Uva Wellassa University

Faculty of Management

Degree of Bachelor of Business Management in Entrepreneurship and Management

THIRD YEAR SECOND SEMESTER EXAMINATION –AUGUST/SEPTEMBER 2011

EMG 337-2- IT for Actuarial Science

Instructions to candidates:

No. of pages	: Three(03)
No. of questions	: Five (05)
Time allocation	: Two (02) Hours
Marks allocation	: 100 Marks

Answer **any four** questions.

Index Number:

Create a folder with your index number on your desktop. Copy the excel sheet provided to you, in to the folder you created. Now make the current directory of MATLAB to this folder. Save all your work in this folder. Before you get started on answering the questions, type the following commands in the MATLAB command window

diary 'index no.'
dairy on

Insert following command before close the MATLAB command window
diary off

01. Create a bond yield rate calculator using excel. You may use following steps.

Step 1: Design the Following Excel worksheet.

		Bond yield rate calculator
	Price	
	Coupon Rate	
	No. of Coupon period	
	Yield Rate	1
	Equation	

Step 2: Add values for price, coupon rate and number of period.
Step 3: Insert the relevant equation.
Step 4: Calculate the answer for yield rate using excel solver.

(25 Marks)

02. A nine month European call option on a non- dividend-paying stock has a strike price of $44. The stock price is $45, the risk free interest rate is 5% per annum and the volatility is 12% per annum. Use six step binomial tree to calculate the option price.

[You may use equations: $u = \exp(\sigma\sqrt{\Delta t})$ *and* $d = \exp(-\sigma\sqrt{\Delta t})$. Use Excel software for calculations]

(25 Marks)

03. Following table gives some historical data of a portfolio.

Stock	Invested Amount ($)	Price(Bought)	Price(Today)
MSFT	29150.95	25.66	24.49
XOM	30000	82.71	81.57
HP	0	59.36	60.31
PG	30000	65.14	67.36
GE	10849.05	20.07	19.62

i) Insert this table into an excel worksheet

ii) Add another column for arithmetic return and calculate the arithmetic return for each stock.

iii) Calculate the portfolio return

iv) You are given the variance covariance matrix of daily returns for above stock as follows.

	MSFT	XOM	HP	PG	GE
MSFT	0.000402147	0.000229	0.000296	0.000132	0.000232
XOM	0.00022852	0.000366	0.000424	0.000148	0.000234
HP	0.000295852	0.000424	0.001106	0.000169	0.000356
PG	0.000131693	0.000148	0.000169	0.000165	0.000155
GE	0.000231721	0.000234	0.000356	0.000155	0.000608

Use this matrix and calculate the daily portfolio volatility.

(25 Marks)

04.

i) Solve the following system of linear equations using MATLAB.

$$4x - 2y + 6z = 8$$

$$2x + 8y + 2z = 4$$

$$6x + 10y + 3z = 0$$

ii) Write the MATLAB command to import the 'stockmrt.xls' file

a) Assign the imported matrix to a variable "A". Further assign the second column of the matrix "A" to a variable "b".

b) Find the range of the variable "b".

c) Represent the data in the variable "b" in a histogram.

(25 Marks)

05.

i) Write a MATLAB function to calculate European call option price. Use one step binomial model with parameters *u*, *d*, risk-free interest rate *(r)*, stock price *(S0)*, strike price *(K)* and time to maturity *(T)*.

ii) A nine month European call option on a non- dividend-paying stock has a strike price of \$44. The stock price is \$45, the risk free interest rate is 5% per annum and the volatility is 12% per annum. Use created MATLAB function to calculate the option price.

(25 Marks)

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