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**University Examinations 2015/2016**

FIRST YEAR FIRST SEMESTER EXAMINATION

FOR DIPLOMA IN

ELECTRICAL AND ELECTRONICS ENGINEERING

**EEE 2100: ELECTRICAL ENGINEERING PRINCIPLES I**

**DATE: APRIL 2016 TIME: 1 ½ HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. State the Ohm’s Law. (2 marks)
2. With the aid of a sketch show that the equivalent resistance, R, of three resistors of resistances  and connected in series is given by the equation (5 marks)
3. For the circuit shown in figure 1 below use Ohms Law to find current flowing in each branch of the circuit.

Figure 1

(7 marks)

1. State Kirchhoff’s
2. Current law (1 ½ marks)
3. Voltage Law (1 ½ marks)
4. Define the following terms
5. Resistivity (1 ½ marks)
6. Temperature coefficient (1½ marks)
7. Draw the resultant magnetic field formed by two conductors in parallel having current flowing through them in the same direction (5 marks)
8. Show that the equivalent capacitance, C, of three capacitors of capacitances C1, C2 and C3 connected in parallel is given by the equation

 (5 marks)

**QUESTION TWO (15 MARKS)**

1. Define the following terms as used in magnetic circuits.
2. Magnitomotive force
3. Magnetic flux density
4. Magnetic flux indensity
5. Permeability
6. Reductance. (5 marks)
7. Define the following terms
8. Self-inductance
9. Mutual inductance (2 marks)
10. A coil of inductance 0.2 henry has current change from AO to 5A in 0.4 seconds. Find the average emf induced in the circuit. (6 marks)

**QUESTION THREE (15 MARKS)**

1. State three types of capacitors (3 marks)
2. Define the term capacitance (1 mark)
3. With the aid of a diagram explain the constant current method of charging a battery.

(11 marks)

**QUESTION FOUR (15 MARKS)**

A ring shaped core shown in figure 2 below is made of a ferromagnetic material having relative permeability of 600. It is required to set up a flux density of 1.6 testa in the thin section of the core. Find the MMF and the exciting current if the coil has 300 turns. (15 marks)

Figure 2