

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 – SEPTEMBER 2008
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 (a) Distinguish between Yield to Maturity (YTM) and Realised Yield (RY) **[5 marks]**
- (b) An investor purchases a 180-day TB with a par value of \$1 000, 20 days after issue at a discount rate of 18% and sells it with 30 days remaining to maturity at a discount rate of 15%. Calculate the RY **[10 marks]**
- (c) An investor is considering two investments. The first is a 91-day Treasury Bill discounted at a simple rate of discount of 6% per annum. The second is a 91 day NCD at a rate of interest of 6.15% per annum. Determine which provides the higher effective rate of return. Assume that there are 365 days in a year. **[10 marks]**

Question 2

[25 marks]

- 2 (a) Distinguish between the terms Effective Interest and Nominal Interest. **[5 marks]**
- (b) Show that the future value of a compound amount is given by $S = P(1 + i)^n$, where:
- | | | | |
|---|---|---------------------------------|-------------------|
| S | = | Accumulated amount | |
| P | = | the initial principal | |
| i | = | interest rate per period | |
| n | = | the number of periods in a term | [10 marks] |
- (c) How long will it take for \$15 000 to double if it is invested today at 40% interest compounded (i) monthly and (ii) continuously?

Question 3 [25 marks]

- 3 (a) Fund A accumulates at a rate of interest of 5% per annum and fund B at 7% per annum. At the end of 20 years the total of the two funds is \$1,000. At the end of 10 years the amount of fund A is half that of fund B. What is the amount of the combined funds after 5 years? [12 marks]
- 3.(b) Talkmore makes a series of payments at the end of each year for 20 years. The first payment is \$1 500 and each subsequent payment increases by 5%. Calculate the PV of these payments if the annual interest rate is 7%. [10 marks]

Question 4 [25 marks]

- 4 (a) Construct an amortization schedule for a loan of \$15 000 which is repaid in annual payments over 5 years at an interest rate of 15% p.a. [10 marks]
4. (b) A \$15 000 loan bearing 25% interest paid semi-annually must be discharged at the end of 5 years by means of a sinking fund which earns 20% compounded quarterly.
- i. Calculate the quarterly deposit [10 marks]
 - ii. Calculate the annual cost of servicing the debt [5 marks]

Question 5 [25 marks]

A manufacturing company is considering a new product line. It is anticipated that the new product line will have the following cashflows:

YEAR	NET CASHFLOW
0	(700,000.00)
1	(1,000,000.00)
2	250,000.00
3	300,000.00
4	350,000.00
5	400,000.00
6	400,000.00
7	400,000.00
8	400,000.00
9	400,000.00
10	400,000.00

Required

- a. Assuming that the cost of capital is 15%, what will be the project `s NPV [5]
- b. should the project be accepted [2]
- c. What is the projects` IRR [8]
- d. What are the attributes of a capital budgeting technique that maximizes shareholder value? [10]