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**University Examinations 2015/2016**

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

**CIC 3175: PRINCIPLES OF ELECTRICAL ENGINEERING**

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

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

**QUESTION ONE (30 MARKS)**

1. State Kirchaff laws (4 Marks)
2. Define the following terms:
3. Passive elements (2 Marks)
4. Active elements (2 Marks)
5. Four resistors 3Ω, 4Ω, 5Ω and 6Ω are connected in series. If the total current is 1.0A. Find the voltage across each resistor. (5 Marks)
6. Differentiate between short and open circuit (4 Marks)
7. A coil consists of 100 turns of copper wire and has a cross sectional area of 0.8mm2. The mean length per turn is 80cm and the resistivity of copper is 0.02µ Ωm. Find the resistance of the coil. (5 Marks)
8. Three capacitors 3 µf, 6mf and 12 µf respectively are connected in series to a 220V d.c supply. Find:
9. Total capacitance (2 Marks)
10. Charge in each capacitor (3 Marks)
11. State three essentials features of indicating analogue instruments (3 Marks)

**QUESTION TWO (20 MARKS)**

1. Define the following terms:

i) Inductance

ii) Conductance (2 Marks)

1. Using node voltage method, find the current in the 3 Ω. resistor of the network shown in figure 1 (8 Marks)
2. A coil having an inductance of 0.5H has its current reduced from 5A to 2A in 0.5s. Calculate the mean value of the e.m.f induced in the coil. (5 Marks)
3. What are the causes of transit disturbances (3 marks)

**QUESTION THREE (20 MARKS)**

1. state the maximum power transfer theorem (3 Marks)
2. show that the power transfer for the source to load is maximum when the resistance R of the load is equal to the internal resistance (r) of the source (7 Marks)
3. A moving coil instrument gives a full-scale deflection of 16mA and has a resistance of 4Ω. calculate the resistance required:
   * 1. in parallel to enable the instrument to read up to 1A (6 Marks)
     2. in series to enable it read up to 10V (4 Marks)

**QUESTION 4 (20 MARKS)**

* + - 1. Using kirchoff’s network calculate currents through the 18 Ω. resistor in the circuit below (8 Marks)
      2. With the aid of circuit diagram differentiate between forward and reverse based diode. (8 Marks)
      3. State the assumptions made when calculating steady current in electrical circuits. (4 Marks)