

**SIR ARTHUR LEWIS COMMUNITY COLLEGE
SCIENCE, TECHNOLOGY, INNOVATION AND SUSTAINABILITY**

**2024 – 2025 ACADEMIC YEAR - SEMESTER I
END OF SEMESTER EXAMINATION**

COURSE TITLE : MATHEMATICS FOR FINANCE

COURST CODE : MAT108

**TUTORS : TITUS MATHURIN
PETRUS JN FRANCOIS**

DATE : Tuesday 10th December 2024

TIME : 1.00 – 3.00 PM

DURATION : 2 HRS.

STUDENT ID# :

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. Write your student's ID number on all the work you hand in.
2. This paper consists of **three (3)** sections A, B and C.
3. Answer ***all*** the questions in sections A, B and C.
4. Write in BLACK or BLUE pen. (***NO WRITING IN PENCIL***)
5. Show all calculations and working.
6. **Only NON-PROGRAMMABLE calculators are permitted.**
7. Section A & B – **10 marks each** Section C – **40 marks each**
8. A formula sheet is included.
9. Do not use correction fluid.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

FORMULAS

Simple Interest Formulas:

$$\text{Simple Interest} = Prt$$

$$\text{Future Value} = P(1 + rt)$$

$$\text{Present Value} = \frac{FV}{(1 + rt)}$$

Compound Interest Formulas:

$$\text{Future Value} = P(1 + i)^n$$

$$\text{Present Value} = \frac{FV}{(1 + i)^n}$$

Ordinary Annuity Formulas:

$$\text{Future Value} = R \left[\frac{(1+i)^n - 1}{i} \right]$$

$$\text{Present Value} = R \left[\frac{1 - (1+i)^{-n}}{i} \right]$$

Annuity Due Formulas:

$$\text{Future Value} = R \left[\frac{(1+i)^n - 1}{i} \right] * (1 + i)$$

$$\text{Present Value} = R \left[\frac{1 - (1+i)^{-n}}{i} \right] * (1 + i)$$

SECTION A – MULTIPLE CHOICE: COMPULSORY QUESTION

Answer ***all*** questions in this section

1. Which of the following is the most used to calculate interest amounts.
 - a. Simple Interest
 - b. Compound interest
 - c. Accrued interest

[1 mark]
2. Which of the following is not included on a promissory note.
 - a. Payer
 - b. Location
 - c. Payee

[1 mark]
3. What symbol is used to represent the interest rate per period?
 - a. r
 - b. i
 - c. n

[1 mark]
4. Financially, time must always be expressed in
 - a. Months
 - b. Weeks
 - c. Years

[1 mark]
5. Break-even is the point at which
 - a. Total Cost = Total Profit
 - b. Total Profit = Total Revenue
 - c. Total Revenue = Total Cost

[1 mark]
6. An annuity paid at the start of a period is referred to as
 - a. Ordinary Annuity
 - b. Annuity due
 - c. Annuity certain

[1 mark]

7. If the firm's revenue is lower than its cost, the firm is expected to make
 - a. Profit
 - b. Loss
 - c. Break-even

[1 mark]
8. If the proceeds of a promissory note is known at the discount date, what is the pathway that should be followed to determine the promissory note's issued value?
 - a. Discount date to Start date to Maturity date
 - b. Discount date to maturity date to Start date
 - c. Start date to maturity date to discount date

[1 mark]
9. What is the quantitative measure for a per annum compounded bi-weekly period?
 - a. 26
 - b. 14
 - c. 52

[1 mark]
10. When a firm hasn't produced any unit, what cost has it incurred?
 - a. Variable cost
 - b. Total cost
 - c. Fixed cost

[1 mark]

SECTION B

This section consists of five (5) questions. Answer *all* questions.

1. Determine the exact number of **weeks** between April 4, 2020 and September 11, 2023.
[2 marks]
2. If $P = \$500.00$, $r = 0.045$ and $t = 3.25$, calculate the simple interest (S.I). **[2 marks]**
3. If $i = 0.025$, $n = 8$ and $cp = 4$, calculate the time (t) and the interest rate (r). **[2 marks]**
4. Given that $\pi = q^2 - 981$, determine whether a profit or loss is made when 31 units are produced and sold. **[2 marks]**
5. Calculate the present value of an annuity due with $R = \$400.00$, $i = 0.012$ and $n = 23$.
[2 marks]

SECTION C

This section consists of five (5) questions. Answer *all* questions.

1. Jack deposited \$5,000.00 into his retirement account on January 1, 2021. If he withdrew \$1,200.00 six (6) months later and deposit a further \$2,500.00 into his account one hundred and four (104) weeks later and interest is paid at 10% p.a. simple interest.
 - a. Determine the date Jack made his withdrawal. **[1 mark]**
 - b. Calculate the amount of money Jack has in his account after he made the withdrawal. **[4 mark]**
 - c. Calculate the amount of money in Jack's account after he made the second deposit. **[4 mark]**

2. A seven-year interest bearing promissory note was issued on September 21, 2023. The note was discounted 130 weeks before its maturity date and is valued at \$10, 500.00 at the discount date. If interest is applied at a rate of 14% p.a. compounded quarterly, determine the following:
 - a. Maturity date of the promissory note. **[1 mark]**
 - b. Values of **n** and **i**. **[2 marks]**
 - c. Value of the promissory note at the maturity date. **[3 marks]**

3. Peter approached the St Lucia Credit Union for a loan in the amount of \$25,000.00. He was successful in negotiating an interest rate of 8.25% p.a. compounded semi-annually for five (5) years with an instalment payment of \$3,101.49.
 - a. State two (2) other financial institutions in St Lucia that Peter could have approached. **[2 marks]**
 - b. Prepare a detailed loan amortization schedule for the first two (2) years of the loan. **[6 marks]**

4. Philbert opened a HomeSTART account with Bank of Saint Lucia (BOSL) on December 23, 2020, with the hope of accumulating enough money to put towards a house downpayment in five (5) years. To meet his goal, he has been instructed to deposit \$1,005.35 at the end of each month into his account which will pay him 6.6% p.a. compounded monthly. Calculate the amount of money Philbert will amass towards his house downpayment? **[5 marks]**

5. Courts sells household fans at \$130.00 per fan. Its fixed cost is \$2,500.00 and administrative and operational costs is \$65.00 for each fan that is sold.
 - a. Write an expression to represent Courts' total revenue function. **[1 mark]**
 - b. Write an expression to represent Courts' total cost function. **[2 marks]**
 - c. Write an expression to represent Courts' profit/loss function. **[2 marks]**
 - d. When Courts sells one hundred (100) fans, calculate its profit/loss and state whether a profit or loss was made. **[2 marks]**
 - e. Draw a break-even chart to illustrate the above information. **[5 marks]**

END OF EXAMINATION