



# MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ACTUARIAL SCIENCE)

SAC 305: INVESTMENT AND ASSET MANAGEMENT 1

DATE:

TIME:

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## INSTRUCTIONS TO CANDIDATES

Answer **ALL** the questions **ONE** and **ANY TWO** Questions

### QUESTION ONE (COMPULSORY) (30 MARKS)

a) **Describe** five principles of taxation (5 marks)

b) JC Corporation is a company located in a country with a double taxation system where the corporate tax rate on income is 39.6%, and personal tax on dividends is 25%. JC pays out 100% of all its after-tax income as dividends to its shareholders.

The effective tax rate on JC pretax income distributed as income is *closest to*: (5 marks)

c) Explain any three other possible types of risk that might be relevant in an investment context? (6 marks)

d) Suppose there are  $n$  assets which are uncorrelated (they might be  $n$  different “wild cat” oil well prospects). You may invest in any one, or in any combination of them. The mean rate of return  $\mu$  is the same for each asset, but the variances are different. The return on asset  $i$  has variance  $\sigma_i^2$  for  $i = 1, 2, \dots, n$ .

i) Describe the efficient set for this situation (3 marks)

ii) Write a formula for the minimum-variance point. Express your result in terms of

(3 marks)

$$\hat{\sigma}^2 = \left( \sum_{i=1}^n \frac{1}{\sigma_i^2} \right)^{-1}$$

e) Explaining the Difference Between Passive and Active Asset Management (4 marks)

f) **Describe 4** roles of Nairobi stock exchange as a market of securities (4 marks)

## QUESTION TWO (20 MARKS)

Assume that the expected rate of return on the market portfolio is 23% ( $r_M = .23$ ) and the rate of return on T-Bills (risk free rate) is 7% ( $r_f = .07$ ). The standard deviation of the market is 32% ( $\sigma_M = .32$ ). Assume that the market portfolio is efficient.

- a) What is the equation for the capital market line? (4 marks)
- b) If an expected return of 39% is desired, what is the standard deviation of this position? (5 marks)
- c) If you have \$1000 to invest, how should you invest it to achieve the above position? (4 marks)
- d) If you invest \$300 at the risk free rate and \$700 in the market portfolio, how much money do you expect to have at the end of the year? (7 marks)

## QUESTION THREE (20 MARKS)

Consider an oil drilling venture. The price of a share in this venture is \$800 with an expected yield after 1 year of \$1000 per share. However, due to the high uncertainty about how much oil is at the drilling site, the standard deviation of the rate of return on this investment is  $\sigma = .4$ . Currently the risk free rate is .1. The expected rate of return on the market portfolio is .17 with a standard deviation of .12. The beta of the drilling shares is .6. What is the value of the drilling shares based in the CAPM? Would you advise purchasing these shares based on this model?

## QUESTION FOUR (20 MARKS)

- a) Explain five basic techniques of risk management (10 marks)
- b) Explain five factors that may affect a capital project and result in delays (10 marks)

## QUESTION FIVE (20 MARKS)

- a) Describe five Examples of Fixed Income Securities (10mks)
- b) Let's assume Sky Limited intends to pay a \$1 dividend per share next year and it is expected that this would increase by 5% per year thereafter. Let's further assume the required rate of return on Sky Limited's stock is 10%. Currently, XYZ Company stock is trading at \$10 per share. Further, assume that during the next few years Sky Limited's dividends will increase rapidly and then grow at a stable rate. Next year's dividend is still expected to be \$1 per share, but dividends will increase annually by 7%, then 10%, then 12%, and then steadily increase by 5% after that. Compute the intrinsic value and fair value of Sky Limited's stock (10mks)