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**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE**

**UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE ACTUARIAL**

**3rd YEAR 1st SEMESTER 2015/2016 ACADEMIC YEAR**

**REGULAR (MAIN)**

**COURSE CODE: SAC 307**

**COURSE TITLE: FINANCIAL ECONOMICS**

**EXAM VENUE: STREAM: (BSc. Actuarial)**

**DATE: EXAM SESSION:**

**TIME: 2.00 HOURS**

**Instructions:**

1. **Answer question 1 (Compulsory) and ANY other 2 questions**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**QUESTION ONE [30 marks]**

a).An investor is considering inesting her total ealth in one of the two portofolios,A and B.The total return on A,  is uniformly distributed on the interval [0.9, 1.3]

The total return on B,  has the discrete distribution:



i)Calculate the mean and standard deviation of  and  [4 marks]

ii)The investor makes decisions using the utility function

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Determine in which of the two portofolios she will invest [4 marks]

iii)Comment briefly on your answers to parts (a) and (b) [2 marks]

b) State the shortcomings of Capital Asset pricing model [5 marks]

c).Using the standard Black Scholes put option price formula, calculate the price of a European put on a dividend paying –paying stock with the following features: [5 marks]

Risk free rate :6% pa (continuously compounded)

Volatility 20% pa

Dividends:3%(continuously compounded)

Time to expiry :3 months

Current price of underlying 450 kshs

Strike price 400kshs

d.)What does the terms: In-the money, Out –of –the money and at –the money refer to in regards to European call option and a European put option (6marks)

e)Suppose the expected returns and varianc es of stocks A and B are

 ,  ,  and vly

1. Calculate the expected return and variance of a portfolio that is composed of 60% A and 40% B, when the correlation coefficient between the stocks is -0.5. (2 marks)
2. Calculate the expected return and variance of a portfolio that is composed of 60% A and 40% B when the correlation coefficient between the stocks is -0.6. (2 marks)
3. How does the correlation coefficient affect the variance of the portfolio? (1 marks)

**QUESTION TWO (20 marks)**

a).i)What are differences between a future contract and a forward contract. (4 marks )

ii).Differentiate between the terms long position and short position in regards to the futures contract (2 marks)

b) .i)Suppose that you enter into a 6 month forward contract on a non dividend paying stock when the stock price 30 and risk –free interest rate (continuously compounded) is 12% pa.What is the forward price (3 marks)

ii).A stock index currently stands at 350.The risk free interest rate is 8% pa (continuously compounded) and the dividend yield on the yield on the index is 4% pa.Calculate the future price of a 4 month contract (4 marks )

c) Company X issues 6- month European call option on its own shares with a strike price of 120 kshs.They are currently priced at 35 kshs.per share.The current share price is 123 kshs and the current force of interest is $δ=6\% pa$. If dividends are payable continuously at a rate of q=12 % pa then calculate the fair price for put options on the share price at the same strike price. (4 marks).

d) Suppose that Matheka plans to invest 200 percent of his wealth in the market portofolio.Current rate of treasury bills is 6% and expected market return and risk 14 and 20 % respectively. What would be the return and risk of Matheka’s portfolio [3 marks]

**QUESTION THREE (20 marks)**

The quarterly returns of mutual funds and stock market were as below

|  |  |  |  |
| --- | --- | --- | --- |
| DATE | Returns of fund X | Returns of fund Y | Stock Market |
| 2005/Q1 | 6.4% | 7.9% | 9.2% |
| 2005/Q2 | 8.5 | 9.5 | 7.3 |
| 2005/Q3 | 3.4 | -6.6 | -6 |
| 2005/Q4 | 13.7 | 31.3 | 17.3 |
| 2006/Q1 | 14.5 | 17.5 | 14.0 |
| 2006/Q2 | 3.2 | 11.6 | 5.9 |
| 2006/Q3 | -0.9 | -14.7 | -6.9 |
| 2006/Q7 | 4.5 | 6.7 | 5.6 |

Required:

1. Correlation of returns for fund X and market (6 marks)
2. Correlation of returns for fund Y and the market (6 marks)
3. Beta of each fund (4 marks)
4. Percentage of risk (systematic and unsystematic) in each fund (4 marks)

**QUESTION FOUR (20 marks)**

a.The CAPM model is assumed to hold in a particular investment market. The total return on a unit invested in asset A in this market has mean 1.15 and standard deviation 0.10.The return on a unit invested risk free asset is 1.05 and the expected return on a unit ionvested in the market portofolio is 1.08.You are given that A is an efficient portofolio

i)Derive the equation for the capital market line [3 marks]

ii)Calculate the standard deviation of the return on the market portofolio [3 marks}

iii)Calculate the beta for asset A [3 marks]

iv)Asset B has a beta of 4 and the standard deviation of return is 0.15.Determine whether B is an efficient portofolio .Give reasons for your answer [3 marks]

b) You are given that assets X and Y are perfectly correlated such that $R\_{Y}=6+0.2 R\_{X}$ and the probability distribution of X is

|  |  |
| --- | --- |
| Probability | Return on X, $R\_{X }$ % |
| 0.1 | 30 |
| 0.2 | 20 |
| 0.4 | 15 |
| 0.2 | 10 |
| 0.1 | -50 |

1. Graph the portfolio opportunity set (3 marks)
2. What is the percentage of your wealth to put into asset X to achieve zero variance? (5 marks)

**QUESTION FIVE (20 marks)**

a.i)Define the term efficient market hypothesis [3 marks]

 ii)Discuss any 2 forms of market efficiency [6 marks]

b.) Define risk and discuss 3 methods of mitigating risk a [7 marks]

c)Assume there are just two risky securities in the market portofolio.Security A , which constitutes of 40% of this portofolio , has an expected return of 10% and a standard deviation of 20%.Security B has an expected return of 15% and standard deviation of 28%.If the correlation between the assets is 0.3 and risk free rate is 5%.Calculate the capital market line [4 marks]