NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF COMMERCE
DEPARTMENT OF FINANCE
BACHELOR OF COMMERCE HONOURS DEGREE IN FINANCE
Optional for: Accounting, Banking, Insurance & Risk Management, Marketing, and Management
PART I 1ST SEMESTER FINAL EXAMINATION – DECEMBER 2006
<u>FINANCIAL MATHEMATICS I [CFI 1101]</u>
TIME ALLOWED: 3 HOURS 10 MINUTES

<u>INSTRUCTIONS</u>
1. The paper is 3 hours and 10 minutes.
2. Answer any **_FOUR_** questions.
3. Start each question on a fresh page.
4. All workings must be shown.

<u>Question 1</u>   [25 marks]

1.1   The yield on 91 day commercial paper is 24%, and the discount rate on similar risk Bankers` Acceptance with same maturity is 22%. Which security are you going to purchase? Explain.   **[5 marks]**

1.2   An investor purchases a 91 day TB 20 days after issue at a rate of discount of 30% and sells it 30 days before maturity at a rate of discount of 32%.

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

    1.2.2   Distinguish between realized yield and promised yield.   **[5 marks]**

<u>Question 2</u>   [25 marks]

2.1   You are faced with two investment options whose interest is determined as as follows:
- 44% per annum compounded semi annually.
- 43% per annum compounded monthly.

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

2.2   You invest $20 000 today the rate of interest of 36.5% compounded daily in order harvest $30 000 at some future date? What is your investment horizon?
                 [15 marks]

<u>Question 3</u>   [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   A Charity Fund is set up to pay $10 000 at the beginning of each quarter for 5 years. How much should be invested today if interest of 24% is capitalized monthly?   **[13 marks]**

Question 4   **[25 marks]**

The terms of a mortgage loan are:

- Price $24 000 000
- 25% Deposit
- Interest 48% compounded monthly for 25 years.
- Principal and interest to be amortized by equal monthly payments.

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

4.2   Calculate the Buyer's and Seller's equity at the end of 10 years **[10 marks]**

4.3   Calculate the monthly payment if at the end of 10 years the Building Society adjusts interest to 45%, 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 40% simple interest, to be paid half yearly, must be discharged at the end of 4 years by means of a sinking fund which earns 24% interest compounded quarterly.

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

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

5.2   Discuss, in brief, the attributes of a capital budgeting appraisal method whose objective is owner value maximization.   **[10 marks]**