JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF EDUCATION AND ACTUARIAL SCIENCE

2nd YEAR 2nd SEMESTER 2021/2022 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: WAB 2210

COURSE TITLE: INVESTMENT AND ASSET MANAGEMENT 1

EXAM VENUE: **STREAM: EDUCATION, ACTUARIAL**

DATE: **EXAM SESSION:**

TIME: 2.00 HOURS

Instructions:

1. **Answer question one (compulsory) and any other two 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 1 [30marks]

a. Define the following terms [3marks]

i) Internal rate of return

ii) Payback period

iii) Net present value

b. Describe the basic principles of company taxation. [5marks]

c. Suppose a stock has two assets A and B with the following returns: Asset A=5,7,3,12,15,17,8,1,14,10 and asset B=20,15,2,11,7,8,12,3,4,9.Suppose we have the correlation coefficient of 0.1 and weighted average of return of $A = 0.7$.Calculate the mean and the variance portfolio of stock. [7marks]

d. The business plan for a new company that has obtained a 5-year lease for operating a local bus service is shown in the table below. Items marked with an asterisk represent continuous cashflows.

Cashflow item	*Timing*	*Amount (£000)*
Initial set up costs	Immediate	–100
Fees from advertising contracts	1 month	+200
Purchase of vehicles	3 months	–2,000
Fares from passengers*	from 3 months onwards	+1,000 *pa*
Staff costs and other operating costs*	From 3 months onwards	– 400 *pa*
Resale value of assets	5 years	+500

Determine the discounted payback period for this project assuming that it will be financed by a flexible loan facility based on an effective annual interest rate of 10% per annum. [5marks]

e. State five the principles underlying legislation [5marks]

f. Calculate the rate of return of the following portfolio of the three assets. [5marks]

Security	Number of shares	price	rate of return
A	250	50	20%
B	500	30	17%
C	300	20	27%

Question 2 [20marks]

An investor is considering making an investment in one or both of two projects. The cashflows associated with the projects are as follows. The unit of time is years.
Project A: Initial payments of £2 million at time zero and £4 million at time 2 are made. In return a sum of £900,000 per annum is paid continuously from time 5 to time 25.
Project B: Regular payments of £100,000 are made at the start of each year for 10 years. In return, amounts of X , $2X$, $3X$ and so on are made annually for 10 years, the first payment being made at time 11.
(i) Find the net present value of Project A at an effective annual interest rate of 10%. [2marks]
(ii) Show that the internal rate of return for Project A is 9.38% *pa*. [2marks]
(iii) Find the value of X if the internal rate of return for Project B is the same as that for Project A [3marks]
(iv) Find the value of X if both projects are to have the same net present value at 10% *pa*. [3marks]
(v) The investor proposes to borrow all the money needed for the project. Funds are available at an interest rate of 7% per annum effective. Repayments can be made at any time, and positive cash balances can be invested to yield 3% per annum. If X = £45,000, find the accumulated value of each project at the end of the 25 year period. [10mrks]

Question 3 [20marks]

Explain **TEN** factors that an investor should take into account before venturing into an investment [20marks]

Question 4 [20marks]

a. State and explain five types of systematic risk [5marks]
b. State and explain five ways on which one can minimize risk exposure [5marks]
c. State and explain five risk measures [5marks]
d. Describe the basic principles of personal and corporate taxation [5marks]

Question 5 [20marks]

Define the following measures of investment risk:

(i) variance of return [2marks]
(ii) (ii) downside semi-variance of return [2marks]
(iii) (iii) shortfall probability. [2marks]
(iv) (iv) value at risk [2marks]
(v) 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:
(a) variance of return [4marks]
(b) downside semi-variance of return [2marks]
(c) shortfall probability, where the shortfall level is £100,000 [2marks]
(d) Value at Risk at the 5% level. [4marks]