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BIEE-039

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

December, 2015

BIEE-039 : ELECTRICAL MEASUREMENTS AND INSTRUMENTS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions in all. All questions carry equal marks. Question no. **1** is **compulsory**. Missing data, if any, may be suitably assumed. Use of calculator is permitted.*

1. Choose the best option in the following questions : *7×2=14*

(a) When the measured value approaches the true value, the reading is

(i) Accurate

(ii) Accurate, but not Precise

(iii) Precise, but not Accurate

(iv) Both Accurate and Precise

(b) A Megger is used for the measurement of

(i) Low valued resistance

(ii) Medium valued resistance

(iii) High valued resistance, particularly insulation resistance

(iv) All of the above

(c) To protect the personnel from high voltage electric shock from an instrument transformer, the following sequence of connections is followed (assuming $N_1 >> N_2$ in PT and $N_2 >> N_1$ in CT) :

(i) In PT, primary winding is connected first, then the secondary.

(ii) In PT, secondary winding is connected first, then the primary.

(iii) In CT, primary winding is connected first, then the secondary.

(iv) In CT, secondary winding is connected first, then the primary.

(d) One of the following connections may spoil the measuring instrument :

(i) An overrated ammeter in series with the load.

(ii) An underrated ammeter in series with the load.

(iii) A rated voltmeter in series with the load.

(iv) A rated voltmeter in parallel to the load.

(e) If the pressure coils in a two-wattmeter method are connected in series, it can measure

(i) Apparent power

(ii) Active power

(iii) Reactive power

(iv) No power

(f) To prevent creeping in an energymeter the following arrangement is made :

(i) Copper shading bands are provided on the central limb.

(ii) A permanent magnet is positioned near the edge of the aluminium disc.

(iii) A shunt coil is provided on the central limb.

(iv) Two diametrically opposite holes are drilled in the aluminium disc.

(g) A Lissajous pattern of straight lines at 60° with x-axis means that the sinusoidal signals are

(i) in phase and of the same magnitude.

(ii) 60° out of phase and of the same magnitude.

(iii) in phase and of the same amplitude.

(iv) 60° out of phase and of different amplitude.

2. Explain the damping system employed in a measuring instruments. Explain the various types of damping with the help of neat sketches. *14*

3. (a) Explain the construction and working principle of a maximum demand indicator. *7*

   (b) Describe various types of instrument transformers. How do they differ from power transformers ? *7*

4. (a) A moving coil instrument gives full scale reading of 24 mA, when the potential difference across the terminal is 72 mV. Calculate the resistance to be connected for a full scale deflection corresponding to 120 amp. *7*

   (b) Explain the working of a single phase electrodynamometer type power factor meter with the help of a neat sketch. *7*

5. (a) Describe the construction and working principle of a single phase energy meter. *7*

   (b) An energy meter is designed to make 100 revolutions of disc for one unit of energy. Calculate the number of revolutions made by it when connected to a load carrying 40 A at 230 V and 0·4 p.f. for an hour. If it actually makes 360 revolutions, find the percentage error. *7*

6. Discuss the working of a CRO and its various controls with the help of a block diagram. *14*

7. Write short notes on any ***two*** of the following : *2×7=14*

   (a) Phase Sequence Indicator

   (b) Analogue Multimeter

   (c) Recording Instruments