NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF COMMERCE
DEPARTMENT OF FINANCE
BACHELOR OF COMMERCE HONOURS DEGREE IN
Finance, Banking; Insurance & Risk Management ; Marketing; and Management
PART I 1ST SEMESTER SUPPLEMENTARY – JULY 2005
FINANCIAL MATHEMATICS I [CFI 1101]
TIME ALLOWED: 3 HOURS 30 MINUTES

INSTRUCTIONS

1. The paper is 3 hours and 30 minutes, 30 minutes of which is reading time. Candidates may write on the question paper but may not write in the answer book during the reading time.
2. Answer any *FOUR* questions.
3. Candidates should write answers only on the top page of an answer sheet. The reverse page may be used for rough work.
4. All workings must be shown.

Question 1 [25 marks]

1.1 Explain the term equivalent yield, what is its use in money market portfolio management? **[5 marks]**

1.2 An investor purchases a 91 day TB 20 days after issue at a rate of discount of 12% and sells it 30 days later at a rate of discount of 15%.

    1.2.1 Calculate equivalent yield at purchase and sale. **[5 marks]**

    1.2.2 Calculate the realized yield. **[15 marks]**

Question 2 [25 marks]

2.1 You are faced with two investment options whose interest is determined as as follows:
- 39.50% per annum compounded semi annually.
- 38% per annum compounded monthly.

Which investment should you choose? **[10 marks]**

2.2 You invest $20 000 000 today the rate of interest of 36.5% compounded daily. In how many years could you double the amount of your investment? **[15 marks]**

Question 3 [25 marks]

3.1 Show that the present value of a growing ordinary annuity is

$$\frac{(1+i)^n - (1+g)^n}{(i-g)(1+i)^n}$$

Where n = number of periods
i = compound interest per period
g = annuity growth rate **[12 marks]**

3.2   An ordinary annuity pays $10 000 at the end of each quarter for 4 years but interest of 36% is compounded monthly.   What is the future value of the annuity.   **[13 marks]**

Question 4   [25 marks]

The terms of a mortgage loan are:

- Price $50 000 000
- Deposit 20%
- Interest 48% compounded monthly for 25 years.
- Principal and interest to be amortized by monthly payments.

4.1   Calculate the monthly payment   **[8 marks]**

4.2   Calculate the Buyers` and Sellers` equity at the end of 5 years   **[10 marks]**

4.3   Calculate the monthly payment if at the end of 5 years the Bank adjusts interest to 50%, compounded monthly and if the term of the loan remains the same.

                                                                                          [7 marks]

Question 5   [25 marks]

5.1   A loan of $10 000 000 bearing 28% interest to be paid half yearly must be discharged at the end of 5 years by means of a sinking fund which earns 24% compounded quarterly.

        5.1.1   Calculate the quarterly deposit   **[10 marks]**

        5.1.2   Calculate the annual cost of servicing the debt.   **[5 marks]**

5.2   Why is net present value accepted as the most superior method of capital budgeting appraisal?   **[10 marks]**