 10,000–15,000 thousand of extra value per year, which does not come close to covering the FRW 110,500 thousand net upfront outlay within the 5-year window - except for the boost from the Year-5 terminal disposal difference, which is not enough on its own. Deferring replacement by 2 years, however, has a positive net benefit (≈ FRW 44,990 thousand) and should be recommended. This is a stronger and more decision-useful conclusion than simply saying "Option 2 has the higher NPV" - it shows that immediate replacement is not justified at all on these figures, whereas deferral genuinely creates value.

End of Model Answers and Marking Guide.