Reg. No. : | | | | | | | | | | |

Question Paper Code: 43505

B.E. / B.Tech. DEGREE EXAMINATION MAY 2018

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 galvanometer uses a circular scale arrangement .The light source is placed 1*m* away from the moving system in galvanometer. Arrangement is calibrated in *mm* find deflection?

   (a) 1000 *mm* (b) 2000*mm* (c) 500 *mm* (d) 100 *mm*

2. The relative damping in a galvanometer is 0.8. Its logarithmic decrement is approximately

   (a) 0.48 (b) 1.25 (c) 4.19 (d) -4.19

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 100/5 *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

6. The standardization of A.C potentiometer is done by

(a) Directly using a.c standard voltage sources
(b) Using d.c standard sources and transfer instruments
(c) Using d.c standard and D'Arsonval galvanometer
(d) Using a.c standard sources and transfer instruments

7. A Wheatstone bridge cannot be used for precision measurements because errors are introduced into an account of

(a) Resistance of connecting leads (b) Thermo-electric emfs
(c) Contact resistances (d) All the above

8. The value of resistance of an earthing electrode depends upon

(a) shape and material of electrode
(b) depth to which electrode is driven into earth
(c) Specific resistance of soil
(d) all the above

9. The frequency can be measured using

(a) Maxwell's bridge (b) Campbell's bridge
(c) Wein's bridge (d) Anderson's bridge

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. Define Phantom loading .

13. Why secondary of current transformer should not be open?

14. Design a Wheatstone bridge whose values are P = 1000 Ω, Q = 100Ω, R = 2005Ω and S = 200Ω. The battery emf is 5V with negligible resistance with negligible galvanometer resistance. Calculate the current flowing through the galvanometer.

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

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the principle of working of thermocouple type instruments. Draw the diagram to illustrate the working of contact and non contact type thermo elements. (8)

(ii) Describe the constructional details of Electrodynamometer type instrument with its phasor diagram and torque equation. (8)

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) With neat diagram, explain the working of an electrodynamometer type Wattmeter. Derive an expression for deflection torque and mention its significance. (16)

Or

(b) Explain the construction, theory and operation of single phase induction type energy meters with neat diagrams. (16)

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

Or

(b) (i) Discuss the construction and working of drysdale polar type potentiometer. (8)

(ii) What are the functions of transfer instrument and phase shifting transformer? (8)

19. (a) Write short notes on the following methods of measuring resistances:

(i) Ammeter-Voltmeter method

(ii) Substitution method (16)

Or

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

20. (a) (i) Describe the working of an Anderson's bridge. Derive the equation of balance. (8)

(ii) Explain the measurement of inductance using Maxwell - Wein's bridge circuit. (8)

Or

(b) Give a detailed account of vibration galvanometers. (16)

43505