Roll No .....

EE/EX - 303

B.E. III Semester

Examination, June 2016

Electrical Instrumentation

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each questions are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) Differentiate between accuracy and precision.
   b) A 0-300V voltmeter has an error of ±2% of full scale deflection. What would be the range of readings if true voltage is 30V?
   c) What is loading effect? Explain with neat diagrams.
   d) The constants of a galvanometer are:
   Control constant = 0.23×10^{-6}N-m/rad, damping constant = 5×10^{-9} N-m/rad-s^{-1} and moment of inertia = 0.18×10^{-6} kg-m^2. It is proposed to increase the periodic time to 15 second by attaching small weights on light arms fixed to the coil spindle. Determine by how much these weights must increase the moment of inertia of the coil.

   OR

   Give the detailed classification of analog instruments along with their operating principle.

Unit - II

2. a) Describe the working principle of hot wire instrument.
   b) Why it is necessary to use shunt with galvanometer.
   c) Write the main source of errors in electrodynamometer type instrument.

   d) Describe the construction and working of PMMC instrument. Derive the equation for deflection if the instrument is spring controlled.

   OR

   Derive an expression for the torque of induction type shaded pole ammeter.

Unit - III

3. a) What is meant by instrument transformer?
   b) Differentiate between double element and three element dynamometer wattmeter.
   c) What are the errors introduced in current transformer? How these error can be reduced?
   d) Explain the construction and working principle of single phase electrodynamometer type wattmeter.

   OR

   Discuss with neat diagrams, the measurement of reactive power by single wattmeter.

Unit - IV

4. a) Give the classification of potentiometers.
   b) Explain the term 'standardization' of potentiometer.
   c) Why does the rotating disc of an induction type energy meter carry a small hole?
   d) Explain the construction and working principle of maximum demand meter.

   OR

   Explain in detail, how to carry out single phase energy meter testing in laboratory.

Unit - V

5. a) Give classification of resistance on measurement point of view.
   b) Give various types of frequency meters.
   c) Discuss in brief, the working principle of power factor meter.
   d) Describe a step by step method for the determination of Hysteresis loop of a magnetic substance of ring form.

   OR

   What are the difficulties encountered for the measurement of high resistance? Explain how these difficulties are overcome. Also explain the loss of charge method for measurement of insulation resistance.

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