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SF-6483

B. E. - II (Sem - IV) (ECC) Examination

May / June – 2011

Electrical Measuring Instrument

Time : Hours] [Total Marks :

Instructions :

(1)

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 - IV) (ECC)**

Name of the Subject :

☛ **Electrical Measuring Instrument**

☛ Subject Code No. : **6 4 8 3** ☛ Section No. (1, 2,.....) : **1, 2**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to right indicate full marks.

(4) Assume suitable data wherever it is necessary.

SECTION - I

1 (a) Do as Directed :

(i) Write the balance equation of an A.C. Bridge. **1**

(ii) List classification of Resistance. **2**

(iii) Kelvin's double bridge is used for measurement of _____ Resistance. **1**

(iv) Potentiometer is basically a _____ type instrument. **1**

(v) List types of damping. **1**

(vi) Define Impulse Ratio. **1**

(vii) Define Impulse Voltage. **1**

(viii) Why the guard circuit is used in the measurement of High resistance. **2**

(ix) May's Bridge is suitable for measurement of _____ Q-Factor Of Inductor. **1**

(b) (i) Explain the applications of d.c. potentiometer. 4

(ii) Draw and explain Kelvin's double bridge with balance equation. 6

2 (a) Derive the expression for Schering Bridge for the measurement of capacitance with phasor diagram. 8

(b) Draw and explain the Multistage Impulse generator. 7

OR

(b) Explain the direct deflection method for the measurement of High Resistance. 7

3 Attempt any **three** : 15

(a) Derive the expression for Wien's Bridge for the measurement of frequency with phasor diagram.

(b) Explain the construction and working of Meggar.

(c) Explain Voltage Ratio Box in d.c. potentiometer.

(d) Explain construction and working principle of Vibration Galvonameter.

(e) Explain sphere gap and write its advantages and disadvantages.

SECTION - II

4 (a) Answer the following questions : 5

(i) Draw setting curves for different types of damping.

(ii) What is critical damping ?

(iii) Define transformation ratio for C.T.

(iv) Define Nominal ratio for C.T.

(v) Define Ratio Correction Factor (RCF) for CT.

(b) State "True" or "False" for the following questions : 5

(i) Electrodynamometer type of instruments are used both on a.c. and d.c.

(ii) Thermal instruments have the advantage that their calibration is the same for both a.c. and d.c.

(iii) The electric strength (breakdown voltage) of new

insulated oil for transforomer and switchgear should have a minimum value of 3 KV/mm (rms).

(iv) The Secondary winding of CT should not be opened when primary winding is energised.

(v) If the insulation between two conductors is faulty, a current flows between them. This is called a open circuit fault.

(c) In a test by Murray loop method for a fault to earth on a 520 metre length of cable having a resistance of 1.1 Ω per 1000 metre, the faulty cable is looped with a sound cable of the same length but having a resistance 2.2g Ω per 1000 metre. The resistance of the other two arms of the testing network at balance, are in the ratio of 2.7 : 1. Calculate the distance of fault from the testing end. 8

OR

(c) A 1000/5 A, 50 Hz current transformer has a secondary burdon comprising a non-inductive impedance of 1.6 Ω. The primary winding has one turn. Calculate the flux in the core and ratio error at full load. Neglect leakage reactance and assume the iron loss in the core to be 1.5 Wat full load. The magnetising mmF is 100A. 8

5 (a) Explain the construction and working of moving iron instruments. 7

(b) Explain Murray loop and Varley loop test for localization of short circuit fault in cable. 7

6 Attempt any **three** : 18

(a) Explain Clamp on Ammeter.

(b) Discuss various methods of obtaining damping torque.

(c) Explain capacitance potential divider method of high voltage measurement.

(d) Explain the construction of single phase induction type energy meter.