UNIVERSITY EXAMINATIONS: 2013/2014

EXAMINATION FOR THE MASTERS OF SCIENCE (MSC) IN COMMERCE

MEI 509 FINANCIAL RISK MANAGEMENT (KITENGELA)

DATE: APRIL, 2014   **TIME: 3 HOURS**

INSTRUCTIONS: Answer Question One and Any Other Three Questions

QUESTION ONE (31 MARKS)

(a)   State and discuss two Greeks   (5 Marks)

(b)   Suppose the returns of two portfolios are given below:

return A %	return B %	Probability
4,000	10	0.05
3,000	15	0.60
3,000	20	0.10
6,000	30	0.25

   (i)   What is the expected return of each investment?

   (ii)   What is the standard deviation of each investment?

   (iii)   Compute the correlation coefficient between the returns   (12 Marks)

(c)   State and explain the assumptions of the Black-Scholes-Merton Option Pricing Model

                                                                         (6 Marks)

(d)   Given that a portfolio is formed of two assets whose expected returns are R_1 and R_2

         respectively, the standard deviation are σ_1 and σ_2, with weights w_1 and w_2. Suppose asset one is

risk-free, show that portfolio return is positively correlated to the portfolio standard deviation
(portfolio risk) (8 Marks)

QUESTION TWO (23 MARKS)

(a)   Define the term hedging (6 Marks)

(b)   Consider forming a portfolio with three assets.

The expected returns are $E(R) = (40, 50, 80)$ and the variance-covariance matrix is Σ

$$\Sigma = \begin{pmatrix} 0.090 & 0.030 & 0.007 \\ 0.030 & 0.100 & -0.020 \\ 0.007 & -0.020 & 0.010 \end{pmatrix}$$

Portfolio 1 weights are $w' = (0.2, 0.2, 0.6)$, Portfolio 2 weights are $w' = (0.4, 0.5, 0.1)$

Compute:

(i)   the portfolio expected return

(ii)   the standard deviations for each asset's return

(iii)   the correlation between the asset's returns and express in matrix form

(iv)   Calculate the portfolio variances.

(v)   Calculate the covariance between the portfolios. (15 Marks)

QUESTION THREE (23 MARKS)

(a)   Define Capital Asset Pricing Model and state the assumptions on which it is based (11 Marks)

(b)   The ABC Company has a market value of $4milliom. Its required rate of return is 18%. The
company is evaluating an $88,000 investment project which is expected to generate after-tax
cash flows of $176,000 a year indefinitely. The project is 40% riskier than the firm's average
operations. If the riskless rate is 8% and the expected market return on the project is 15.5%,
should the project be accepted? (12 Marks)

QUESTION FOUR (23 MARKS)

(a)   An investor wishes to construct a portfolio consisting of Security A and Security B. The
expected returns of A and B are *% and 12% per year respectively and their standard
deviations are 20% and 30% respectively. The correlation coefficient between the returns is -

0.5. The investor is free to choose the investment proportions w_1 and w_2, subject that $w_1 + w_2 = 1$ and that w_1 and w_2 are positive.

(i) Find the expected return on the two-security portfolio

(ii) Compute the standard deviation of the two-security portfolio.

(iii) Suppose investment A is risk-free, what is the expected return and standard deviation of the portfolio? (16 Marks)

(b) Using the above results plot graph of Expected return and standard deviation (7 Marks)

QUESTION FIVE (23 MARKS)

(a) State and explain three Greeks of a European call option (7 Marks)

(b) Suppose you own a call option on a stock for which the following apply:

Underlying asset's price is $60, exercise price is $58, annual risk-free is 5%, time to expiration on the option is 3 months and the volatility of the underlying asset's return is 12%. Calculate the value of the call option. (16 Marks)

QUESTION SIX (23 MARKS)

(a) Describe the CAPM (8 Marks)

(b) Suppose the returns of two portfolios are given below:

State of economy	Probability of state of economy	Rate of Return of A	Rate of return of B
Recession	0.30	-15	100
Normal	0.50	40	90
Boom	0.20	50	110

(i) Compute the portfolio return

(ii) What is the portfolio standard deviation? (15 Marks)