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UH-8089

B. E. - II (Sem. - III) (EL) Examination

May/June – 2012

Electrical &
Electronics Measuring Instruments : Paper - II

Time : **3** Hours] [Total Marks : **100**

Instruction :

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :
☛ **B. E. - II (Sem. - III) (EL)**

Name of the Subject :
☛ **Electrical & Electronics Measuring Instruments - 2**

☛ Subject Code No. : **8 0 8 9** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

1 (a) Answer in shrort : (each of **two** marks) **10**

(i) Derive the dimensions of (a) resistivity, (b) conductivity in L,M,T,I, system of dimensions.

(ii) Define : (a) True value, (b) Drift.

(iii) Define : (a) sensitivity, (b) resolution.

(iv) What is function of synchroscope ?

(v) Comparison between attraction type and repulsion type instrument.

(b) What is a galvanometer ? Derive torque equation of a d'Arsonval galvanometer. **10**

2 (a) Classify various measuring instruments and discuss Null type and deflection type instruments. **8**

(b) Explain the construction and working principle of Weston frequency meter. **7**

OR

2 (a) Describe the construction and working of a ballistic galvanometer. **8**

(b) A PMMC instrument has a coil of dimensions 15mm × 12mm. The flux density in the air gap is 1.8×10^{-3} Wb/m^2 and the spring constant is 0.14×10^{-6} Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degrees when a current of 5 mA is flowing through the coil. **7**

3 Attempt any **three** : **15**

(i) Describe the construction and characteristics of an unsaturated weston cell used as an emf standard.

(ii) Differentiate between spring control and gravity control methods used to produce the controlling torque.

(iii) Explain Advantages and Disadvantages of PMMC instruments.

(iv) Explain Thermocouple instruments.

(v) Explain with a neat diagram working of Merz price maximum demand indicator.

4 (a) State 'True' of 'False' for the following statements : **5**

(i) Series magnet is wound with few turns of thick wire in case of single phase induction type energy meter.

(ii) In electrodynamometer type wattmeter the air friction damping is used.

(iii) A Brooks deflection potentiometer is used when the unknown voltage is varying at a slow rate.

(iv) 10 kilowatt hour is equal to 10 unit.

(v) A potentiometer is basically a null type instrument.

(b) Answer the following questions :

(i) Define : (1) Eletronic Voltmeter (2) Meter constant (3) Peak factor. **3**

(ii) List any two advantages of Electronics voltmeter. **2**

(c) List the applications of d.c. potentiometer and discuss any two in detail. **10**

5 (a) Explain 'true RMS responding' voltmeter. **8**

(b) Explain AC electronic voltmeter using rectifiers. **7**

OR

5 (a) Explain the principle and construction of single phase induction type enegry meter. **8**

(b) Explain the special features incorporated in an electrodynamometer thpe wattmeter so that it can be used for low power factor applications. **7**

6 Attempt any **three** : **15**

(i) Derive the expression of deflecting torque in single phase induction type energy meter.

(ii) Write down the comparison between Electronic voltmeter & Analog voltmeter.

(iii) A 3-Phase, 20kVA load has p.f. of 0.866 lag. The power is measured by two wattmeter method. Find reading of each wattmeter and reactive power consumed by the load.

(iv) Explain the principle of d.c. potentiometer.

(v) What are the two alternative methods of connecting a wattmeter in a circuit ? Discuss the errors introduced due to power loss in these methods.
