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 335-3 Economics for Actuarial Science

Instructions to candidates:

No. of pages	: Six (06)
No. of questions	: Five (05) Structured Four (04) Essays
Time	: Two (02) hour and thirty (30) Minutes
Marks allocated	: 80 Marks

Index No:

Question paper is not to be removed from the examination hall.

Part C - Essay Question

Marks allocation: 45 Marks

Answer **only three (3)** questions **including question No. 01**

01.

i. Explain the role of interest rate as a tool of government policy.
ii. Explain two theories of interest rate and their weaknesses.
iii. Critically explain the Efficient Market Hypothesis.

(5 x 3 =15 Marks)

02.

i. Find the price of a 10 year bond which is having the following information.
Par value: Rs. 1000
Coupon rate: @8.4% convertible semi annually
Redemption value: Rs. 1050
Yield rate: 10% convertible semi annually

(5 Marks)

ii. Consider that there are three bonds with same maturity value and term. Their respective coupon and selling prices are as follows.

Bond	Coupon	Selling price
Bond A	40	P
Bond B	30	Q
Bond C	80	?

Further, note that all the prices are based on the same yield rate and all coupons are paid at the same frequency.

Determine the price of the Bond C.

(10 Marks)

(Total marks 15)

03.

i. Consider that a European call option on stock A with a strike price of \$50 matures in one year. The stock A is trading at a price of \$40 and expected to appreciate at a rate of 20% per annum. The standard deviation of that return is assessed at 30% per annum. The annualized, continuously compounded risk-free rate is 5%.

a) Accordingly, you decide to carry out a binomial option pricing analysis by sub-dividing the 1-year time interval into two 6-month intervals. What is the risk-neutral probability of stock going up every 6 months?

(4 Marks)

b) What would be the price of the European call option now?

(3 Marks)

ii. Current price of a stock is Rs. 25. It is known that at the end of one month period it would be either Rs. 23 or Rs. 27. The risk- free interest rate is 10% per annum with continuous compounding. Suppose S_T is the stock price at the end of one month.

What is the value of a derivative that payoff $(S_T)^2$ at this time?

(8 Marks)

(Total marks 15)

04.

i. A European call option on a non divided-paying stock is having following information.
Stock price: \$52
Strike price: \$50
Risk free interest rate: 12% per annum
Volatility: 30% per annum
Time to maturity: 3 months
What is the price of this European call option?

15

[Relevant equation: $= S_0 \ \emptyset\left(\frac{\ln\left(\frac{S_0}{K}\right)+rT+\frac{1}{2}\sigma^2T}{\sigma\sqrt{T}}\right) - e^{-rT}K \ \emptyset\left(\frac{\ln\left(\frac{S_0}{K}\right)+rT-\frac{1}{2}\sigma^2T}{\sigma\sqrt{T}}\right)$]

(8 Marks)

ii. A cash position of a company (in million Rs.) follows a generalized wiener process with a drift rate of 2 per annum and variance rate of 16.0 per annum.

$$dc = 2dt + 4dw$$

Here dw is a wiener process. How high does the company's cash position have to be in order to have a less than 5% chance of negative cash by the end of the year?

(7 Marks)

(Total marks 15)