



MACHAKOS UNIVERSITY

SCHOOL OF PURE AND APPLIED STATISTICS.

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE.

BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

THIRD YEAR: SECOND SEMESTER

SAC 305: INVESTMENT AND ASSET MANAGEMENT 1

INSTRUCTION: ANSWER QUESTION ONE [COMPUSLSORY] AND TWO OTHER QUESTIONS

QUESTION ONE: 30 MARKS.

- a) Define the following terms:
 - i. Blue – chip stocks. (2 marks)
 - ii. Convertibles. (2 marks)
- b) Give three main adjustments that have to be made to accounting profit to arrive at taxable profit? (3 marks)
- c) State three possible varieties of preference shares. (3 marks)
- d) How can the covariance of the returns on securities S_i and S_j be expressed in terms of the correlations of the returns on securities S_i and S_j ? (5 marks)
- e) Assume that the capital gains allowance is £10,000 and the capital gains tax rate is 18% on gains that fall within the basic rate tax band and 28% on any further gains.
Mrs. Y has £1,000 of the basic tax band left unused. She makes a chargeable gain of £15,000. How much capital gains tax does she pay? (5 marks)
- f) Give the equation of the Markowitz model. (5 marks)
- g) Mention five features of a EURO bond. (5 marks)

QUESTION TWO (20 MARKS)

a) Using mean-variance portfolio theory, prove that the efficient frontier becomes a straight line in the presence of a risk-free asset. **(8 marks)**

b) Consider two independent assets, Asset A and Asset B, with expected returns of 6% p.a and 11% p.a and standard deviations of returns of 5% pa and 10% pa respectively.

If only Assets A and B are available, calculate the equation of the efficient frontier in expected return-standard deviation space. **(12marks)**

QUESTION THREE (20 MARKS)

a) Mention and describe five types of corporate bonds. **(10 marks)**

b) Complete the following table comparing ordinary shares with preference shares.

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(10 marks)

	ordinary shares	preference shares
Voting rights		
Dividends		
Importance for company		
Different varieties		
Priority on winding up the company		

QUESTION FOUR (20 MARKS)

a) As an actuary you have been assigned the task of assessing some of the risk incurred/ may be incurred by your company.

i. If the company wished to invest in bonds, discuss five types of risk that they may encounter. **(10 marks)**

ii. What advice would you give that may help in controlling those risk? .

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(10 marks)

QUESTION FIVE (20 MARKS)

- a) A speculator borrows £50,000 at an effective interest rate of 8% per annum to finance a project that is expected to generate £7,500 at the end of each year for the next 15 years. Find the discounted payback period for this investment. **(10 marks)**

- b) The directors of Merchant plc are considering a five year project that has been proposed by the company's sales director. A customer is about to sell a very specialized milling machine that has become surplus to requirements. This type of machine would cost tens of millions of pounds to buy new. Used machines are rarely sold on the open market. The machine has an expected remaining useful life of five years and has been checked and certified by an independent engineer. The sales director proposes buying the used machine for £4 million and using it to manufacture a new product for which Merchant plc owns some patent rights and which cannot be manufactured in an economic manner without such equipment.

The sales director proposes taking out a five year lease on a factory building and using an employment agency to provide labor for the five year period. The sales director estimates that it would be necessary to invest a further £1 million at the start of the first year in addition to buying the machine: a returnable deposit of £100,000 on the factory, £200,000 for the first year's lease, £400,000 for the opening inventory of raw materials and £300,000 for the initial payment for labor.

The sales director has drafted the following budgeted annual income statement for the project:

	£m
Revenue	2.6
Raw materials	(0.4)
Factory lease	(0.2)
Labour	(0.3)
Depreciation of machine	(0.8)
Other running costs	<u>(0.5)</u>
Profit	<u><u>0.4</u></u>

It is anticipated that materials, recurring lease payments and labor will be paid for annually at the start of each year. Other running costs comprise the cost of electricity and other operating costs and they will be paid for annually at the end of each year. Revenues will be received at the end of the year in which they are earned.

At the conclusion of the project, the sales director anticipates that it will cost £300,000 to dismantle the equipment and at that time it will be possible to reclaim 100% of the deposit paid to the factory owner.

The sales director has shown this proposal to a potential lender, who has agreed to lend Merchant plc £5 million at an interest rate of 7% p.a. This loan will be secured on Merchant plc's existing assets because the milling machine is deemed to be too specialized to be a suitable form of security.

The sales director proposes that the project should be evaluated at a required rate of return of 7% p.a. because it will be financed by means of a self-contained loan package upon which that rate will be charged. The finance director believes that the project should be evaluated at a much higher rate than 7% p.a., but cannot state the specific rate that should be charged without conducting a further analysis.

The finance director is also concerned that the sales director has ignored tax when preparing the budgeted income statement.

- i. Calculate the net present value of the project using a discount rate of 7% p.a. and ignoring tax. (5 marks)

- ii. Explain why the required rate of return might be higher than the 7% rate charged by the bank on the funding for the project. **(2 marks)**
- iii. Explain how adjusting for tax will affect the analysis of this project. You are not required to calculate the effects of tax. **(3 marks)**