SIR ARTHUR LEWIS COMMUNITY COLLEGE

ENGINEERING AND THE CIRCULAR ECONOMY

ACADEMIC YEAR (2024/2025) – SEMESTER ONE

END OF SEMESTER EXAMINATION

TUTOR (S)	**:**	**Mr. Kendall Numa**
PROGRAMME TITLE	**:**	**Computer Systems Engineering**
COURSE TITLE	**:**	**Electricity**
COURSE CODE	**:**	**ELE112**
LEVEL	**:**	**Associate Degree/ Year One**
PAPER	**:**	**One**
DATE	**:**	**Thursday, 12th December 2024**
COMMENCEMENT TIME	**:**	**1:00 p.m.**
DURATION	**:**	**Two (2) Hours**
INVIGILATOR(S)	**:**	**D. Jn Baptiste, A. Mason, A. L-Goodman, M. St Clair, A. Regis**
ROOM(S)	**:**	**LFT-1R-05**

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consist of Two (2) Sections (A and B). Answer the questions on the foolscap provided.
- **Section A** consist of Three (3) Long Answer Questions. You are required to **answer ALL questions.** Marks are awarded accordingly.
- **Section B** consist of Three (3) questions. You are required to **answer Only One question. Marks are awarded accordingly.**
- Students must sign **IN** and **OUT** on the examination class list.
- Students must **not** write their names on their answer sheets, only their ID number
- Please number your responses accurately.
- **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!!!

SECTION A

Answer ALL questions.

1. A coil of 400 turns is wound uniformly over a mild steel ring of relative permeability 70, having a mean circumference of 200 mm and a uniform cross-sectional area of 300 mm^2. If the current through the coil is 2 A, calculate:

   a. the magnetic field strength [2]

   b. the magnetic flux density [2]

   c. the total flux [2]

   d. the reluctance of the ring [2]

   [8 marks]

2. A parallel plate capacitor has 7 plates, separated by sheets of mica of thickness 0.25 mm and relative permittivity 6. The area of one side of each plate is 300 cm^2. If a potential difference of 400 V is maintained across the terminals of the capacitor, calculate:

   a. the capacitance [2]

   b. the charge [2]

   c. the electric field strength [2]

   d. the electric flux density [2]

   e. the energy stored in the capacitor [2]

   [10 marks]

3. A coil of resistance 36 Ω and inductance 0.6 H is connected in series with a 9.4 μF capacitor. The circuit is connected to a 12 V, 70 Hz supply. Calculate:

   a. the inductive reactance [2]

   b. the capacitive reactance [2]

   c. the total impedance [2]

   d. the total current [2]

   e. the impedance of the coil [2]

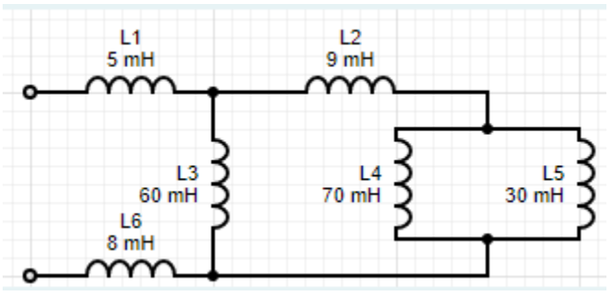
   f. the voltage drop across the coil [2]

   g. the voltage drop across the capacitor [2]

   h. the phase angle [2]

   [16 marks]

4. Calculate the total inductance for the circuit shown below



[8 marks]

[TOTAL 42 MARKS]

SECTION B

Answer Only One question.

1. A resistance of 200 Ω and a pure inductance of 200 mH are connected in parallel across a 100 V, 50 Hz supply, calculate:

   a. the inductive reactance [2]

   b. the current flowing through the resistor [2]

   c. the current flowing through the inductor [2]

   d. the total current [2]

   e. the impedance [2]

   f. the phase angle [2]

[12 marks]

2. a. Draw a simple diagram of a transformer, naming the relevant parts [4]

   b. Explain the operation of a simple transformer [4]

   c. An ideal transformer has a turns ratio of 8:1 and the primary current is 3 A when it is supplied at 240 V. Calculate the secondary voltage and current. [4]

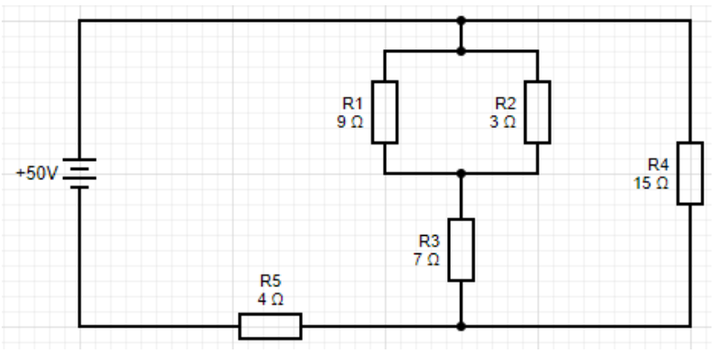
[12 marks]

3. For the circuit shown below, calculate:

   a. the total resistance [8]

   b. the voltage across R_4 [2]

   c. the current flowing through R_3 [2]



[12 marks]

[TOTAL 36 MARKS]

END OF EXAMINATION!!!