

# KASNEB

## CIFA PART III SECTION 5

### FIXED INCOME INVESTMENTS ANALYSIS

WEDNESDAY: 23 November 2016.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

#### QUESTION ONE

(a) Describe the following mechanisms available for issuing fixed income securities in the primary financial markets:

- (i) Underwritten offerings. (1 mark)
- (ii) Shelf registration. (1 mark)
- (iii) Auctions. (1 mark)
- (iv) Private placements. (1 mark)

(b) Anthony Omenda, an investment and financial analyst with Topcap Ltd. has been tasked by his senior manager to prepare a report on how structured note securities differ from traditional debt securities.

In the context of the above statement, discuss how the following structured note securities differ from traditional debt securities:

- (i) Equity index-linked notes. (2 marks)
- (ii) Commodity-linked bear bonds. (2 marks)

(c) A fixed income trader is analysing a dual currency bond (USD/CHF) as a possible addition to his bond portfolio. He believes that CHF (Swiss franc) will appreciate against the United States Dollar (USD) over the life of the bond.

#### Required:

- (i) Explain the meaning of the term "dual currency bond". (1 mark)
- (ii) Give one reason why a dual currency bond might trade at a premium compared to identical single currency bond. (1 mark)
- (iii) Discuss whether there is an impact on a dual currency bond's interest payments and principal payments if the CHF appreciates against the USD over the life of the bond. (2 marks)

(d) Nyati Limited is a high yield bond issuer with a credit rating of Ba2/BB. The company has presented the following extract of financial statements for the year ended 31 December 2015:

	Sh."million"		Sh."million"
Cash	10	Accounts payable	10
Accounts receivable	15	Short term debt	5
Inventories	<u>55</u>	Current portion of long term debt	<u>3</u>
Total current assets	80	Total current liabilities	18
Land	10	Long term bank loans	30
Property, plant and equipment (net book value)	85	Secured bonds	10
Goodwill	<u>25</u>	Unsecured bonds	<u>20</u>
Total non-current assets	<u>120</u>	Total long term debt	60
Total assets	<u>200</u>	Pension liabilities	<u>22</u>
		Total liabilities	100
		Paid in capital	10
		Retained earnings	<u>90</u>
		Total shareholders equity	<u>100</u>
		Total liabilities and equity	<u>200</u>

**Additional information:**

1. For the year ended 31 December 2015, Nyati Limited's earnings before interest, taxes, depreciation and amortisation (EBITDA) were Sh.45 million.
2. For firms in Nyati's industry, credit rating standards for an investment grade (Baa3/BBB) credit rating include a debt to EBITDA ratio of less than 1.8x and a debt to capital ratio (based on all sources of financing) of less than 40%.
3. During an investor briefing, Nyati Limited's management states that they believe that Nyati Limited, should be upgraded to investment grade, based on its debt to EBITDA ratio of 1.5x and its debt to capital ratio of 34%.

**Required:**

Using appropriate ratios, justify why the credit analyst would disagree with the management's assessment. (5 marks)

- (e) An 8-year, 5.75% semi-annual coupon corporate bond is priced at Sh.108.32. The bond's duration and reported convexity are 6.4 and 50.0 respectively. The bond's credit spread narrows by 75 basis points due to a credit rating upgrade.

**Required:**

Estimate the return impact with convexity adjustment.

(3 marks)

(Total: 20 marks)

**QUESTION TWO**

- (a) Evaluate how each of the following theories of the term structure of interest rates could explain an upward slope of the yield curve:

- (i) Pure expectations theory. (2 marks)
- (ii) Liquidity preference theory. (2 marks)
- (iii) Market segmentation theory. (2 marks)

- (b) The following table shows the current coupon yields-to-maturity and spot rates of interest for six treasury securities:

Term to maturity of the treasury securities (years)	Current coupon yield-to-maturity (%)	Spot rate of interest (%)
1	5.25	5.25
2	5.75	5.79
3	6.15	6.19
5	6.45	6.51
10	6.95	7.10
30	7.25	7.67

Assume all the securities pay interest annually.

**Required:**

- (i) The two-year implied forward rate three years from now under the pure expectations theory. (3 marks)
  - (ii) State the assumption underlying the calculation of the implied forward rate in (b)(i) above. (1 mark)
- (c) An investor has 1-year, 10% semi-annually paying coupon bond priced at Sh.1,025. Assume that the 6-month spot rate on a bond equivalent basis is 8%.

**Required:**

The 1-year theoretical spot rate on a bond equivalent basis.

(4 marks)

- (d) Baraka Hospital has been forced to file for bankruptcy protection. The company managing the hospital has been allowed to reorganise under the name United Hospital (2016). The court has specified that a new indenture should be written to accompany a planned new bond issue. The issue would have ten years to maturity and shall carry a 10% coupon that would be paid annually. The new agreement would relieve the company of the obligation to make interest payments during the first five years of the bond issue. For the remaining five years, regular interest payment would resume. Finally, at maturity, the principal (Sh.1,000) plus the accrued interest for the first five years would be paid. However, no additional interest would be payable on the deferred interest. The bond yield to maturity is 10%.

**Required:**

Determine the value of the bond with deferred interest.

(3 marks)

- (c) An investor purchases a Sh.1,000, 4.50% semi-annual coupon bond with seven years to maturity priced to yield 6.50% for Sh.888.94.

**Required:**

The re-investment income that must be generated over the life of the bond for the investor to realise a yield of 6.50%.

(3 marks)

(Total: 20 marks)

**QUESTION THREE**

- (a) Explain three uses of a yield curve in relation to fixed income investments analysis. (3 marks)

- (b) (i) Discuss three assumptions of structural models used in corporate credit risk analysis. (6 marks)

- (ii) John Omwodho is a fixed income analyst at Fiduciary Bank Limited. He is analysing the term structure of credit spread for one of the bank's holdings, Patcom Limited. He obtains the following data on Patcom Limited's 5-year, 3% senior unsecured corporate bonds issued three years ago:

Payment date	Risk-free rate (%)	Credit spread (%)
30/9/2014	0.15	0.01
31/3/2015	0.22	0.02
30/9/2015	0.25	0.03
31/3/2016	0.27	0.04

The rates given above are continuously compounded annual rates, and the par value of the bonds is Sh.1,000.

**Required:**

The present value of the expected loss for the corporate bond.

(6 marks)

- (c) Samuel Busolo is an investment analyst with City Bank (E.A.) Ltd. He is currently evaluating two bonds, Bond X and Bond Y, with the following characteristics:

**Bond X:** The yield for a 3% coupon, 10-year annual-pay bond is 2.5% at Nairobi Securities Exchange (NSE). The same bond sells for Sh.104.376 per Sh.100 face value at the Uganda Securities Exchange (USE).

**Bond Y:** The yield for a 3% coupon, 10-year annual-pay bond is 3.2% at Nairobi Securities Exchange (NSE). The same bond sells for Sh.97.22 per Sh.100 face value at the Dar es salaam Stock Exchange (DSE).

**Required:**

Using arbitrage-free pricing approach, identify the bond that would include an arbitrage opportunity.

(5 marks)

(Total: 20 marks)

**QUESTION FOUR**

- (a) Assess five factors that could affect the credit spread of a corporate bond. (10 marks)

- (b) Wilson Omuse is considering the purchase of either of the following two bonds, CIE bond or PTB bond described below:

	CIE Bond	PTB Bond
Market price	Sh. 101.75	Sh.101.75
Maturity date	1 June 2026	1 June 2026
Call date	Non-callable	1 June 2021
Annual Coupon	6.25%	7.35%
Interest payment	Semi-annual	Semi-annual
Effective duration	7.35	5.40
Yield-to-maturity	6.02%	7.10%
Credit rating	A	A

Wilson Omuse realises his purchase decision would depend primarily on effective duration and he believes that interest rates would decline by 50 basis points at all maturities over the next six months.

**Required:**

- (i) The percentage price change forecasted by effective duration for both the CIE bond and PTB bond, assuming interest rates decline by 50 basis points over the next six months. (2 marks)
- (ii) The six-month horizon return (in percentage) for each bond, if the actual price of CIE bond is Sh.105.55 and the actual price of PTB bond is Sh.104.15 at the end of six months. (Assume you purchased the bonds to settle on 1 June 2016). (4 marks)
- (iii) Wilson Omuse is surprised by the fact that although interest rates fell by 50 basis points, the actual price change for the CIE bond was greater than the price change forecasted by effective duration, whereas the actual price change for the PTB bond was lower than the price change forecasted by effective duration.

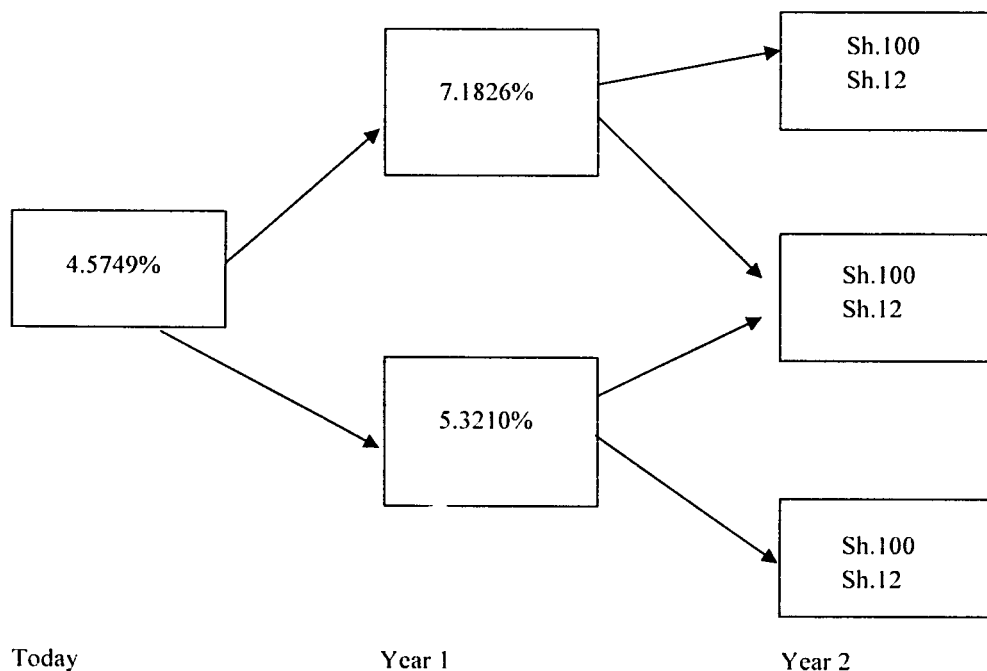
Explain why the actual price change would be greater for the CIE bond and lower for the PTB bond.

(4 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

- (a) Propose three reasons why the term-to-maturity of a bond is important to bond investors. (3 marks)
- (b) Discuss three bond features that could affect the interest rate risk of a bond. (6 marks)
- (c) In the context of bond valuation, explain the term “relative analysis of a bond”. (2 marks)
- (d) Mita Opati is a fixed income trader and uses the following binomial tree to value a bond with embedded options. The bond has a 12% annual coupon with two years to maturity, though the bond is puttable at Sh.105 at the end of year 1.



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**Required:**

The value of the embedded put option.

(6 marks)

- (e) A convertible bond with a 9% annual coupon is currently selling for Sh.1,073 with a conversion value of Sh.30 and a straight value of Sh.1,031. The ordinary shares pay a Sh.1.25 dividend per share and are currently selling for Sh.32 per share.

**Required:**

The premium payback period of the convertible bond.

(3 marks)

**(Total: 20 marks)**

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