REFORMED CHURCH UNIVERSITY

FACULTY OF COMMERCE

BACHELOR OF COMMERCE HONOURS DEGREE IN BANKING AND FINANCE

FINANCIAL ENGINEERING

HBAF 409

PART 4 SEMESTER 2 EXAMINATION

TOTAL MARKS   [100]

DATE: OCTOBER 2024

Time: 3 Hours

INSTRUCTIONS

1. This paper has *six (6)* questions
2. Answer question *one (1)* and *any* other *three (3)*
3. Each question carries *25 marks*
4. Start each question on a new page

1. a) Analyze the primary purpose of valuation techniques in finance and discuss the key factors that influence the choice of a valuation method for a financial asset. **(15)**

   b) Discuss how market conditions might affect the applicability of various valuation techniques. **(10)**

2. Sketch the graphs of the following functions and explain the distance between each point.
   a) $Y = x + 1$ **(5)**

   b) $f(x) = -x + 5$ **(5)**

   c) $y = e^x$ **(5)**

   d) $y = (0)\,x$ **(5)**

   e) $y = \sin x$ **(5)**

3. a) Explain how the Abitrage Pricing Theory (APT) differs from the Capital Asset Pricing Model (CAPM) indicating the key assumptions of APT **(15)**

   b) With the aid of real-world scenarios, discuss the limitations that investors face when applying APT. **(10)**

4. a) Explain the process of identifying relevant risk factors in APT and how these factors impact the pricing of an asset. **(10)**

b) Given the following data:

   Asset A's expected return: 12%

   Risk-free rate: 3%

   Factor sensitivities: Factor 1 (1.5), Factor 2 (0.5)

   Factor risk premiums: Factor 1 (4%), Factor 2 (2%)

   Calculate the expected return of Asset A using APT. **(15)**

5. a) Explain the concept 'financial innovation' in the context of quantitative finance providing examples of recent innovations and their impact on financial markets. **(12)**

   b) Analyze the potential benefits and risks of advancements in technology (machine learning, big data analytics) and their influence on quantitative finance and valuation techniques. **(13)**

6. Calculate the absolute value of the following;
   a) 6 **(3)**
   b) -3 **(3)**
   c) $-1\frac{1}{2}$ **(3)**
   d) 0,0005 **(3)**
   e) **Given that** $f(x) = \frac{x-1}{x^2+2}$
      Find the following;
      i)   f(0) **(2)**
      ii)   f(-1) **(2)**
      iii) $f(-\frac{1}{x})$ **(4)**
      iv)   f(x+h)-f(x) **(5)**

END OF PAPER