

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 31364

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Instrumentation and Control Engineering

01UIC304 – MEASUREMENTS AND INSTRUMENTATION

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is the use of swamping resistance?
2. List the merits of PMMC ammeter.
3. Differentiate LPF wattmeter differ and UPF wattmeter?
4. What is the need of lag adjustment device in single phase energy meter?
5. Define nominal ratio and turns ratio of an instrument transformer.
6. Define burden of an instrument transformer.
7. List out the methods of measurement of earth resistance.
8. Classify resistance according to the values.
9. Give two applications of vibration galvanometer.
10. What are the sources of errors in bridge circuits?

PART - B (5 x 16 = 80 Marks)

11. (a) With neat sketch explain in detail about the working principle of D'Arsonval galvanometer and derive its torque equation. (16)

Or

(b) Describe the construction and working principle of ballistic galvanometer with neat diagram. (16)

12. (a) What are the errors in electro-dynamometer type wattmeter? Discuss its compensation methods. (16)

Or

(b) Explain two wattmeter method for measuring three phase power. Give neat circuit and vector diagram. (16)

13. (a) Analyze the equivalent circuit and phasor diagram of current transformer with neat sketch. Derive expression for ratio and phase angle error. (16)

Or

(b) Describe the construction and working principle of co-ordinate type ac potentiometer. (16)

14. (a) Describe the price's guard wire method of finding high resistance and insulation resistance of a cable. Analyze its advantages. (16)

Or

(b) A Kelvin double bridge each of the ratio arms $P=Q=R=S=1000\Omega$. The emf of the battery is 100 V and a resistance of 5Ω is included in the battery circuit. The galvanometer has a resistance of 500Ω and the resistance of the link connecting the unknown resistance to the standard resistance may be neglected. The bridge is balanced when standard resistance $S=0.001\Omega$. Evaluate (i) the value of unknown resistance. (ii) the current through the unknown resistance R at balance. (iii) the deflection of the galvanometer when the unknown resistance R is changed by 0.1% from its value at balance. $S_i=200mm/\mu A$. (16)

15. (a) Design a Wein's bridge and explain the measurement procedure for measuring unknown frequency using this bridge. Derive formula used. (16)

Or

(b) Illustrate the working principle of Anderson's bridge with neat diagram. Derive the equations for resistive and inductive components of the inductance to be measured. (16)