SIR ARTHUR LEWIS COMMUNITY COLLEGE

FACULTY OF ENGINEERING

ACADEMIC YEAR (2024/2025) – SEMESTER TWO

END OF SEMESTER EXAMINATION

LECTURER(S)	**:**	**Mr Arnaldo Sanchez Rojo**
PROGRAMME TITLE	**:**	**Computer Systems Engineering**
COURSE TITLE	**:**	**Electricity**
COURSE CODE	**:**	**ELE112**
LEVEL	**:**	**Associate Degree/ Year Twos**
PAPER	**:**	**Alternate**
DATE	**:**	**Monday, 26th May 2025**
COMMENCEMENT TIME	**:**	**9:00a.m.**
DURATION	**:**	**TWO (2) HOURS**
INVIGILATOR(S)	**:**	**-**
ROOM(S)	**:**	**VAR-0R-02**

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consists of **TWO (2)** sections. Answer all questions on the foolscap paper provided.
- **Section A** consist of four (4) long answer questions. You are required to answer **ALL** questions**.** Marks are awarded accordingly.
- **Section B** consist of two (2) short answer questions. You are required to answer only one (1) questions. 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.
- Calculators are needed.

DO NOT TURN THIS COVER SHEET UNTIL

YOU ARE TOLD TO DO SO!!!

SECTION A: Long Answer Questions

Answer all questions in this section. (Marks are awarded accordingly).

1. A parallel plate capacitor has 17 interleaved plates, each 150 mm by 75 mm separated by mica sheets of 0.1 cm thick. Assuming the relative permittivity of the mica is 6, and a potential difference of 400 V is maintained across the terminals of the capacitor calculate:

   a) the capacitance of the capacitor. [5]
   b) the charge of the capacitor [5]
   c) the electric field strength [5]
   d) the electric flux density [5]
   e) the energy stored in the capacitor [5]

$$\varepsilon_0 = 8.85 \times 10^{-12}\ F/m$$

[25 marks]

2. A coil of 4500 turns is wound uniformly over a mild steel ring of relative permeability 40, having a mean circumference of 350 mm and a uniform cross-sectional area of 800 mm^2. If the current through the coil is 5 A, calculate:

   a) the magnetic field strength [5]
   b) the magnetic flux density [5]
   c) the total flux [5]
   d) the reluctance of the ring [5]

$$\mu_0 = 4\pi \times 10^{-7}\ H/m$$

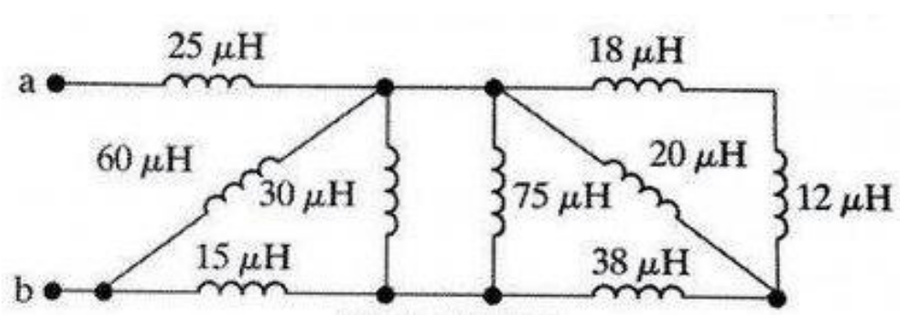
[20 marks]

3. A coil of resistance 50 Ω and inductance 4 H is connected in series with a 8.8 μF capacitor. The circuit is connected to a 240 V, 50 Hz supply. Calculate:

   a) the inductive reactance [5]
   b) the capacitive reactance [5]
   c) the total impedance [5]
   d) the total current [4]
   e) the impedance of the coil [4]
   f) the voltage drop across the coil [4]
   g) the voltage drop across the capacitor [4]
   h) the phase angle [4]

[35 marks]

4. Calculate the total inductance between **A** and **B** for the circuit shown below:



[8 marks]

Total (88 Marks)

SECTION B: Short Answer Questions

Answer one (1) question in this section. (Marks are awarded accordingly).

1. A 5 Ω resistor is connected in series with a parallel bank of resistors of 30 Ω and 40 Ω. The whole network is connected to a 40 V D.C supply.
   a) Draw the circuit described above. [3]
   b) Calculate the total current drawn from the supply [3]
   c) Calculate the voltage drop across the 5 Ω resistor and the parallel branch. [3]
   d) Calculate the power dissipated by the network. [3]

[12 marks]

2. a) Draw a simple diagram of a transformer, naming the relevant parts [6]
   b) Explain the operation of a simple transformer [4]
   c) A transformer has 500 primary turns and 3000 secondary turns. If the primary voltage is 240 V, determine the secondary voltage, assuming an ideal transformer. [2]

[12 marks]

Total (12 Marks)

END OF EXAMINATION!!