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
$2^{\text {nd }}$ YEAR $2^{\text {nd }}$ 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 | $+1,000 \mathrm{pa}$ |
| 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 $X, 2 X, 3 X$ 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
b. State and explain five ways on which one can minimize risk exposure
c. State and explain five risk measures
d. Describe the basic principles of personal and corporate taxation
[5marks]
[5marks]
[5marks]
[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 $£ \mathrm{R}$, where:

$$
R=300,000-500,000 U
$$

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 $£ 100,000$ | $[2 \mathrm{marks}]$ |
| (d) Value at Risk at the $5 \%$ level. | [4marks] |

