SIR ARTHUR LEWIS COMMUNITY COLLEGE

ENGINEERING AND THE CIRCULAR ECONOMY

ACADEMIC YEAR (2024/2025) – SEMESTER ONE

END OF SEMESTER EXAMINATION

TUTOR (S)	**:**	**Mr. Kwame Frederick**
PROGRAMME TITLE	**:**	**Refrigeration & Air-conditioning - Part Two** **Motor vehicle Mechanics - Part Two**
COURSE TITLE	**:**	**Basic Electronic Theory IA**
COURSE CODE	**:**	**ELE113**
LEVEL	**:**	**Certificate/Year Two**
PAPER	**:**	**One (1)**
DATE	**:**	**Tuesday, 10th December 2024**
COMMENCEMENT TIME	**:**	**9:00a.m.**
DURATION	**:**	**Two (2) hours**
INVIGILATOR(S)	**:**	**A. V. Regis (Chief), A. Drysdale-Felix, T. Mathurin & U. Joseph**
ROOM(S)	**:**	**OTW-1R-08**
STUDENT ID	**:**	

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consists of Three (3) Sections (A, B & C). **You are required to attempt all questions in the spaces provided on this question paper.** You may request additional sheets to complete your responses. ENSURE the additional sheet are properly stapled to your answer booklet and your answers are visible
- **Section A** and **B** consist of one (1) question.
- **Section C** consist of two (2) questions.
- The marks for each question is indicated next to the question
- Ensure your student ID number is clearly written on the paper
- Where you are required to draw to scale FREE HAND SKETCHES will not be accepted.
- **Note: Bags, Books as well as writing paper not given by the invigilator should be deposited at the front of the examination room or as otherwise indicated.**
- **All cell phones must be turned off during the exam**

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

Student ID#_____

SECTION A

(Answer the following question.)

Question One – Atoms

(A) The atom is regarded as the fundamental building block of matter, containing three distinct particles. Complete the missing information for each particle in the table provided. **[6 marks]**

PARTICLE	CHARGE	LOCATION
Electrons		
Protons		
Neutrons		

(B) An ion can be described as an atom or molecule with a net charge. State the two types of ions and explain how they achieved their particular charge. **[4 marks]**

(C) You are given a battery, a piece of wire, and a light bulb. You connect the wire between the battery's terminals and the light bulb, completing a simple circuit.

i) Describe what is happening in terms of current, voltage, and resistance in this circuit. **[3 marks]**

ii) If you added a second bulb to the circuit, predict what would happen to resistance and current flow. What effect would it have on the brightness of the bulbs? Provide reasoning for your answers. **[4 marks]**

(D) A current of 2 amperes flows through a circuit for 3 minutes. Calculate the total electric charge that has passed through the circuit during this time. **[3 marks]**

[TOTAL 20 MARKS]

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SECTION B

(Answer the following question.)

Question Two – Ohm's law

(A) State the formula for Ohm's Law, _____ **[1 Mark]**

(B) Ohm's Law defines the mathematical relationship between voltage, current, and resistance. Explain how changes in each of these quantities—voltage, current, and resistance—affect the others in an electrical circuit. **[4 Marks]**

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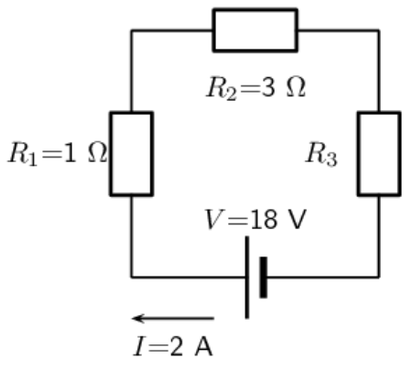
(C) The circuit below shows a simple resistor connected to a power source by two copper wires.

1) Calculate the current running through the circuit. **[2 Marks]**

2) Calculate the power delivered by the source. **[2 Marks]**

(D) The diagram below shows three resistors R_1, R_2 and R_3 connected in series. Calculate:

I. The resistance, R_3 if $R_{eq} = 9\Omega$ **[2 Marks]**



II. The voltage drops across R_1, R_2 and R_3 **[4 Marks]**

III. The power dissipated by resistor, R_3. **[2 Marks]**

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(E) Three resistors $R_1 = 5\Omega, R_2 = 7\Omega$ and $R_3 = 10\Omega$ are connected in parallel. There is a 5 Amp current flowing from the voltage source (Battery).

I. Draw and label the circuit described above, showing the direction of conventional current. **[4 Marks]**

II. Calculate the equivalent resistance R_{eq} of the circuit. **[3 Marks]**

III. Calculate the voltage, V_s, delivered by the battery. **[2 Marks]**

IV. Calculate the current flowing through R_1, R_2 and R_3. **Label appropriately**. [**4 Makrs]**

V. Is the voltage cross the R_1, R_2 and R_3 the same? **[1 Mark]**

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[TOTAL 36 MARKS]

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SECTION C

(Answer both questions.)

Question Three – Switches

A switch is an electrical component that breaks or closes an electric circuit. Many types of switches exist, which serve varying functions. Some popular types include SPST, SPDT, DPST and DPDT.

(A) For each abbreviation listed, write out what it represents. **[4 Marks]**

I. SPST_____

II. SPDT_____

III. DPST_____

IV. DPDT_____

(B) Using an example, describe the functioning of either a SPDT or DPST switch. **[3 Marks]**

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Question Four – Protection & Cells

(A) What role does a fuse play in a circuit, and how could its absence create potential problems? **[2 Marks]**

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(B) Draw a fuse circuit symbol **[1 Mark]**

(C) State two types of cells and an example of each. **[4 Marks]**

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(D) Using two separate circuit diagrams show two cells vs two cells in parallel. **[4 Marks]**

SERIES	PARALLEL

[TOTAL 19 MARKS]