NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FUCULTY OF COMMERCE

DEPARTMENT FINANCE

B.COMM (HONOURS) DEGREE IN FINANCE

FNANCIAL MATHEMATICS 1 – CFI 1101

AUGUST 2010 – FIRST SEMESTER SUPLEMENTARY EXAMINATIONS

DURATION: 3 HOURS

Instructions to Candidates

1. **Attempt all FIVE questions**

2. **Show calculations where this is appropriate**

Requirements

1. **Scientific calculator**

Question 1.

(i) Define giving clear illustrations in each of the following terms:
   a) Simple interest rate.   [1½ marks]
   b) Simple discount rate.   [1½ marks]
   c) Money market.   [1½ marks]
   d) Annuity certain.   [1½ marks]
   e) Annuity due.   [1½ marks]
   f) Perpetuity.   [1½ marks]
   g) Effective rate of interest.   [2 marks]

(ii) Briefly describe the main features of a negotiable certificate of deposit. [4 marks]

(ii) An investor is considering two investments. One is a 3-month deposit account which pays a rate of return of 6% p.a. convertible quarterly. The second is a 3-month Treasury Bill. Calculate the annual simple rate of discount available from the Treasury Bill if both investments provide the same effective rate of return.   [5 marks]

[Total 20 Marks]

Question 2.

(i) Suppose $100 is invested at 15% per annum for 6 years. Determine its future value if interest is capitalised:

    a) Every two years.   [2 marks]
    b) Half yearly.   [2 marks]
    c) Monthly.   [2 marks]
    d) Weekly.   [2 marks]
    e) Continuously.   [2 marks]

(ii) At time $t = 0$ an investor purchased an annuity-certain which paid her $7,600 per annum annually in arrear for four years. The purchase price paid by the investor was $20,000.

    a) Calculate, to the nearest 0.1%, compound rate of interest per annum achieved by the investor from her investment in the annuity   [4 marks]

    b) Compute the effective monthly rate of interest for this transaction? And hence determine the value of the monthly payment.   [5 marks]

[Total 20 Marks]

Question 3.

(i) Briefly explain the following terms:

    a) Equivalent yield   [2 marks]
    b) Yield to Maturity   [3 marks]

(ii) John bought a 180 day NCD and sold it to Yvonne 60 days latter, who latter sold it to Maka with 90 days to maturity. The 180 day NCD had a coupon of 6% and the following yields were obtainable on the market;

    8% for the first 90 days
    7.5% for the remainder of the time.

    Present in tubular format the cash-flows for each of the mentioned three dealers if:

a) The coupon was to be shared in proportion to holding period at maturity. [6 marks]

b) If the buyer would settle all the dues to the buyer at the purchase date.   [9 marks]

[Total 20 Marks]

Question 4.

(i)

a) The yield at issue on a 60 day Commercial paper is 5.525%. Determine the equivalent discount rate. [3 marks]

b) A 91 day TB is purchased 19 days after issue when the discount rate is 10.2%. Determine the realized yield. [4 marks]

(ii)

a) Define the process of amortisation. [3 marks]

b) Draw up an amortisation schedule for a loan of $15 000 with interest at 10% compounded annually and a term of 6 years. [10 marks]

Question 5.

(i) Explain what is meant by a capital project. [2 marks]

(ii) An investor must select between three alternative proposals: A, B and C. The initial investment outlays and the cash flows are set out in the table bellow.

Year	Proposal A ($)	Proposal B ($)	Proposal C ($)
0	-600	-600	-800
1	250	200	300
2	200	200	320
3	220	200	340
4	180	200	

(a) Given that the cost of capital K = 12%, calculate each of the given project's NPV and IRR. [12 marks]

(b) Which project(s) should be accepted if they are independent? [1 marks]

(c) Which project should be accepted if they are mutually exclusive? [1 marks]

(d) Highlight any four attributes of a capital budgeting technique that maximises shareholder value. [4 marks]

[Total 20 Marks]

****END OF EXAMINATION****