



SIR ARTHUR LEWIS COMMUNITY COLLEGE
ACADEMIC YEAR (2024/2025) – SEMESTER TWO
END OF SEMESTER EXAMINATION

COURSE CODE : MAT145
COURSE TITLE : Mathematical Reasoning and Logic
LECTURER(S) : John Estephane
DATE : May 6, 2025
TIME : 1 p.m.
DURATION : 2 Hours
STUDENT ID # : _____

GENERAL INFORMATION AND INSTRUCTIONS

- Students must sign **IN** and **OUT** on the examination class list.
- Write your ID number on the question paper.

INSTRUCTIONS:

This examination consists of two (2) sections. Section A comprises Fifteen (15) objective type questions. Circle the letter that best answers the question. Section B comprises six (6) questions. You are required to answer **ALL** questions in the spaces provided. Section A accounts for fifteen (15) marks while section B accounts for forty-five (45) marks. Total = 60 marks.

Please write in **BLACK** or **BLUE** pen. **NO WRITING IN PENCIL.**

SHOW ALL NECESSARY WORKING.

ONLY NON-PROGRAMMABLE CALCULATORS ARE PERMITTED

Question	Score	Moderated Mark	Max. Score
Section A 1 - 15			15
Section B			
1			6
2			5
3			5
4			4
5			9
6			16
Total Section B			45
Total			60

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

Section A:

Instruction: Circle the letter that best answers the question.

1. Which of the following best describes the set of positive integers?
 - A. Infinite
 - B. Finite
 - C. Subset
 - D. Empty
2. What are the four logical connectives?
 - A. conjuncts, disjuncts, conditionals, and negations
 - B. conjunctions, statements, disjuncts, and conditionals
 - C. conjunctions, conditionals, compounds, and disjunctions
 - D. conditionals, disjunctions, negations, and conjunctions
3. Which of the arithmetic mean, median, mode, and geometric mean are resistant measures of central tendency?
 - A. The median and mode only
 - B. The mean and mode only
 - C. The mean only
 - D. The mean and median
4. Which of the following variables is NOT categorical?
 - A. Age of a person
 - B. Choice of a test item: True or False
 - C. Marital Status of a person: single, divorced, married, other
 - D. Gender of a person: Male or Female
5. Two sets are called disjoint if their _____ is the empty set.
 - A. difference
 - B. union
 - C. intersection
 - D. complement
6. How many subsets are in the set $S = \{\text{basketball, football, cricket, netball}\}$?
 - A. 8
 - B. 24
 - C. 32
 - D. 16
7. Find the median of the number of emails received on 7 consecutive days: 11, 13, 17, 13, 23, 25, 19.
 - A. 13
 - B. 23
 - C. 25
 - D. 17
8. What is the simple interest on \$160 for 6 months at 5% per annum is?
 - A. \$4
 - B. \$8
 - C. \$16
 - D. \$48
9. A conditional is symbolized like _____.
 - A. $p \wedge q$
 - B. $p * q$
 - C. $p \rightarrow q$
 - D. $p \vee q$

10. The proposition $(P \rightarrow Q) \wedge (Q \rightarrow P)$ is a _____.
- absurdity
 - tautology
 - contradiction
 - contingency
11. Which of the following best describes an annuity?
- A one-time investment with no future cash flows
 - A series of equal payments made at regular intervals for a specified period
 - A loan with variable interest payments
 - A perpetual increase in cash flow
13. How much do you need to invest today to receive \$1000 at the end of each year for 15 years, assuming an interest rate of 6% per year?
- \$10,000
 - \$11,255
 - \$12,000
 - \$14,105
14. What is the cardinality of the set of odd positive integers less than 10?
- 10
 - 5
 - 3
 - 20
15. Let p represent the statement: Students are happy and let q represent the statement: Teachers are happy. Which statement is equivalent to: $\neg(p \vee \neg q)$?
- Students are not happy or teachers are not happy.
 - It is not the case that students are happy and teachers are not happy.
 - It is not the case that students are happy or teachers are not happy
 - Students are not happy and teachers are not happy.

Section B: Answer all questions in this section in the space provided.

- Write the inverse, converse and contrapositive, and negation of the statement: **If I had \$40000, I'd buy you a car.** [6]
- Construct a truth table for $(p \vee \sim q) \rightarrow (\sim p \vee q)$ [5]

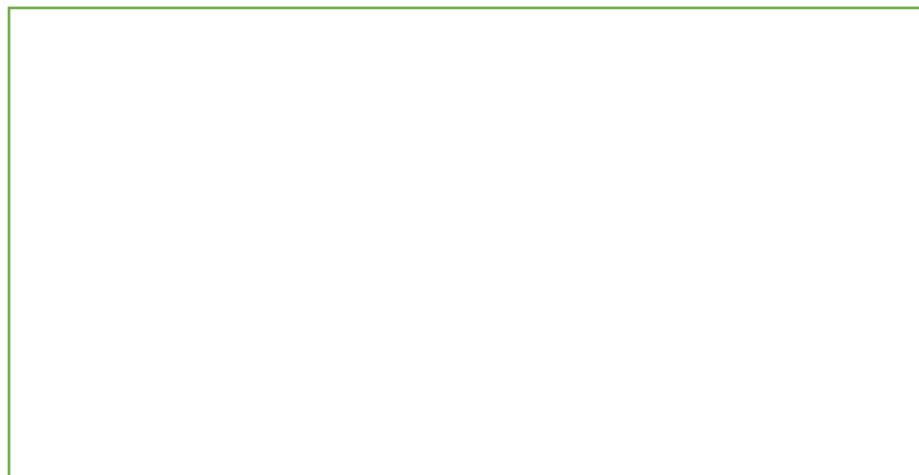
3. If you deposit \$4000 into an account paying 6% annual interest compounded quarterly, how much money will be in the account after 5 years? [5]

4. Find the future value of \$12 000 invested for 6 years if interest is paid at 8% compounded quarterly. [4]

5. In a recent math test, 20 students scored the following marks (out of 100):
78, 85, 92, 73, 88, 90, 85, 76, 91, 84,
75, 82, 85, 89, 90, 77, 83, 88, 84, 86
Calculate the mean, median, mode and range of the scores. [9]

6. AAA Travel surveyed 125 potential customers. The following information was gathered.
18 wished to travel to all three destinations
34 wished to travel to Hawaii and Las Vegas
26 wished to travel to Las Vegas and Disney World
23 wished to travel to Hawaii and Disney World
68 wished to travel to Hawaii
53 wished to travel to Las Vegas
47 wished to travel to Disney World

a) Create a Venn diagram to summarize the information. [8]



b) How many did not wish to travel to any of these destinations? [2]

- c) How many wished to travel only to Hawaii? [2]
- d) How many wished to travel to Disney World and Las Vegas, but not to Hawaii? [2]
- e) How many wished to travel to Disney World or Las Vegas, but not to Hawaii? [2]

END OF EXAMINATION