

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

LECTURER(S) : Mr. Kwame Frederick

PROGRAMME TITLE : Refrigeration of Air Conditioning – Part II
Motor Vehicle Mechanics – Part II

COURSE TITLE : Basic Electronics I

COURSE CODE : ELE114

LEVEL : Certificate/ Year Twos

PAPER : One

DATE : Friday, 2nd May 2025

COMMENCEMENT TIME : 1:00 P.M.

DURATION : TWO (2) HOURS

INVIGILATOR(S) : S. Auguste (Chief), N. Fevrier & H. Malcolm

ROOM(S) : LFT-0R-02

STUDENT ID :

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consist of four (4) questions. You are required to **answer ALL questions.**
- Answer the questions in the spaces provided **on the question paper.** You may request additional sheets to complete your responses. ENSURE the additional sheet are properly stapled to your answer booklet
- The marks for each question is indicated next to the question
- Ensure your student ID number is clearly written on the paper
- Ensure that your answers are clearly visible.
- Where you are required to draw to scale FREE HAND SKETCHES will not be accepted.
- **Calculators are needed.**

**DO NOT TURN THIS COVER SHEET UNTIL
YOU ARE TOLD TO DO SO!!**

Structured Questions

You are required to answer all questions on the exam paper. (Marks are awarded accordingly).

Question One – Electronic Components

- (A) Electronic components can be categorized into two main types: active components and passive components. Differentiate between active and passive components and provide an example of each. **[4 Marks]**

- (B) Provide a short description of how each of the following components functions. **[3 Marks]**

Switch _____

Fuse _____

Capacitor _____

- (C) Using a switch, a light bulb, and connecting wires, draw two circuit diagrams: one showing an open circuit and the other a closed circuit. Next, explain how the state of the switch in each setup affects the light bulb's status and explain why this occurs. **[6 Marks]**

OPEN CIRCUIT	CLOSED CIRCUIT

(D) Using a drawing show how three resistors connected in series are arranged differently to three connected in parallel. Include your power source. **[4 Marks]**

SERIES CIRCUIT	PARALLEL CIRCUIT

(E) Match the component to the right circuit symbol. **[5 Marks]**

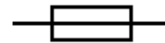
Cell



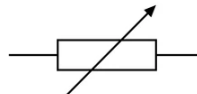
Variable Resistor



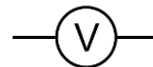
Voltmeter



Fuse



Diode



Total [22 Marks]

Question Two – Electronic Devices

(A) Define semiconductors and state what is unique about their valance (last) shell. **[3 Marks]**

(B) Silicon is often preferred over germanium due to its greater. What specific property of silicon contributes to this increased stability? **[2 Marks]**

(C) Semiconductors can be categorized into N-Type and P-Type. Identify the majority charge carriers in each type. **[2 Marks]**

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(D) What is the primary function of a diode? **[1 Mark]**

(E) Draw a diode in both a forward-biased and a reverse-biased configuration. **[4 Marks]**

REVERSE BIAS	FORWARD BIAS

(F) Explain on a microscopic level what happens in the diode when the diode in forward-biased and a reverse-biased configuration. **[6 Marks]**

(G) Explain the term barrier potential and state the barrier potential for silicon. **[2 Marks]**

Total [20 Marks]

Question Three – Rectifiers & Transistors

(A) What function does a rectifier serve? **[2 Mark]**

(B) What are the two main categories of rectifiers? **[2 Marks]**

- (C) The two primary types of bipolar transistors are **NPN** and **PNP** transistors, each constructed with different arrangements of semiconductor materials. Draw the block diagram and schematic for each type. **[6 Marks]**

NPN

BLOCK DIAGRAM	SCHEMATIC

PNP

BLOCK DIAGRAM	SCHAMATIC

Total [10 Marks]

Question Four – Digital Electronics

- (A) Decimal to binary conversion. Write the following numbers in binary: **[4 Marks]**

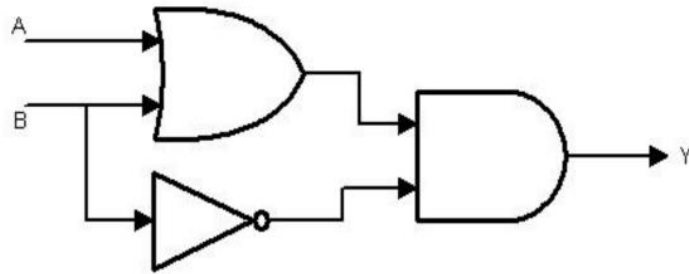
- I. 10
- II. 134

- (B) Binary to decimal conversion. Convert the following binary numbers to decimal numbers: **[2 Marks]**

- I. 1001

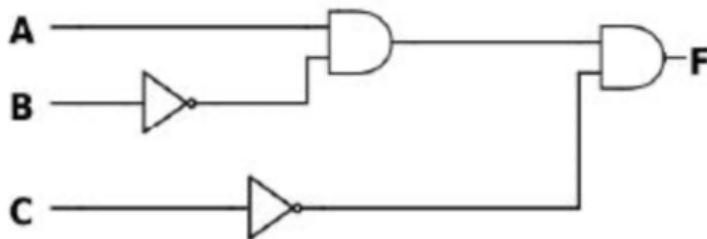
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(C) Use the following diagram composed of OR, AND and NOT gates to trace the output Y if $A = 1100$ and $B = 1010$ [8 Marks]



(D) Determine the truth table output for the following circuit. [10 Marks]

[10 Marks]



Total [24 Marks]

END OF EXAMINATION!!