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Question Paper Code: 41535

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

Third Semester

Electronics and Instrumentation Engineering

14UEI305 – ELECTRICAL MEASUREMENTS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

1. A Ballistic galvanometer should be designed with
 - (a) a large period of natural oscillations and a negligible damping constant
 - (b) a small period of natural oscillations and a high damping constant
 - (c) a large period of natural oscillations and a high damping factor
 - (d) a small period of natural oscillations and a low damping factor
2. An Electrodynamometer type Instrument finds its major use in
 - (a) standard instrument only
 - (b) transfer instrument only
 - (c) standard and transfer instrument
 - (d) indicator type
3. In a single phase induction meter, in order to obtain true value of energy, the shunt magnetic flux should lag behind the applied voltage by
 - (a) 90 degrees
 - (b) 0 degrees
 - (c) 60 degrees
 - (d) 180 degrees
4. Creeping in a Single phase induction type energy meter may be due to
 - (a) overcompensation for friction
 - (b) overvoltage
 - (c) vibrations
 - (d) all of the above

5. A current transformer has a rating of 100/5A. Its magnetizing and loss components of the exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is:
- (a) 20.12 (b) 20.2 (c) 200.2 (d) none of these
6. A current transformer has a rating of 100/5 A. Its magnetizing and loss component are 1 A and 0.6 A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is
- (a) 20.12 (b) 20.2 (c) 200.2 (d) 203
7. A Wheatstone bridge has ratio arms of 1000Ω and 100Ω resistance, the standard resistance arms consists 4 decade resistance boxes of 1000, 100, 10, 1Ω steps. The maximum and minimum values of unknown resistance which can be determined with this setup is
- (a) $111100\Omega, 1\Omega$ (b) $11110\Omega, 10\Omega$ (c) $111100\Omega, 10\Omega$ (d) none of these
8. The value of resistances of an earthing electrode depends upon
- (a) shape and material of electrode
 (b) depth to which electrode is driven into earth
 (c) specific resistances of soil
 (d) value of electrode
9. Maxwell's inductance-capacitance bridge is used for measurement of inductance of
- (a) Low Q coils (b) medium Q coils
 (c) High Q coils (d) Low and medium Q coils
10. The frequency can be measured using
- (a) Maxwell's bridge (b) Campbell's bridge
 (c) Wein's bridge (d) Anderson's bridge

PART - B (5 x 2 = 10 Marks)

11. Give the expression for deflection in Moving iron ammeter.
12. Draw two different circuits for measuring power and state the difference between the circuits.
13. Why secondary of current transformer should not be open?
14. What are the depending factors for any earthing system?

15. State the balance equation used in A.C bridge methods.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the principle of working of thermocouple type instruments. Draw the diagram to illustrate the working of contact and non contact type thermo elements. (16)

Or

(b) Describe the constructional details and principle of operation of a D'Arsonval galvanometer. Derive the expression for steady state deflection. (16)

17. (a) Derive the torque equation of Electrodynamometer type wattmeter and prove the true power is the product of correction factor and actual wattmeter reading. (16)

Or

(b) Describe the construction and operation of Single phase induction type energy meter. Write a short note on any two adjustments required in energy meters. (16)

18. (a) Discuss the construction and working of drysdale polar type potentiometer. (16)

Or

(b) Draw the Equivalent circuit and phasor diagram of current transformer and also derive the expression for ratio and phase angle errors. (16)

19. (a) Explain the procedure for measuring a low resistance with the help of Kelvin's double bridge. Derive the relation for finding unknown resistance. (16)

Or

(b) Explain the loss of charge method for measurement of insulation resistances of cables. (16)

20. (a) Explain the measurement of inductance using Maxwell-Wein's bridge circuit. (16)

Or

(b) What are the sources of errors in a.c. bridges? Explain the precautions taken for Elimination. (16)

