CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SPECIAL/RESIT EXAMINATION

EXAMINATIONS FOR THE AWARD OF BACHELOR OF COMMERCE

BCOM 435: FINANCIAL MODELLING AND FORECASTING

STREAMS: BCOM   **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 12/9/2018   **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS: Answer Question ONE and Any Other TWO Questions

Question One (30 Marks)

(a) Explain the following terms:
   (i) Financial modelling   [2 marks]
   (ii) Financial Forecasting   [2 marks]
(b) Explain the following terms as used in the options models
   (i) Exercise price   [2 marks]
   (ii) American option   [2 marks]
   (iii)   In-the-Money   [2 marks]
(c) Consider the following four portfolios

Portfolio	Expected Return %	Standard deviation (σ_P)
A	15	5
B	13	6
C	10	7
D	16	10

If the market return is 10% with a standard deviation of 4% and risk free rate of 6%, determine using the capital market line equation which of the portfolios are efficient and which are inefficient.   [8 marks]

(d) The effectiveness of forecasting as a tool for reducing risk in financial planning decisions requires following a series of steps. Decribe the steps involved in forecasting process   [4 marks]

(a) A financial analyst has gathered the following data about the relationship between returns on stock N and the market (M) for the last six years. The data is expected to fit

the simple stochastic regression model of the form $R_N = \alpha + \beta R_m + \varepsilon$ where ε is expected to be zero over time due to randomness of unsystematic risk.

The percentage returns for the past six yars are shown in teh table beow.

Year	Return %	
	N	M
1	8	15
2	9	7
3	20	16
4	-10	-13
5	5	4
6	12	7

Required

(i)   Develop a regression model that best describes this data using regression analysis   [4 marks]

(ii)   Interprete the beta and intercept term in model (i) above?   [4 marks]

QUESTION TWO (20 marks)

(a) Consider the following income statement for Rama Ltd for the year ended 31st December 2011

	Sh '000'
Sales	20,000
Less: costs	16969.70
Taxable income	3030.30
Less: taxes	1030.30
Net income	2000.00
Dividends	1000.00
Addition to retained earnings	1000.00
	2000.00

Statement of financial position as at 31st December 2011.

	Sh. 000	Sh.000	Sh. 000
Assets			
Non-current			
Plant & Equipment (Net)			24,000
Current Assets:			
Cash		1000	
Accounts receivables		2000	
Inventory		3000	
		6000	
Less: Current Liabilitiees			
Accounts payable	6000		
Notes payab	4000	(10,000)	(4000)

		20,000
Equities and long-term Liabilities		
Common stock	4000	
Retained earnings	10000	
Long-term debt	6000	20000

The following assumptions are to be taken into consideration:

(i)   The corporation tax rate is 34%
(ii) The balance sheet items are expected to increase spontaneously with sales except common stock and retentions.
(iii) The company will maintain 50% payout rate for the foreseable future.

Required

Prepare a proforma income statement and proforma statement of financial postion to forecast the external financing needed to support 10% gorwth in sales.

[15 marks]

(b) Compute call option price by applying Black-scholes option pricing model on the following values

Current market price of the share:	Sh.75
Variance of the underlying stock	0.2025
Exercise price	Sh.80
Risk-free rate	0.12
Time to expiration	6 months

[5 marks]

QUESTION THREE (20 Marks)

a. Explain briefly the components of time series data   [4 marks]

b. The sales data for ABC Ltd (in million of shilling) for the year 2009 to 2012 inclusive are given

Year	Q1	Q2	Q3	Q4
2009	3.7	4.1	3.3	3.5
2010	3.7	3.9	3.6	3.6
2011	4.0	4.1	3.3	3.1
2012	3.3	4.4	4.0	4.0

Determine:

(i) The trend in the data using least squares method   [4 marks]
(ii) Forecast sales for the 1st and 2nd quarter of 2013 using multiplicative model
[4 marks]

c. Explain how finance managers can utilize the following qualitative decision models
(i)   Delphi method   [2 marks]
(ii) Scenario writing   [2 marks]
(iii) Cross-impact analysis   [2 marks]

(iv)   Jury of executive opinion   [2 marks]

QUESTION FOUR (20 MARKS)

(b) Explain the significance of 'hedge ratio' in the context of options modelling [2 marks]

(c) Consider a two year European put option with a strike price of sh. 52 on a stock whose current price is sh. 50. Suppose there are 2 time steps of one yar and in each step, the stock price moves up by 20% or down by 20%. The risk-free rate is 5%. Calculate the value of the put using binomial model.   [8 marks]

(d) The Altman model for forecasting company failure is given as follows:

Z score= $1.2X_1 + 1.4X_2 + 3.3X_3 + 1X_4 + 0.6X_5$

Where: X_1 =   Working capital/Total assets

X_2 =   Retained earnings/Total assets

X_3 =   Earnings before interest and tax/Total assets

X_4 =   Sales/Total assets

X_5 =   Market value of Equity/Liabilities

In this model, A company with a Z-score less than 1.81 is considered to have high failure risk, a Z score of 2.7 or more indicates low failure risk and a Z–score between 1.81 and 2.7 indicates that the company's failure risk is indeterminate (i.e. the company cannot be classified as either high or low risk).

You are provided with the following information in respect of four listed companies.

	WC Sh.'000'	RE Sh.'000'	EBIT Sh.'000'	MV of equity Sh.'000'	TA Sh.'000'	L Sh.'000'	Sales Sh.'000'
A Ltd	4,000	60,000	10,000	20,000	200,000	120,000	200,000
B Ltd	2,000	20,000	0	5,000	100,000	80,000	120,000
C Ltd	6,000	20,000	-30,000	48,000	800,000	740,000	900,000
D Ltd.	40,000	200,000	30,000	100,000	1,800,000	1,000,000	2,000,000

Required: The Z-Score for each of the companies. Comment on the results obtained.
(10 marks)