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**University Examinations 2015/2016**

FIRST YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL ENGINEERING

**EEE 2100: ELECTRCAL ENGINEERING PRINCIPLES I**

 **DATE: NOVEMBER 2015 TIME: 11/2 HOURS**

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

**QUESTION ONE (30 MARKS)**

1. For the circuit shown in figure 1, use ohm’s law to determine;
2. Current flowing in each resistor.
3. Power dissipated in the 10 ohms resistor. (8 Marks)
4. Explain briefly the effect of temperature on the value of resistor for the following materials:
5. Carbon (11/2 Marks)
6. Copper (11/2 Marks)
7. Define the following terms as used in magnetic circuits and state the unit of measurement in each case:
8. Magnitomotive force.
9. Magnetic flux density.
10. Magnetic flux intensity.
11. Permeability. (6 Marks)
12. With the aid of a clear diagram show the magnetic field formed when a dc current is passed through a solenoid. (6 Marks)
13. (i) State Kirchhoff’s current law and voltage law. (3 Marks)

(ii) Define the following terms as is used in electrostatics:

1. Capacitance
2. Permittivity (4 Marks)

**QUESTION TWO (15 MARKS)**

1. A wire of cross section area 1 mm2 has resistance of 200. Find the resistance of a wire of the same length and material if its cross-sectional area is 1cm2. (5 Marks)
2. With the aid of a labeled diagram explain briefly the constant current method of charging a battery. (10 Marks)

**QUESTION THREE (15 MARKS)**

1. State Faraday’s laws of electromagnetic induction. (4 Marks)
2. Use Kirchhoff’s laws to calculate the value of current flowing in each circuit in the circuit shown in figure 2. (11 marks)

**QUESTION FOUR (15 MARKS)**

1. With the aid of a sketch show that the total capacitance, C, of three capacitors of capacitances C1, C2 and C3 are given by the equation;

 (5 Marks)

1. A magnetic circuit is existed by 120 turn coil. The cross-sectional area and the length of the magnetic circuit are 5cm2 and 5 cm respectively. When the current is 1.5 A the total flux is 0.3 milliwebber and when current is 5A the total flux is 0.6 milliwebber. Find the
2. Magnetic field strength.
3. Relative permeability in each case. (10 Marks)