

**FACULTY OF COMMERCE
DEPARTMENT OF FINANCE
BACHELOR OF COMMERCE HONOURS DEGREE IN FINANCE
PART I 2ND SEMESTER FINAL EXAMINATION – DECEMBER 2002
FINANCIAL MATHEMATICS II CFI 1201
TIME ALLOTTED: 3 HOURS 20 MINUTES**

INSTRUCTIONS

- ❖ Choose and answer 4 out of 6 questions
- ❖ Twenty minutes is reading time of which candidates may write on the question paper but not on the answer script
- ❖ Calculator maybe used

Question One [25 marks]

- (a) Use a time line to Depict the scenario below and also calculate the price of the following stock:

Norminal Value	\$1 000 000
Coupon Rate [half-yearly]	15% p.a
Interest Dates	15 July and 15 January
Maturity Date	15 July 2026
Yield to maturity	18,75% p.a.
Settlement date	15 July 2008
	[12 marks]

- (b) Using the R% convention [translated to the \$ % convention] calculate the price of the following stock:

Stock: Inscor loan 54	
Coupon half-yearly	14,7% p.a
Interest dates	1 May and 1 November
Maturity date	1 May 2013
Yield to maturity	16,88 p.a
Settlement date	31 March 2001
	[13 marks]

Question Two [25 marks]

- (a) Explain the term **PAR STOCK** [5 marks]
- (b) Calculate the all-in price for the following two stocks A and B which are purchased 30 days cum dividend and 10 days ex dividend

Stock	A	B	
Coupon [half-yearly]	13% p.a.	15% p.a.	
Yield to maturity	15% p.a.	15% p.a.	
Term to maturity	10 years	10 years	[15 marks]

- (c) What is the accrued interest in each case [5 marks]

Question Three [25 marks]

[a] A firm is considering two mutually exclusive investment options X and Y.

<u>Year</u>	<u>Proposal A</u> <u>Investment of \$20 000</u> <u>After tax income (\$)</u>	<u>Proposal B</u> <u>Investment of \$16 000</u> <u>After Tax income (\$)</u>
1	2 000	1 000
2	2 000	1 000
3	2 000	1 000
4	2 000	1 500
5	2 000	1 500
6	2 000	1 500
7	2 000	2 500
8	2 000	3 500

- a. Determine which proposal should be accepted and state why? Assume the cost of capital is 12% [25 marks]

Question Four [25 marks]

- Define a rational risk averse wealth maximising investor. [5 marks]
- The probability distribution of NPVs of two mutually exclusive projects A and B are Tabled below.

<u>Project A</u>		<u>Project B</u>	
<u>Probability</u>	<u>NPV</u>	<u>Probability</u>	<u>NPV</u>
.20	10 000	.40	- 10 000
.50	20 000	.60	50 000
.30	30 000		

Which project should be undertaken? Show all calculations and explain fully. [20 marks]

Question Five (25 marks)

- List and briefly explain the conditions for Parity in Money and Foreign Exchange markets. [5 marks]
- Money and Foreign exchange rates between sterling and USD are tabled below

	<u>USD</u>	<u>£</u>
Interest rates	3%	5%
Spot exchange rate	1.57	
3 month Forward exchange rate	1.50	

3. i. Are money and foreign exchange markets in equilibrium? [5 marks]
 ii. What actions should investors take to earn Arbitrage Profit? [5 marks]
 iii. Why is this arbitrage opportunity short lived? [5 marks]
4. The consumer price indices in Botswana and Zimbabwe are 478 and 1 292 respectively.
- i. What is your estimate of the exchange rate between the two countries? [2 marks]
 ii. What critical assumptions have you made? [3 marks]

Question 6 [25 marks]

- [a] What are the shortcomings of the internal rate of ration (IRR) method of investment appraisal, as compared to the net present value method (NPV) (10marks)
- [b] Mrs Busy Boy is considering a factory development which will involve the following cash flows:

Time (years)	Cash flow
0	-760
1	-80
2	300
3	350
4	-180
5	600
6	650

Assuming that he can borrow funds at 16% and that he expects to receive 19% p.a. on investments of comparable risk, what is his **MIRR** for the project?

[15 marks]