2024 SHS2 END OF SEMESTER EXAMS – APPLIED ELECTRICITY 2

APPLIED ELECTRICITY

PAPER 2

SECTION B

ESSAY (1 HOUR)

[50 marks]

Answer **five** questions only from this section.

Write your answer in **ink** in your answer booklet.

All questions carry equal marks

1. I. A coil of 100turns, 10cm in length carries a current of 0.4A. if the magnetic flux density of the core is 0.14T, calculate the

   a. Magnetomotive force

   ---[1mark]

   b. Magnetizing force

   ---[1mark]

   c. Permeability of the magnetic material

   ---[1 mark]

   II. Sketch a typical hysteresis loop for an iron cored coil including the magnetization curve and mark the following on the loop

   - Coercive force. - Residual magnetism. - Saturation zone

   ---[7 marks]

2. a. Define the potential gradient of an electric field.

---[4 marks]

b. Define capacitance and list three materials that are used in capacitors for each of the following

i. dielectric ii. Plates

Dielectric materials	**Plate materials**

[6 marks]

3. Draw and explain the circuit of a (i) charging capacitor (ii) Discharging capacitor

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---10 marks]

4. a. State the laws of electromagnetic induction

---[4 marks]

b. sketch the magnetic field pattern of a current carrying conductor wound round a soft iron core.

----------[4 mark]

c. State the rule for the determination of the polarity of the field.

----------[2 marks]

5. a. Explain the term mutual and self-inductance

---------- [4 marks]

b. What are the factors that determine the magnitude of an induced e.m.f?

---------- [6 marks]

6. a. State

i. Two factors which affect the induced e.m.f in a conductor

----------[2 marks]

ii. Three ways of inducing e.m.f. in a conductor

----------[3 marks]

b. State two effects of self-inductance of a coil forming part of a circuit

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----------[2 marks]

d. Tabulate three differences between permanent magnets and electromagnets

Permanent Magnets	Electromagnets

[3 marks]

7. The current in a coil charges from 5A to 1A in 0.4 seconds. If the induced e.m.f is 40V, calculate;

   i. the self-inductance of the coil

--- [5 marks]

   ii. The energy stored in the coil.

---[5 marks]