UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2014/2015

COURSE NAME	:	FINANCIAL STATISTICS
COURSE CODE	:	BWB 20602
PROGRAMME	:	3 BWQ/ 2 BWQ/ 1 BWQ
EXAMINATION DATE	:	DECEMBER 2014 / JANUARY 2015
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 (a) The following **Table Q1(a)** gives the monthly stock returns

Table Q1(a): Monthly financial return

Month	Financial Return (%)
1	2.50
2	-1.50
3	4.44
4	-3.1
5	-0.7

Calculate the Arithmetic Mean and Geometric Mean from the monthly stock returns and explain the differences between the two means.

(3 marks)

(b) The monthly stock returns for the Stock A and B are shown in **Table Q1(b)**.

Table Q1(b): Monthly stock return for Stock A and Stock B.

Month	Stock A (%)	Stock B (%)
1	-1.60	0.40
2	-2.80	0.90
3	7.20	-4.90
4	-6.60	4.30
5	2.20	1.50

Calculate:

(i) the mean and variance return of Stock A and Stock B.

(4 marks)

(ii) the covariance and correlation for Stock A and Stock B.

(3 marks)

Q2 (a) A person borrows RM85,000.00 for 15 years at 3.65% interest, to be paid in equal monthly instalments. Compute the monthly payment, A.

(3 marks)

(b) Find the amount A to be deposit in a bank account paying an interest rate 6% per annum, compound four times per year, in order to make a tuition payment RM5000 per month due in 18 months.

(4 marks)

(c) Assume the price moves of a stock follows the binomial lattice model with initial price S_0 = RM150 and parameters u = 1.02, d = 0.99 and p = 0.52. Assume that the time period is one week.

(i) Give the formula for the probability distribution S_4 , which is the stock price after one month.

(2 marks)

(ii) Compute the probability that after one month $S_4 \geq 152$.

(8 marks)

(iii) Compute the probability that after one month the price is up by at least 5%.

(4 marks)

(iv) Compute the probability that after one month the price is down by at least 3%.

(4 marks)

Q3 Suppose a stock in a single period binomial lattice model with the current price S_0. It is known that at the end of sixth months it will be either increase to Su, or decrease to Sd. The risk free interest rate is r per year; the strike price is K and the time maturity T. If the option price using payoff portfolio replication is defined by $F = \Delta S_0 + B$.

(a) Show that $\Delta = \dfrac{Cu - Cd}{Su - Sd}$, and $B = \left(Cd - Sd\left[\dfrac{Cu - Cd}{Su - Sd}\right]\right)e^{-rT}$ where Cu and Cd is the call option in up and down states, respectively.

(7 marks)

(b) Suppose that a stock price is currently RM100 and at the end of 6 months it will be either RM150 or RM50. The risk free interest rate is 5% per year. Based on result in Part (a), what is the price of this option using payoff portfolio replication approach if the strike price is RM110?

(13 marks)

Q4   (a)   In risk free and risky investing, the investors are classified accordingly as the expected return. Express the classification of investors with respect to their tolerance.

(3 marks)

(b)   Find the risk-neutral probability measure for

$$E\left(\frac{S_1}{S_0}\right) = pu + (1-p)d = 1+r.$$

(4 marks)

(c)   Consider a long forward contract on a 5 years bond which is currently traded at a price RM750. The delivery price is RM800, the time to maturity of the forward contract in one year. The financial charges or coupon payment of the bond of RM50 occurs after 6 and 12 months. The continuously compounded of the bond annual interest rates for 6 and 12 months are 8% and 10% respectively.

(i)   Calculate the value of forward contract.

(5 marks)

(ii)   Show that the forward price F_t of the forward contract is RM711.42.

(4 marks)

Q5   (a)   A portfolio has a weekly return of $\mu = 0.002$ and weekly volatility $\sigma = 0.025$. The current value of the portfolio is RM250,000.00. Calculate the VaR for the one week period of the investment with 5% probability. Interpret your result.

(5 marks)

(b)   Supposed the distribution of a stock price $S(t)$ (t measured in years) is governed by a geometric Brownian motion with parameters $\mu = 0.15$, volatility $\sigma = 0.25$, and initial price $S_0 = RM40$.

(i)   Compute E(stock price after 1 year).

(4 marks)

(ii)   Compute σ (stock price after 1 year).

(6 marks)

(iii)   Find the probability of a loss after 1 year.

(4 marks)

(iv)   What is the probability that the stock's price will be up at least 25% after 1 year.

(4 marks)

(v)   What is the probability that the stock's price will be down at least 15% after 1 year?

(3 marks)

- **END OF QUESTION -**