THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Fax: 254-20-891084
E-mail:academics@cuea.edu

MAIN EXAMINATION

JANUARY – APRIL 2018 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF MATHEMATICS AND ACTUARIAL SCIENCE

REGULAR PROGRAMME

ACS 403: FINANCIAL ECONOMICS

Date: APRIL 2018	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1. a) What is financial economics? **(2 marks)**

b) Explain the three forms of the Efficient Markets Hypothesis **(3 marks)**

c) Discuss the three types of multifactor models of asset returns **(3 marks)**

d) List any three assumptions of APT **(3 marks)**

e) An investor has the choice of the following assets that earn rates of return as follows in each of the four possible states of the world:

State	Probability	Asset 1	Asset 2	Asset 3
1	0.2	5%	5%	6%
2	0.3	5%	12%	5%
3	0.1	5%	3%	4%
4	0.4	5%	1%	7%
Market capitalisation	10,000	17,546	82,454	

Determine the market price of risk assuming CAPM holds.
Define all terms used. **(8 marks)**

f) Why study financial economics in higher education level? **(4 marks)**

g) An investor is contemplating an investment with a return of £ R , where:
R = 300,000 - 500,000U where U is a uniform [0,1] random variable.

Calculate each of the following four measures of risk:

i) Variance of return **(2 marks)**

ii) Downside semi-variance of return **(1 mark)**

iii) Shortfall probability, where the shortfall level is Kshs100,000 **(2 marks)**

iv) Value at Risk at the 5% level. **(2 marks)**

Q2. i) Two assets are available for investment. Asset 1 returns a percentage 4 B%, where B is a Binomial random variable with parameters n = 3 and p = 0.5. Asset 2 returns apercentage 2P%, where P is a Poisson random variable with parameter μ = 3.Assume a benchmark return of 3%. Calculate the following three measures of investment risk for each asset:

a) Variance **(3 marks)**

b) Semi-variance and **(3 marks)**

c) Shortfall probability **(4marks)**

ii) An investor can construct a portfolio using only two assets A and B with the following properties:

	A	B
Variance of return	24%%	12%%

Correlation coefficient between assets 0.25

Derive a formula for and determine the composition of the investor's minimum variance portfolio. **(10 marks)**

Q3. a) A market consists of three assets A, B and C. Annual returns on the three assets (RA, RB and RC) have the following characteristics:

Asset	Expected return %	Standard deviation %
A	9	20
B	6	20
C	3	10

The correlation between the returns are as follows: Corr(RA, RB) = -¼, Corr(RB, RC) = -½ and Corr(RA, RC) = -½.

Calculate the variance of the returns of each asset and the covariances between the returns of each pair of assets. **(10 marks)**

b) Explain five properties of Standard Brownian motion **(10 marks)**

Q4. i) Explain what is meant by self-financing in the context of continuous-time derivative pricing, defining all notation used **(6 marks)**

ii) Define the delta of a derivative, defining all notation and terms used other than those already defined in your answer to (i) **(4 marks)**

iii) A researcher has analysed the annual returns of equity stocks in a particular country over a 10-year period and has made the following observations:

a) Annual market returns in consecutive years have a negative correlation of –0.25. **(2 marks)**

b) The closing value of the index of the 100 stocks with the highest market capitalisationhas been found to be 1% higher on average on Fridays than on Mondays. **(2 marks)**

c) Announcements of changes in company's dividend policies typically take three months to become fully reflected in the quoted share price. **(2 marks)**

d) The prices of a particular subset of stocks have been consistently observed to fall immediately following a favourable announcement and to rise immediately following an unfavourable announcement. Discuss these observations in the light of the EMH. **(2 marks)**

Q5. i) State the assumptions underlying the Black-Scholes option pricing formula **(6marks)**

ii) Within the context of the capital asset pricing model, explain what is meant by the "market price of risk". **(4 marks)**

iii) Show how the security market line relationship can be rearranged to give an expression for the expected return in terms of the market price of risk Y_M, and briefly interpret your answer. **(4 marks)**

iv) Show that the capital asset pricing model result can be written as a single-index model and hence that it is consistent with the arbitrage pricing theory. **(6 marks)**

END