UNIVERSITY OF COLOMBO, SRI LANKA

FACULTY OF MANAGEMENT AND FINANCE

Bachelor of Business Administration (Level II-Semester V) Examination - June, 2017

FIN 2302- Quantitative Finance

Three (03) Hours

Answer all Five (05) questions

Use of calculators is permitted

1.

i. "The effective rate of interest under simple interest decreases with time whereas the effective rate of interest under compound interest is constant." Do you agree with this statement? Provide mathematical justification for your answer by comparing the behaviors of effective rate of interests under simple interest and compound interest with time.

(06 Marks)

ii. Suppose you have borrowed Rs. 1.5 million from a commercial bank in Sri Lanka at an annual effective rate of interest i. You agreed to pay back Rs. 1 million after five years and Rs. 1.2 million after another eight years from your first payment date. However four years after your first payment, you wish to repay the outstanding balance completely. What will be your second payment?

(04 Marks)

iii. On 01 January 2016, portfolio A was worth Rs. 100,000. On 01 July, the value of the portfolio increased to Rs. 115,000 and an additional deposit of Rs. 30,000 was made on the same day. On 01 October 2016, the value of the portfolio was Rs. 146,000 and Rs. 15,000 was withdrawn from the portfolio immediately. At the end of the year (31 December, 2016) the value of the portfolio A was Rs. 135,000. Calculate the rate of return difference between time-weighted return and rupee-weighted return of portfolio A for the year 2016.

(06 Marks)

iv. "When the derivatives of two accumulation functions are equal at time t, it can be argued that these two funds are growing at an equal rate." Do you agree with this statement? Justify your answer by providing suitable graphs.

(04 Marks)

(Total 20 marks)

2.

i. Derive the present value of annuity immediate formula by using geometric progression.

(04 Marks)

ii. Suppose you and your partner deposited Rs. 25,000 in two separate accounts in the beginning of each year for 15 years. From the beginning of the 16th year, you will make annual withdrawals of X for 10 years and your partner will also make annual withdrawals of Y for 12 years. Both funds will have a zero balance after the last withdrawal. Your fund earns an annual effective interest rate of 7% and your partner's fund earns an annual effective interest rate of 10%. Calculate the difference between two withdrawals (Y-X).

(04 Marks)

iii. Mr. Perera borrowed a certain amount of money from HCBC bank at an annual effective interest rate of 12%. He agreed to pay back the loan in monthly installments. The amount of principal repaid in the 6th payment was Rs. 23,000 and the amount of principal repaid in the tth payment was Rs. 35,000. Calculate time t.

(03 Marks)

iv. Suppose you have borrowed money from a bank and you made quarterly payments of Rs. 5,000 per quarter from 01 July, 2002 to 01 April, 2013. If the nominal rate of interest is 8% convertible quarterly;

a. Find the present value on 01 July, 2002.

(03 Marks)

b. Find the current value on 01 October, 2008.

(03 Marks)

c. Find the accumulated value on 01 January, 2017.

(03 Marks)

(Total 20 marks)

3.

i. "Outstanding loan balance can be computed by using retrospective method or prospective method." Illustrate the above statement.

(06 Marks)

ii. Mr. Saman Perera, finance manager of Transepts private limited company borrowed a certain amount of money from TNB Bank for five years period at an annual effective rate of 16%. He agreed to repay the loan by making 5 annual installments of Rs. 125,000. Construct the loan amortization schedule for the loan.

(06 Marks)

iii. Suppose you have borrowed a certain amount of money from a reputed financial institution in your area. You agreed to repay the loan by making annual installments for a certain period of time at 5% nominal interest rate. The term of the loan is 15 years. The amount of principal repaid in the first payment was Rs. 10,000.

    a. What is the principal repaid in the 10th payment?

    b. What is the original amount of loan?

(04 Marks)

iv. Mr. Amal borrowed a certain amount of money from a financial institution. He agreed to pay annual interest to the lender for 15 years at 7% nominal interest rate. Further he agreed to pay 120% of the original loan amount to the lender at the end of the 15 year by making 8 annual deposits in a sinking fund which earns at 5% interest rate. After making the 8 deposits, sinking fund grows with interest only. The total payment made by the borrower in the first 8 years is Rs. 20,000. What is the original loan amount?

(04 Marks)

(Total 20 marks)

4.

    i. "Econometrics is an amalgam of various disciplines such as economic theory, mathematical economics, economic statistics and mathematical statistics." Do you think that econometrics should be studied as a separate discipline? Justify your answer.

(04 Marks)

    ii. Briefly explain the steps involved in formulating an econometric model.

(08 Marks)

    iii. "The modern interpretation of regression is different from the Galton's interpretation of regression." Do you agree with this statement? Justify your answer.

(04 Marks)

    iv. "The term 'linear regression model' always suggests a regression that is linear in the parameters but may or may not be linear in the independent variables." Discuss the above statement.

(04 Marks)

(Total 20 marks)

5.

    i. Identify six assumptions of classical linear regression model (CLRM).

(06 Marks)

    ii. Derive the least square estimators (β_1 and β_2) using differential calculus.

(06 Marks)

    iii. "Disturbance term surrogates all the variables that collectively affect the dependent variable. Therefore it is essential to include all these variables explicitly to the model." Do you agree with this statement? Justify your answer.

(04 Marks)

    iv. Briefly explain the four types of measurement scales of variables with examples.

(04 Marks)

(Total 20 marks)