MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2012/2013

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN APPLIED STATISTICS WITH INFORMATION TECHNOLOGY (MAIN CAMPUS)

SAC 204: THEORY OF INTEREST

Date: 24th July, 2013 *Time: 2.30 – 4.30 p.m.*

INSTRUCTIONS

- Answer Question ONE and any other TWO questions.

SAS 204: THEORY OF INTEREST

QUESTION ONE (30MARKS)

(a). Briefly explain the following concepts:-

(i). Hedging against inflation

(ii). Perpetual Annuity

(iii). Basis-point

(iv). Sinking Fund

(v).Amortization **(5Mks)**

(b). (i). Give and explain three interest rate terms **(3Mks)**

(ii). A risk-free zero-coupon bond with 10years to maturity has face value of K£ 500 and sells for K£ 192.77

(1). What is the nominal yield on the bond?

(2). What is the real yield on the bond if the inflation rate over the life of the bond is 5%?

(3). What is the real yield on the bond if the inflation rate over the life of the bond is 8%? **(3Mks)**

(c). (i). Explain the term real rate of interest **(2Mks)**

(ii). An insurance company has to pay K 20Million, four years from now to pensioners. The company can invest money at an annual rate of 7% com pounded semi-annually. How much should the company invest? **(3Mks)**

(d). (i). Give reasons for a wide spread between the yield on treasuries and the yield on high grade corporate bonds? **(2Mks)**

(ii). Explain the concept compound annuity **(2Mks)**

(iii). How much must we deposit in 8% savings account at the end of each year to accumulate K£ 5,000 at the end of 10years? **(4Mks)**

(c). (i). Give and explain different methods of used in computing interest **(3Mks)**

(ii). If our bond currently sells at 95 and pays 8% interest annually and mature for 100% of face value after 1 year. What is the yield? **(3Mks)**

QUESTION TWO (20MARKS)

(a). (i). Explain the term structure of interest rate **(4Mks)**

(ii). At an annual rate of compounding of 90%, how long does it take for a given sum to become double and triple? **(6Mks)**

(b). (i). Give and explain "the ordinary formula of annuity" **(3Mks)**

(ii). Start with cash flow of a level payment mortgage with the lower monthly fixed interest rate, $r - x$. From the monthly payment, D construct a cash flow that grows at a rate of x per month: D, De^{x}, De^{2x}, De^{3x}, ... De^{nx}, x and r are continuously compounded. Verify that new this cash flow discounted at r, has the same PV as that of the original mortgage. **(7Mks)**

QUESTION THREE (20MARKS)

(a). (i). Explain how you will assess the present value of a bond **(4Mks)**

(ii). Give and explain the various bond value theorems with examples **(6Mks)**

(b). (i). Derive an expression for the net amount of interest for a sinking fund (take i to be rate of interest) **(4Mks).**

(ii). You place 25,000 dollars in a savings account paying an annual compound interest of 8% for 3 years and then move it into a savings account that pays 10% interest compounded annually. How much will your money have grown at end of the 6 years? **(6Mks)**

QUESTION FOUR (20MARKS)

(a). (i). Give and explain five different methods used to compute changing value of money overtime **(5Mks)**

(ii). You have 10,000 dollars which you invest for one year in XYZ stock, which is currently selling for 50 dollars per share. You cannot purchase on margin; **(5Mks)**

(1). How many shares can you buy?

(2). What is the return if the stock price at the end of the year is 70 dollars?

(3). What is the profit from the investment?

(b) Explain the concept:-

(i). Annuities Due **(1Mk)**

(ii). Zero – Coupon Bond **(1Mk)**

(iii). Immunization of Liability **(1Mk)**

(iv). Compound Annuities **(1Mk)**

(v). Give factors to be disclosed by the mutual funds **(2Mks)**

(c). What are the factors that affects the earnings per share of the company?(4Mks)

QUESTION FIVE (20MARKS)

(a). Explain the following concepts:-

(i). Indenture **(2Mks)**

(ii). A secured Issue **(2Mks)**

(iii). Interest Rate Risk **(2Mks)**

(b) (i). Give and explain bond value theorems and the factors that influence bond Value **(5Mks)**

(ii). Give and explain two steps used to compute yields for compound interest situations **(4Mks)**

(c). Suppose that a bank deducts interest in advance on a1, 000 dollars, 8% note. The note is to be outstanding for 90days. How much will the borrower receive **(4Mks)**