CERTIFIED PUBLIC ACCOUNTANT INTERMEDIATE LEVEL EXAMINATIONS

I1.1: MANAGERIAL FINANCE

DATE: THURSDAY, 01 DECEMBER 2022

MODEL ANSWERS AND MARKING GUIDE

SECTION A

Marking Guide

Question 1: NMSL	**Marks**
a) Impact of the stock split	
i. Number of shares (0.5 marks for calculation and 0.5 marks for impact)	2
ii. Par value of the stock (0.5 marks for calculation and 0.5 marks for impact)	2
iii. The total capital of the company	2
Maximum marks	**6**
b) Factors that determine dividend policy	
Factors (1 mark per each factor and 1 marks per correct explanations, 12 max)	12
c) Concept of Dividend – Irrelevant Theory (MM Theory)	
Introduction (2 marks)	2
Assumptions (2 marks each, 4 max)	4
Conclusion (1 mark each, 1 max)	1
Maximum marks	**7**
Total marks	**25**

Model Answer

(a) If the Board of Directors approved a 5 for 2 split of NMSL's common shares, calculate the new par value of the stock split and show if there would be a change in the total capital of the company.

(i) Number of shares

The number of shares = share capital / share price = 600,000,000/1,000 = 600,000 shares
The number of shares before the split is 600,000 shares
Number of shares after the split will be (5/2 * 600,000 shares) = 1,500,000
The number of shares will increase from 600,000 to 1,500,000 after the split.

(ii) Par value of the stock

Old par value is FRW 1,000 meaning 1 share is FRW 1,000
New par value after the 5 for 2 split will be 2/5 * 1,000 = FRW 400
Par value of the stock will reduce from FRW 1,000 to FRW 400

(iii) The total capital of the company

There will be no change in the share capital since 1 share will be FRW 400 multiplied by 1,500,000 shares which is FRW 600,000,000.

(b) Explain any six factors that determine dividend policy.

Factors determining dividend policy are:

- **Taxation** – Income tax v capital gains tax. If shareholders pay high marginal rates of Income Tax they may prefer low dividends. If subject to low tax rate or zero tax, they may prefer high dividends.
- **Investment Opportunities** – *"Residual Theory"* retain sufficient funds until all profitable investments (those with a positive NPV) have been funded. Balance to be paid as dividends. Drawback is that dividends may vary dramatically from year to year. Also, consider the timing of the cash flows from the investments as these will be required to pay future dividends.
- **Availability of Finance** – If the company is highly geared it may have little option but to retain. Retentions will build up the equity base, thus reducing gearing and assisting future borrowing. Certain types of company (e.g. small/unquoted) may not have access to external funds and may need to retain.
- **Liquidity** – Profits do not equal cash. Adequate cash must be available to pay dividends. Also, for growth companies, sufficient liquidity must be available for reinvestment in fixed assets. A company with high profit many have a lot of profit blocked in working capital or it may have acquired assets. In that case its liquidity is poor and therefore it will pay less dividend. High dividend payment is possible only if the company has good earnings and sound liquidity
- **Cost of New Finance** – The costs associated with raising new equity/debt can be quite high. If debt is raised interest rates may be high at that particular point in time. This thus reduces the amount to be paid out as dividend. On the other hand, if the cost of acquiring new funds is so low, the company will have enough money to pay as dividend.
- **Transaction Costs** – Some shareholders may depend on dividends. If earnings are retained, they can create "home-made" dividends by selling some shares (capital). However, this may be inconvenient and costly (brokerage fees etc.).
- **Control** – If high dividends are paid the company may subsequently require capital and this may be obtained by issuing shares to new shareholders. This may result in a dilution of control for existing shareholders.
- **Inflation** – In periods of high inflation companies may have to retain funds in order to maintain their existing operating capability. On the other hand, shareholders require increased dividends in order to maintain their purchasing power.

(c) Discuss to the manager the proposition of Dividend Irrelevance Theory (Miller and Modigliani Theory) in company valuation.

According to a 1961 paper by Miller and Modigliani (MM), dividend policy is irrelevant to share value. MM stated that the determinant of value is the availability of projects with positive NPVs; and the pattern of dividends makes no difference. The share price would not move if the firm declared either a zero-dividend policy or a policy of high near-term dividends.

The assumptions underlying their proposition included:

- No corporate or personal kites
- No transaction cost associated with share floatation
- A firm has an investment policy which is independent of its dividend policy (a fixed investment policy)
- Efficient market – all investors have same set of information regarding the future of the firm
- No uncertainty – all investors make decisions using the same discounting rate at all-time i.e required rate of return (r) = cost of capital (k).

It does not matter how the earnings are divided between dividend payment to shareholders and retention. Therefore, optimal dividend policy does not exist. Since when investment decisions of the firms are given, dividend decision is a mere detail without any effect on the value of the firm.

QUESTION TWO

Marking Guide

(a) i. Computation of working capital cycles for both Iranzi and Irakoze	Marks
Inventory conversion period (0.5 marks for Iranzi Ltd, 0.5 marks for Irakoze Ltd)	1
Receivable conversion Period (0.5 marks for Iranzi Ltd, 0.5 marks for Irakoze Ltd)	1
Payable deferred Period (0.5 marks for Iranzi Ltd, 0.5 marks for Irakoze Ltd)	1
Operating Cycle (0.5 marks for Iranzi Ltd, 0.5 marks for Irakoze Ltd)	1
Cash conversion Cycle (0.5 marks for Iranzi Ltd, 0.5 marks for Irakoze Ltd)	1
(0.5 marks for formula of operating cycle)	0.5
(0.5 marks for formula of cash conversion cycle)	0.5
Maximum marks	**6**
ii. Comments from the results of two companies	
Comments (1 mark each, max 2)	2
iii. Calculation of current ratio and quick ratio for the two companies	
Current Ratio	
Formula	1
Calculation (0.5 marks for each company, 1 max)	1
Quick Ratio	
Formula	1
Calculation (0.5 marks for each company, 1 max)	1
Maximum marks	**4**
(b) Evaluation of the credit policy of Kabeza company Ltd	
Incremental sales	1.5
Incremental operating profit	1

Incremental bad debts	1.5
Incremental accounts receivable	1
Opportunity cost	0.5
Analysis and collection cost	0.5
Total cost	0.5
Difference between operating profit and total costs	0.5
Advice on the decision to take	1
Maximum marks	**8**
Total marks	**20**

Model Answer

a)

(i) Working capital cycles (operating and cash conversion cycles) for both Iranzi Ltd and Irakoze Ltd.

Working capital

Operating Cycle (OC) = Inventory Conversion Period (ICP) + Receivable Collection Period (RCP)

Cash conversion cycle (CCC) = Operating Cycle (OC) - Payable Deferred Period (PDP) or Inventory Conversion Period (ICP) + Receivable Collection Period (RCP) - Payable Deferred Period (PDP)

Working Capital Ratios	**Formula**	**Iranzi Ltd (FRW 000)**	**Irakoze Ltd (FRW 000)**
Operating cycle	Inventory Conversion Period (ICP) = $\frac{\text{Inventory}}{\text{cost of sales}} * 360$	ICP = 2,000/4,800*360 =150 days	ICP = 2,200/7,800*360 =102 days
	Receivable Collection Period (RCP) = $\frac{\text{Accounts receivable}}{\text{Annual credit sales}} * 360$	RCP = 1,300/6,000*360 =78 days	RCP = 1,740/9,650*360 = 65 days
Operating Cycle		**150 + 78 = 228 days**	**102 + 65 = 167 days**
	Payables Deferred Period (PDP) = $\frac{\text{Accounts payable}}{\text{cost of sales}} * 360$	PDP = 900/4,800*360 =68 days	PDP = 1,000/7,800*360 = 47 days

Cash Conversion Cycle	**228 – 68 = 160 days**	**167 – 47 = 120 days**

(ii) Comment the results for the two companies from (i) above

Irakoze Ltd performs better than Iranzi Ltd with regards to the operating cycle because the whole cycle from purchasing raw materials to receiving cash takes 167 days compared with 228 days for Iranzi Ltd.

Irakoze Ltd also performs better in cash conversion cycle (period between paying materials to the period of receiving cash) because it takes Irakoze Ltd only 120 days to convert receivables into cash compared to 160 days for Iranzi Ltd

(iii) Calculate the current ratio and quick ratio for both Iranzi Ltd and Irakoze Ltd

Liquidity Ratios	Formula	Iranzi ltd (FRW 000)	Irakoze ltd (FRW 000)
Current Ratio (CR)	CR = current assets/current liabilities	CR =4,250/ 900=4.7 4.72:1	CR = 4,790/ 1,000=4.79 4.79:1
Quick Ratio (QR)	QR =(current assets – inventory)/current liabilities	QR = (4,250-2,000) / 900=2.5 2.5:1	QR = (4790 - 2,200)/ 1,000=2.59 2.59:1

b) Evaluate the company's credit policy.

Incremental sales

New Sales = 40,000,000 + (25/100*40,000,000) = 50,000,000

Old Sales = 40,000,000

Incremental sales = 10,000,000

Incremental Operating profit

For FRW 100 of sales, FRW 75 is variable cost. Therefore FRW 25 is contribution. Thus sales, variable costs and contribution can be converted into a percentage as follows: Sales = 100/100*100=100%, variable cost =75/100*100=75% and contribution=25/100*100=25%.

Sales – variable cost = contribution (profit) 100% - 75% =25%

Incremental Operating profit from incremental sales 25% * 10,000,000 = **FRW 2,500,000**

Costs

Bad Debts

New Bad Debts; 3% * 50,000,000 = FRW 1,500,000

Old Bad Debts; 2.5% * 40,000,000 = FRW 1,000,000

Incremental Bad debts **= FRW 500,000**

Accounts Receivable/opportunity cost

New Accounts Receivable; 72/360*50,000,000 = FRW 10,000,000

Old Accounts Receivable; 45/360*40,000,000 = FRW 5,000,000

Incremental Accounts Receivable = FRW 5,000,000

Opportunity cost;

12% of Incremental Accounts Receivables, 12% * FRW 5,000,000 **= FRW 600,000**

Analysis and Collection Costs **= FRW 540,000**

Total Costs = FRW 1,640,000

Difference between operating profit and total costs = FRW 2,500,000 – FRW 1,640,000 = FRW 860,000

Comparing incremental operating profit with incremental costs, Kabeza Company Ltd should relax its credit standards and change its credit policy because profits are more than costs.

QUESTION THREE

Marking Guide	**MARKS**
a) Loan Amortization	
Computation of annual loan repayment (0.5 marks for formula and 1.5 marks for computation)	2
Loan Amortization schedule	
Year 0 (Indicating the loan amount in the table 0.5 marks)	0.5
Year 1 (Interest, principal, loan balance; 0.5 marks, max 1.5)	1.5
Year 2 (Interest, principal, loan balance; 0.5 marks, max 1.5)	1.5
Year 3 (Interest, principal, loan balance; 0.5 marks, max 1.5)	1.5
Year 4 (Interest, principal, loan balance; 0.5 marks, max 1.5)	1.5
Year 5 (Interest, principal, loan balance; 0.5 marks, max 1.5)	1.5
Maximum marks	**10**
b) i. Roles of capital market	
Roles (1 mark each, max 3)	3
ii. Distinction between equity financing and debt financing	
Equity financing definition	1
Debt financing definition	1

Maximum marks **5**

Total marks **15**

(a)loan amortization schedule for BEL

Loan amount : FRW 15,000,000

Interest rate: 10%

Repayment period: 5years (equal instalments)

To compute annual instalments, present value of annuity will be applied.

A= PVA (1/PVIFA 10%,5yrs)

A= Annual instalment (Loan repayment)

PVA = Loan amount (Present value of annuity)

PVIFA 10%,5yrs: Present value Interest Factor of annuity at 10% for 5years

PVIFA 10%,5yrs = 3.791 (value extracted from financial table)

A= FRW15,000,000(1/3.791) = FRW 3,956,740

Annual loan repayment = FRW 3,956,740

Loan Amortization Schedule

End of year	Annual instalment	Interest (outstanding balance*interest rate)	Principal loan repaid (Annual instalment – interest)	Outstanding Loan (Loan – Principal loan repaid)
0				15,000,000
1	3,956,740	1,500,000	2,456,740	12,543,260
2	3,956,740	1,254,326	2,702,414	9,840,846
3	3,956,740	984,085	2,972,655	6,868,191
4	3,956,740	686,819	3,269,921	3,598,270
5	3,956,740	359,827	3,598,270	0

Note: any difference that may arise in the last row for Principal repayment and outstanding balance is due to rounding off/up. Therefore, the candidate should get the full marks

(b) Capital markets are a crucial part of a functioning economy and a vital source of capital for Explain at three roles of capital market in the Rwandan economy

i) Roles of capital market

- **Accumulates savings:** Investing in securities that are listed in the Capital or Stock market encourages investors to accumulate their savings in small amounts over time.
- **Wealth or Capital gain:** Whenever the prices of securities listed in the market go up, the value of the investment of the holders of those securities increases. This is called capital gain and is an important way of growing wealth through the stock market. It is important to note that a one –off

investment in the Capital market does not make sense. It is therefore the accumulative investment over time that creates opportunities for growth in wealth through the Capital Market.

- **Securities act as collateral:** Listed securities are easily acceptable as collateral against loans from financial institutions
- **Source of Income:** Investment in the stock market provides a source of income. Shares pay dividends when companies declared profits and decide to distribute part of the profits to shareholders. Bonds pay an interest income to the bondholders. Sometimes the income earned from listed securities is higher than interest earned from the money or banking sector.
- **Provides Liquidity:** Liquidity is the ability to convert shares or bonds into cash by selling within the shortest time possible without losing much value. When one needs funds urgently, listed securities could be very useful because they are more liquid than most other forms of assets.

ii) Distinguish between equity financing and debt financing

Equity financing involves selling a portion of a company's shares in return for capital. For example, the owner of a company might need to raise capital to fund business expansion. The owner may decide to give up a certain percentage of the ownership in the company and sell it to an investor in return for capital. The investor will own that portion of the company and will have a voice in all business decisions going forward.

Whereas **debt financing** involves the borrowing of money and paying it back with interest. The most common form of debt financing is a loan. Debt financing sometimes comes with restrictions on the company's activities that may prevent it from taking advantage of opportunities outside the realm of its core business. Creditors look favorably upon a relatively low debt-to-equity ratio, which benefits the company if it needs to access additional debt financing in the future.

SECTION B

QUESTION FOUR

Marking Guide	Marks
a) Calculation of profitability index and payback period	
Profitability index (P.I)	
Present values for machine X (0.5 mark each, max 2.5)	2.5
Present values for machine Y (0.5 mark each, max 2.5)	2.5
Formula for profitability index	1
P.I answer for X and Y (0.5 mark each, max 1)	1
Modified payback period (MPBP)	
Cumulative values for machine X (0.5 mark each, max 2)	2
Cumulative values for machine Y (0.5 mark each, max 2)	2
Formula for Modified payback period	1
MPBP answer for X and Y (0.5 mark each, max 1)	1
Maximum marks	**13**
b) Advice (1 mark each, max 2)	2
c) Principal – agent problem	
i. Causes (1 mark each, max 3)	3
ii. Solutions (1 mark each, max 2)	2
Total marks	**20**

Model Answer

Calculate the profitability index and modified payback period for machine X and machine Y if the discount rate is 10 % taking 2 decimal places

Profitability Index

$$\text{Profitability Index (P.I)} = \frac{\text{Total discounted cash inflows}}{\text{Total discounted cash outflow}}$$

	Machine X			**Machine Y**		
Year	Cash flow (FRW)	Present value interest factor [PVIF(i,n)]	Present values	Cash flow (FRW)	Present value interest factor [PVIF(i,n)]	Present values
1	12,000,000	0.909	10,908,000	15,000,000	0.909	13,635,000
2	15,000,000	0.826	12,390,000	18,000,000	0.826	14,868,000
3	26,000,000	0.751	19,526,000	10,000,000	0.751	7,510,000
4	28,000,000	0.683	19,124,000	10,000,000	0.683	6,830,000

	Machine X			Machine Y		
Total Present Values			61,948,000			42,843,000

Profitability index for machine X =61,948,000/50,000,000=1.24

Profitability index for machine Y =42,843,000/50,000,000=0.86

Modified Payback period

Modified Payback period

$$= \text{Year preceeding to the year of recovery} + \frac{\text{Amount left to be recovered}}{\text{Cash inflow during the year of final recovery}}$$

	Machine X			Machine Y		
Year	Cash flow (FRW)	Discounted cash flows	Cumulative cash flows	Cash flow (FRW)	Discounted cash flows	Cumulative cash flows
1	12,000,000	10,908,000	10,908,000	15,000,000	13,635,000	13,635,000
2	15,000,000	12,390,000	23,298,000	18,000,000	14,868,000	28,503,000
3	26,000,000	19,526,000	42,824,000	10,000,000	7,510,000	36,013,000
4	28,000,000	19,124,000	61,948,000	10,000,000	6,830,000	42,843,000

(a) Advise the Director of Finance on which of the two machines to purchase

Based on the computed profitability index, Machine X has a high profitability index of 1.24 or 124% which is above 1 or 124% while the profitability index of Machine Y is below 1 or 100% meaning it will not be profitable. The advice for TL would be to choose Machine X.

i. Based on the computation for modified payback period, machine X would be the right choice since the payback period is 3 years and 4 months before the 4-year period of investment. =3Year and 7,176,000 *12 /19,124,000 = 3 Year and 4 Months

On other hand, machine Y cannot be taken since it could not attain the initial investment for the four-year period of investment.

(c) i) Briefly discuss three causes of the principal – agent problem

- **Incentive Problem:** Managers may have fixed salary and they may have no incentive to work hard and maximize shareholders wealth. This is because irrespective of the profits they make, their reward is fixed. They will therefore maximize leisure and work less which is against the interest of the shareholders.
- **Consumption of "Perquisites"**

Prerequisites refer to the high salaries and generous fringe benefits which the directors might award themselves. This will constitute directors' remuneration which will reduce the dividends paid to the ordinary shareholders. Therefore, the consumption of perquisites is against the interest of shareholders since it reduces their wealth.

- **Different Risk-profile**

Shareholders will usually prefer high-risk-high return investments since they are diversified i.e they have many investments and the collapse of one firm may have insignificant effects on their overall wealth. Managers on the other hand, will prefer low risk-low return investment since they have a personal fear of losing their jobs if the projects collapse. (Human capital is not diversifiable). This difference in risk profile is a source of conflict of interest since shareholders will forego some profits when low-return projects are undertaken.

- **Different Evaluation Horizons**

Managers might undertake projects which are profitable in short-run. Shareholders on the other hand evaluate investments in long-run horizon which is consistent with the going concern aspect of the firm. The conflict will therefore occur where management pursue short-term profitability while shareholders prefer long term profitability.

- **Management Buy Out (MBO)**

The board of directors may attempt to acquire the business of the principal. This is equivalent to the agent buying the firm which belongs to the shareholders. This is inconsistent with the agency relationship and contract between the shareholders and the managers.

- **Pursuing power and self-esteem goals**

This is called "empire building" to enlarge the firm through mergers and acquisitions hence increase in the rewards of managers.

- **Creative Accounting**

This involves the use of accounting policies to report high profits e.g stock valuation methods, depreciation methods recognizing profits immediately in long term construction contracts etc.

(i) **Explain how the agency-problem discussed above in (c) (ii) can be solved**

- **Pegging/attaching managerial compensation to performance:** This will involve restructuring the remuneration scheme of the firm in order to enhance the alignments/harmonization of the interest of the shareholders with those of the management e.g. managers may be given commissions, bonus etc. for superior performance of the firm.

- **Threat of firing:** This is where there is a possibility of firing the entire management team by the shareholders due to poor performance. The management of a company might be fired by the shareholders who have the right to hire and fire the top executive officers.
- **The Threat of Hostile Takeover**

If the shares of the firm are undervalued due to poor performance and mismanagement, shareholders can threaten to sell their shares to competitors. In this case the management team is fired and those who stay on can lose their control and influence in the new firm. This threat is adequate to give incentive to management to avoid conflict of interest.

- **Executive Share Options Plans**

In a share option scheme, selected employees can be given a number of share options, each of which gives the holder the right after a certain date to subscribe for shares in the company at a fixed price.

- **Direct Intervention by the Shareholders:** Shareholders may intervene as follows:

Insist on a more independent board of directors.

By sponsoring a proposal to be voted at the AGM

Making recommendations to the management on how the firm should be run.

- Managers should have voluntary code of practice, which would guide them in the performance of their duties.
- **Incurring Agency Costs** Agency costs are incurred by the shareholders in order to monitor the activities of their agent. They include: The contracting cost. These are costs incurred in devising the contract between the managers and shareholders.

The contract is drawn to ensure management act in the best interest of shareholders and the shareholders on the other hand undertake to compensate the management for their effort. And monitoring Costs -This is incurred to prevent undesirable managerial actions. They are meant to ensure that both parties live to the spirit of agency contract. They ensure that management utilizes the financial resources of the shareholders without undue transfer to themselves.

QUESTION FIVE

Marking Guide	**Marks**
a) i. Calculations of the required rate of return	
Capital Asset Pricing Model (1 mark for the formula, 1 mark for calculation)	2
Arbitrage Pricing Theory (1 mark for the formula, 1 mark for calculation)	2
Maximum marks	**4**
ii. Assumptions and limitations	
Assumptions (1 mark each, Max 2)	2
Limitations (1 mark each, Max 2)	2
Maximum marks	**4**

iii. Relationship between efficient frontier and capital market line

Illustration (labeling the axes 1 mark, drawing 1 mark)	2
Explanation of efficient frontier and capital market line	2
Maximum marks	**4**

b) i. Calculation of the value of XYZ ltd

Earnings per share	1
Market value of share	1
The value of XYZ Ltd	1
Maximum marks	**3**

ii. Estimating the equity value of XYZ Ltd

Calculation of discounted cash flows for each year (0.5 marks, max 2.5)	2.5
Calculation of terminal value	
Formula	0.5
Calculation	1.5
Total Equity value	0.5
Maximum marks	**5**
Total Marks	**20**

(a)

Model Answer

(i) Calculate Asset 's requires rate of return using Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT)

CAPM; CAPM is $Rs = Rf + \beta (Rm - Rf)$

Where;

Rs is the expected return of a capital asset

Rf is the risk-free rate of return, Rf = 8%

Rm is the expected return from the market, Rm=12%

β is a measure of the systematic risk of the capital asset, β=1.2

$Rs = 8\% + 1.2 (12\% - 8\%)$

$Rs = 8\% + 4.8\% = 12.8\%$

APT

$E(R_i) = R_f + \beta_1(R_1 - R_f) + \beta_2(R_2 - R_f) + \ldots\ldots\ldots + \beta_n(R_n - R_f)$

Where;

$E(R_i)$ is the expected return on the security/asset

R_f is the risk-free rate, $R_f = 8\%$

β is the sensitivity of changes in factor i

$\acute{\epsilon}_i$ is a random error term

$E(R_i) = R_f + \beta_1(R_1 - R_f) + \beta_2(R_2 - R_f) + \beta_3(R_3 - R_f)$

$E(R_i) = 8\% + 0.8(12\% - 8\%) + 1.3(11\% - 8\%) + 0.9(10\% - 8\%)$

$E(R_i) = 8\% + 3.2\% + 3.9\% + 1.8\% = 16.9\%$

(ii) State two assumptions and two limitations of applying Capital Asset Pricing Model

Assumptions

- Investors are rational and they choose among alternative portfolios on the basis of each portfolio's expected return and standard deviation.
- Investors are risk averse.
- Investors maximize the utility of end of period wealth. Thus, CAPM is a single period model.
- Investors have homogeneous expectations with regard to asset return. Thus, all investors will perceive the same efficient set.
- There exist a risk-free asset and all investors can borrow and lend at this rate.
- All assets are marketable and perfectly divisible.
- The capital market is efficient and perfect.

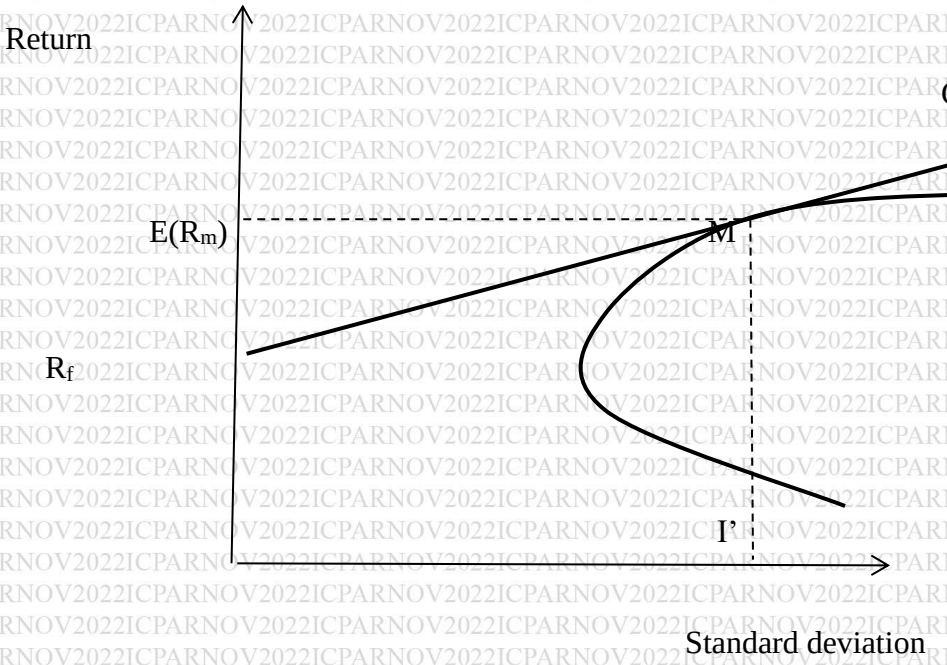
Limitations

- CAPM is a single period model—it looks at the end of the year return.
- CAPM cannot be empirically tested because we cannot test investors' expectations.
- CAPM assumes that a security's required rate of return is based on only one factor (the stock market—beta). However, other factors such as relative sensitivity to inflation and dividend payout ratio may influence a security's return relative to those of other securities.
- It is based on some unrealistic assumptions such as:
  - All assets being perfectly divisible and marketable (human capital is not divisible)
  - Existence of homogeneous expectations about the expected returns
  - Asset returns are normally distributed.
  - Existence of Risk-free assets

(iii) Describe the relationship between efficient frontier and capital market line as used in portfolio theory

Each investor will have a utility-maximizing portfolio that is a combination of the risk-free asset and a portfolio (or fund) of risky assets that is determined by the line drawn from the risk-free rate of return tangent to the investors efficient set of risky assets. The straight line in the figure below will be the efficient set for all investors. This line has come to be known as the capital market line.

A diagram showing capital market line and efficient frontier for a given portfolio



CML is capital market line

R_f is Risk free asset

I is the risky asset

M is Market portfolio

R_m is Market rate

The opportunity set provided by combinations of risky asset I and the market portfolio M. The figure shows the expected return and standard deviation of the market portfolio, M, the risk free asset R_f, and a risky asset I. The straight line connecting the risk-free asset and the market portfolio is the capital market line. In equilibrium, the market portfolio will consist of all marketable assets held in proportion to their weight values.

Investors will invest in a portfolio with the highest return at a given risk or the lowest risk at a given return. The efficient set of investment, therefore, will be given by the frontier I' to I. This frontier is referred to as the Efficient Frontier.

Any point on the efficient frontier dominates all the other points on the feasible set. Any point beyond M will result in reduction of return as the risk increases.

b) i) Calculate the value of XYZ ltd by Earnings Base Method

P/E is given as 10

P/E = Market value of share/Earnings per share
Earnings per share = Earnings after tax/ number of outstanding shares
Earnings per share = 3,000/300 =10
10 = Market value of share/10
Market value of the share is FRW 100
Therefore, the value of the XYZ Ltd is (FRW 100* 300 shares) FRW 30,000

ii) Estimate the value per share of XYZ ltd using discounted cash flow taking 2 decimal places

Year	Projected free cash flow (FRW '000)	Discount Factor at 12%	Discounted Cash flows
1	1,270	0.893	1,134.11
2	1,540	0.797	1,227.38
3	1,850	0.712	1,317.20
4	2,400	0.636	1,526.40
5	2,520	0.567	1,428.84
Present value of terminal value			21,432.60
Total Equity Value			**28,066.53**

$$\text{Terminal Value} = \frac{\text{Discounted Cash Flow of last year} * (1+g)}{r-g}$$

r is the discount rate, r =12%, g is the growth rate, g = 5%

$$\text{Terminal Value} = \frac{14{,}28.84 * (1+0.05)}{0.12-0.05} = \frac{1{,}500.282}{0.07} = 21{,}432.60$$

QUESTION SIX

Marking Guide	Marks
(a) Factors affecting capital structure	
Factors (1 Mark for factor ,1 mark for explanation Max 8)	**8**
(b) Theories underlying capital structure (4 theories)	
The net income (NI) approach	
(1 mark for stating and 2 marks for explanation).	3
The net operating income (NOI) approach	
(1 mark for stating and 2 marks for explanation).	3
The traditional approach	
(1 mark for stating and 2 marks for explanation).	3
The Modigliani – Miller (MM) approach	
(1 mark for stating and 2 marks for explanation).	3
Maximum marks	**12**
Total marks	**20**

Model Answer

(a)Four factors affecting capital structure

- **Size of business**

Small businesses have to face great difficulty in raising long-term finance. If is at all able to get long-term loan, it has to accept unreasonable conditions and has high rate of interest. Such restrictive conditions make the capital structure inflexible for small companies and management cannot freely run the business.

- **Form of business organizations**

Control is much significant in case of private companies, sole traders and partnership firms because in such businesses, ownership is limited to a few hands. In public limited companies, ownership is widely spread. Therefore, control cannot be restricted.

- **Stability of earnings**

The sale and stability of income affects the quantum of leverage. The companies which have stability in income and sales can use more amount of debt in their capital structure. They can easily pay their fixed financial charges. The industries producing consumer goods face more fluctuations in their sales and, therefore, use lesser amount of debt. On the other hand, income and sales of public utility institutions are more stable and therefore, they can use more debts in financing their

assets. Expected increase in sales also affects the amount of leverage. This is the reason that developing companies use more debt in their capital structure.

- **Degree of Competition**

If in an industry, the degree for competition is high; such companies in that industry should use greater degree of share capital as compared to the debt capital. On the other hand, the industries in which the degree of competition is not so high have a tendency of stable income and, therefore, they can use more debt.

- **Credit standing**

Companies, whose credit standing is better from the viewpoint of investors and creditors, are able to raise funds on convenient terms. But in case the credit standing is not good, the financing decision becomes limited.

- **Corporation tax**

Due to the current provisions of tax, the use of debt in the capital structure is cheaper as compared to the ordinary share capital or preference share capital. Interest is chargeable expense from the taxable income, whereas dividend is paid out of earnings available after tax. Hence, level of tax affects the cost of capital. Therefore, to take the advantages of trading on equity, management uses more loan capital in the capital structure which helps in increasing the income of the shareholders.

- **State of capital market**

While taking decision on the capital structure, tendencies of the capital market should be taken into account because these affect the cost of capital and availability of funds from different sources. Sometimes, company wants to issue ordinary shares but the investors do not want to invest in that company due to high risk. In such a situation, company should not issue shares and necessary funds should be raised from other sources. Therefore, timing of the issuance of securities to the public is an important factor affecting the capital structure of a company.

(b) Theories underlying capital structure

(i) The Net Income (NI) Approach

The essence of the NI approach is that the firm can increase its value or lower the overall cost of capital by increasing the proportion of debt in the capital structure. The crucial assumptions of this approach are:

- The use of debt does not change the risk perception of the investor. Thus Kd and Ke remain constant with changes in leverage.
- The debt capitalization rate is less than equity capitalization rate (i.e. Kd < Ke).

The implications of these assumptions are that with constant Kd and Ke, increased use of debt, by magnifying the shareholders earnings will result in a higher value of the firm via higher value of equity. The overall cost of capital will therefore decrease.

(ii) The Net Operating Income (NOI) Approach

The critical assumptions of this approach are:

- The market capitalizes the value of the firm as a whole.
- The overall cost of capital depends on the business risk. If the business risk is assumed to remain constant, then overall cost of capital will also remain constant.
- The use of less costly debt increases the risk of the shareholders. This causes cost of equity to increase and thus offset the advantage of cheaper debt.
- Cost of debt is assumed to be constant.
- Corporate income taxes are ignored.

The implications of the above assumptions are that the market value of the firm depends on the business risk of the firm and is independent of the financial mix.

(iii) The traditional Approach

The traditional approach assumes that there is an optimal capital structure and that the firm can increase total value through the judicious use of leverage. It is a compromise between the net income approach and the net operating income approach. It implies that the cost of capital declines with increase in leverage (because debt capital is cheaper) within a reasonable or acceptable limit of debts and then increases with increase in leverage.

This approach implies that the cost of capital is not independent of the capital structure of the firm and that there is an optimal capital structure.

(iv) The Modigliani-Miller (MM) Approach

The MM, in their first paper (in 1958) advocated that the relationship between leverage and the cost of capital is explained by the net operating income approach. They argued that in the absence of taxes, a firm's market value and the cost of capital remains invariant to the capital structure changes. The arguments are based on the following assumptions:

- Capital markets are perfect and thus there are no transaction costs.
- The average expected future operating earnings of a firm are represented by subjective random variables.
- Firms can be categorized into "equivalent return" classes and that all firms within a class have the same degree of business risk.
- They also assumed that debt, both for the firm and individuals is riskless.
- Corporate taxes are ignored.

It implies that any firm could use the capital budgeting procedures without worrying where the money for capital expenditure comes from.

END OF MARKING GUIDE AND MODEL ANSWERS