CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL

FINAL EXAMINATION
OCTOBER 2024 SEMESTER

COURSE CODE	:	EGB20703
COURSE NAME	:	FINANCIAL ECONOMICS 1
PROGRAMME NAME	:	BACHELOR OF SCIENCE (HONS) IN ANALYTICAL ECONOMICS
DATE	:	14 FEBRUARY 2025
TIME	:	3.00 PM – 6.00 PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. **Please CAREFULLY read the instructions given in the question paper.**
2. **This question paper has information printed on both sides of the paper.**
3. This question paper consists of **SIX (6) Questions.**
4. Answer **ALL** questions.
5. Please write your answers on the answer booklet provided.
6. All questions must be answered in **English** (any other language is not allowed).
7. **This question paper must not be removed from the examination hall.**
8. Formulas have been appended for your reference.

THERE ARE SIX (6) PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

(a) Assume En Ahmad Jais has this intention to buy a car that is worth RM16,105 four years from now. Determine how much must En Ahmad Jais invest today in a bank account that pays 10% interest rate annually , so that the amount he invested will multiply sufficiently for him to purchase his dream car four years later.

(3 marks)

(b) A firm is considering to acquire a new machine that costs RM40,000. The machine is expected to generate the incremental after-tax cash flows as shown below:

Year	Cash Flow
1	RM20,000
2	RM18,000
3	RM16,000
4	RM15,000
5	RM14,000

Given the required rate of return on this project is 10%, compute its NPV and make decision whether the project should be accepted or rejected.

(16 marks)

Question 2

(a) Consider a risky portfolio. The end-of-year cash flow derived from the portfolio will be either \$70,000 or \$200,000 with equal probabilities of 0.5. The alternative risk-free investment in T-bills pays 6% per year.

i- If you require a risk premium of 8%, determine how much will you be willing to pay for the portfolio.

(3 marks)

ii- Suppose that the portfolio can be purchased for the amount you found in (i). Determine the expected rate of return on the portfolio.

(3 marks)

iii- Now suppose that you require a risk premium of 12%. Determine the price that you will be willing to pay.

(3 marks)

iv- Comparing your answers to (i) and (iii), conclude about the relationship between the required risk premium on a portfolio and the price at which the portfolio will sell.

(3 marks)

(b) Explain what will happen to the expected return on stocks if investors perceived higher volatility in the equity market.

(5 marks)

Question 3

A pension fund manager is considering three mutual funds. The first is a stock fund, the second is a long-term government and corporate bond fund, and the third is a T-bill money market fund that yields a rate of 8%. The correlation between the fund returns is 0.10. The probability distribution of the risky funds is as follows:

	Expected Return	Standard Deviation
Stock fund (S)	20%	30%
Bond fund (B)	12%	15%

(a) Identify the proportions in the minimum-variance portfolio of the two risky funds.

(3 marks)

(b) Determine the expected value and standard deviation of its rate of return.

(6 marks)

(c) Solve numerically for the proportions of each asset and for the expected return and standard deviation of the optimal risky portfolio.

(12 marks)

Question 4

Consider a portfolio of 250 shares of firm A worth \$30 per share and 1500 shares of firm B worth \$20 per share. You expect a return of 4% for stock A and a return of 9% for stock B.

(a) Determine the total value of the portfolio, the portfolio weights and the expected return.

(7 marks)

(b) Suppose firm A's share price falls to \$24 and firm B's share price goes up to \$22. Determine the new value of the portfolio, the return and the new portfolio weights.

(7 marks)

Question 5

Consider two stocks, A and B, such that $\sigma_A = 0.3$, $\sigma_B = 0.8$, $\overline{R}_A = 0.1$, $\overline{R}_B = 0.06$ and $r_f = 0.02$.

(a) Determine the minimum variance portfolio when $\rho_{AB} = 0$ and identify its volatility.

(6 marks)

(b) Determine the minimum variance portfolio when $\rho_{AB} = 0.6$ and identify its volatility.

(6 marks)

(c) Determine the minimum variance portfolio when $\rho_{AB} =- 0.6$ and identify its volatility.

(6 marks)

Question 6

Assume you have a 1-year investment horizon and are trying to choose among three bonds. All have the same degree of default risk and mature in 10 years. The first is a zero-coupon bond that pays $1,000 at maturity. The second has an 8% coupon rate and pays the $80 coupon once per year. The third has a 10% coupon rate and pays the $100 coupon once per year.

(a) Define catastrophe bond.

(2 marks)

(b) If all three bonds are now priced to yield 8% to maturity, determine the prices of:

i- the zero-coupon bond

(3 marks)

ii- the 8% coupon bond

(3 marks)

iii- the 10% coupon bond

(3 marks)

FORMULA

Future Value

$$FV = PV(1+i)^n$$

Effective Annual Rate

$$EFF(APR, m) = \left(1+\frac{APR}{m}\right)^m - 1$$

- Where;

APR = annual percentage rate

m = the number of compounding periods per year

Present Value

$$PV_{FV}(FV, i, n) = \frac{FV}{(1+i)^n}$$

Utility Function

$$U = E(r) - \frac{1}{2}A\sigma^2$$

Where;

U = utility

E (r) = expected return on the asset or portfolio

A = coefficient of risk aversion

s^2 = variance of returns

½ = a scaling factor

Expected Return of the complete portfolio

$$E(r_c) = r_f + y\left[E(r_P) - r_f\right]$$

Variance

$$\sigma_C^2 = y^2\sigma_P^2$$

Slope/Sharpe ratio

$$Slope = \frac{E(r_P) - r_f}{\sigma_P}$$

Two-Security Portfolio Return

$$E(r_p) = w_D E(r_D) + w_E E(r_E)$$

Two-Security Portfolio: Risk

$$\sigma_p^2 = w_D^2\sigma_D^2 + w_E^2\sigma_E^2 + 2w_D w_E Cov(r_D, r_E)$$

Single Factor Model

$$r_i = E(r_i) + \beta_i m + e_i$$

Single Index Model Regression Equation

$$R_i(t) = \alpha_i + \beta_i R_M(t) + e_i(t)$$

Expected Return Beta Relationship

$$E(R_i) = \alpha_i + \beta_i E(R_M)$$

Variance Single-Index Model

$$\sigma_i^2 = \beta_i^2\sigma_M^2 + \sigma^2(e_i)$$

Covariance Single-Index Model

$$Cov(r_i, r_j) = \beta_i\beta_j\sigma_M^2$$

Portfolio Variance

$$\sigma_P^2 = \beta_P^2\sigma_M^P + \sigma^2(e_P)$$

Portfolio sensitivity

$$\beta_P = \frac{1}{n}\sum_{i=1}^{n}\beta_i$$

Market Risk Premium

$$E(R_M) = \bar{A}\sigma_M^2$$

Where

$\bar{A}$ = investors risk aversion

σ_M^2 = variance of the market portfolio

CAPM

$$E(r_M) = r_f + \beta_M\left[E(r_M) - r_f\right]$$

Multifactor Model Equation

$$r_i = E(r_i) + \beta_{iGDP} GDP + \beta_{iIR} IR + e_i$$

Multifactor SML Models

$$E(r_i) = r_f + \beta_{iGDP} RP_{GDP} + \beta_{iIR} RP_{IR}$$

Bond Pricing

$$P_B = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} + \frac{ParValue}{(1+r)^T}$$

P_B = Price of the bond
C_t = interest or coupon payments
T = number of periods to maturity
r = semi-annual discount rate or the semi-annual yield to maturity

Yield to Maturity

Yield to Maturity (YTM) = [Annual Coupon + (FV – PV) ÷ Number of Compounding Periods)] ÷ [(FV + PV) ÷ 2]

Holding Period Return

$$Holding\ Period\ Return = \frac{Income + (End\ Of\ Period\ Value - Initial\ Value)}{Initial\ Value}$$