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**Reg. No. :**

**Question Paper Code: 43064**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Third Semester

Instrumentation and Control Engineering

14UIC304 - MEASUREMENTS AND INSTRUMENTATION

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

1. The moving iron voltmeters are likely

(a) To indicate the same value of the ac as on dc (b) To indicate higher value of ac than on dc (c) To indicate lower value of ac than on dc (d) The moving iron instruments should not be used for dc measurements

2. A ballistic galvanometer is used for the measurement of

(a) Voltage (b) Current (c) Frequency (d) Electrical charge

3. The power measurement in a balanced 3-phase circuit can be done by

(a) One wattmeter method (b) Two wattmeter method (c) Three wattmeter method (d) None of the above

4. In an electrodynamometer type of wattmeter

(a) The current coil is made fixed (b) The pressure coil is fixed

(c) Any of the two can be made fixed (d) Both the coils should be movable

5. Potentiometer is an \_\_\_\_\_\_ instrument

(a) Indicating (b) Comparison (c) Calibrating (d) Recording

6. Which of the following devices should be used for the accurate measurement of low D.C. voltage?

(a) Small range moving coil voltmeter (b) D.C. potentiometer (c) Small range thermocouple voltmeter (d) None of these

7. From the point of view of safety, the resistance of earthing electrode should be

(a) low (b) high (c) medium (d) the value of resistance of earth electrodes does not affect the safety

8. For measuring a very high resistance we should use

(a) Kelvin's double bridge (b) Wheat stone bridge(c) Meggar (d) None of the above

9. Anderson's bridge is a modification of

(a) Maxwell's wien bridge (b) Hay's bridge (c) Schering bridge (d) Owen bridge

10. Maxwell’s inductance – capacitance bridge is used for the measurement of inductance of

(a) Low Q coils (b) Medium Q coils (c) High Q coils (d) Low and medium Q coils

PART - B (5 x 2 = 10 Marks)

11. State two sources of error in MI instrument.

12. Define Creeping in energy meter.

13. How the phase angle is measured in polar type potentiometers.

14. State the condition for balance in a Wheatstone bridge.

15. Define Q-factor of the coil

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the principle, construction and operation of moving iron meters with neat diagram. (16)

Or

(b) Explain in detail about the principle, construction and operation of moving coil instrument with neat sketches. (16)

17. (a) Describe the construction details of an electrodynamometer type wattmeter with a neat

diagram. (16)

Or

(b) Explain the construction and working principle of single phase energy meter with neat diagram. (16)

18. (a) With neat circuit diagram explain the principle and operation of Crompton’s type and polar type potentiometers. (16)

Or

(b) Explain the principle of operation of Drysdale phase shifting transformer. How it is used

in polar type A.C potentiometer to measure the unknown e.m.f? (16)

19. (a) (i) Derive an expression for finding out the unknown low resistance under

balanced condition. (10)

(ii) Explain the working of shunt type ohmmeter. (6)

Or

(b) Explain the following methods of high resistance measurement:

(i) Direct deflection method (8)

(ii) Loss of charge method (8)

20. (a) Discuss the operation of schering bridge to determine unknown capacitance. Derive the relevant equations and explain the computation procedure using phasor diagram. (16)

Or

(b) (i) With neat diagram describe in detail about the Maxwell bridge in measurement system. (10)

(ii) Explain the various types errors in AC Bridge methods. (6)