

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF COMMERCE**  
**DEPARTMENT OF FINANCE**  
**BACHELOR OF COMMERCE HONOURS DEGREE IN FINANCE**  
**PART IV – 1<sup>st</sup> SEMESTER SUPPLEMENTARY EXAMINATION –JULY 2007**  
**ADVANCED ASSET PRICING THEORY AND PRACTICE [CFI 4101]**  
**TIME ALLOWED: 3 HOURS 10 MINUTES**

**INSTRUCTIONS**

1. The paper is 3 hours 10 minutes, 10 minutes of which is reading time during which candidates may write on question paper but not in the answer book.
2. Answer any **FOUR** questions.
3. Start each question on a fresh page.
4. All workings must be shown.

**Question 1**

**[25 marks]**

- 1.1 Derive and explain the equation for the portfolio possibility line for a wealth seeking but risk averse investor in a world in which a risk force asset can be bought or short sold. **[8 marks]**
- 1.2 Where is the optimal portfolio located on this line? **[7 marks]**
- 1.3 State and explain the other critical assumptions of this model. **[10 marks]**

**Question2**

**[25 marks]**

The Capital Asset Pricing Model [CAPM] stipulates that the expected return of any asset (*i*) is

$$\bar{R}_i = R_F + \beta_i(\bar{R}_m - R_F)$$

<i>where</i>	$R_i$	=	Expected Return of asset <i>i</i>
	$R_F$	=	Riskfree Rate of Return
	$\beta_i$	=	Beta of asset <i>i</i>
	$\bar{R}_m$	=	Expected return of market portfolio

- 2.1 The first pass first order time series regression equation.

$$R_{it} = \alpha_{it} + \beta_i \bar{R}_{mt} + \varepsilon_{it} \text{ and the second pass cross sectional regression equation.}$$

$$\bar{R}_i =$$

is a two empirical test that has been used to test the validity of the Capital Asset Pricing Model.

State and Explain:

- the objective of the test **[1 mark]**
- the hypotheses to be tested **[4 mark]**
- the two step procedure. **[4 mark]**

- The expected results if the null hypothesis is rejected [4 mark]  
Explain the major limitation of this test. [2 mark]

2.2 Suggest strategy, based on this model, that could be employed, in practice, in the cash markets by Fund Managers to, temporally, target desired systematic risk levels. What problem are they likely to encounter? How could it be minimized? [10 marks]

**Question 3 [25 marks]**

3.1 The market model specifies that variable return is  

$$R_i = \alpha_i + \beta_i R_m + \varepsilon_i$$

- Where:**
- $R_i$  = Variable return of asset  $i$
  - $\alpha_i$  = is a constant
  - $\beta_i$  = Regression slope [or Beta] of the model.
  - $R_m$  = Variable return of the market portfolio.
  - $\varepsilon_i$  = that portion of the variable return of asset  $i$  attributable to non-market factors.

What are the asset pricing implication of the relationships?:

- ◆  $\sigma_{\varepsilon_i \varepsilon_i} = 0$  and  $\sigma_{\varepsilon_i m} = 0$  on the one hand and
- ◆  $\sigma_{\varepsilon_i \varepsilon_i} \neq 0$  and  $\sigma_{\varepsilon_i m} \neq 0$  on the other? [8 marks]

3.2 What are the critical conditions of an arbitrage transaction? [5 marks]

3.3 The returns of an investment ( $i$ ) are modeled by 3 factors as follows:

$$R_i = .29 + 2F_1 + .4F_2 - 1.2F_3$$

Three Pure factor Portfolios, also modeled by the same three factors, have been constructed and their returns are:

$$R_{p1} = .20 + F_1$$

$$R_{p2} = .18 + F_2$$

$$R_{p3} = .15 + F_3$$

The risk free rate of return is 10%

3.3.1 Does an opportunity for arbitrage profit exist? Explain fully. [6 marks]

3.3.2 What are the critical assumptions of asset pricing theory implied in 3.3.1. above. [6 marks]

**Question 4 [25 marks]**

4.1 Compare and contrast, using examples, a Forward contract and a Futures contract on the equity stock of a company. [13 marks]

- 4.2 Discuss, briefly, four uses to which futures contracts could be put in portfolio management highlighting the major advantage over using spot market securities. **[12 marks]**

**Question 5** **[25 marks]**

- 5.1 An American call option on a non dividend stock will never be exercised before expiry date. Explain? **[5 marks]**
- 5.2 A European call and put with the same expiry date of 6 months and exercise price of \$440 are selling for \$20 and \$10 respectively. The price of underlying stock and riskfree interest rate are \$450 and 10% respectively.
- 5.2.1 What do you understand by arbitrage? **[5 marks]**
- 5.2.2 Does an opportunity for arbitrage profit exist? If so, show the arbitrage cash flows today and at expiry if price of underlying stock is either \$400 or \$500. **[5, 10 marks]**