G 585 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL AND ELECTRONIC INSTRUMENTS (E)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 marks.

1. Explain electromagnetic damping used in an indicating instrument.
2. Why does an instrument need deflecting, controlling and damping torque for proper operation ?
3. Why does the moving iron instrument has a non-linear scale ?
4. What are the causes of change of accuracy in moving coil instruments with change of temperature ?
5. How is the error due to resistance of pressure coil compensated for by using a compensating coil in a dynamometer type wattmeter ?
6. What is the function of the copper shading band in an induction wattmeter ?
7. A 200 kV, 50 Hz a.c. supply is fed to a rectifier instrument through a capacitor. The PMMC meter reading is 30 mA. Calculate the value of the capacitor.
8. Explain blanking and unblanking in an oscilloscope and discuss the need for blanking.
9. Explain the grading and classification of electrical instruments as per IS specifications.
10. Describe any one method of phase measurement.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 marks.

11. With necessary diagrams and expressions, explain :
    (i) air friction damping.
    (ii) spring control.
    (iii) torque to weight ratio.

(3 × 4 = 12 marks)

Or

Turn over

12. Explain how controlling and damping torques are produced in measuring instruments ? (12 marks)

13. A moving coil voltmeter with a resistance of 20 Ω gives a full scale deflection of 120° when a potential difference of 100 V is applied across it. The moving coil has dimensions of 30 mm × 25 mm and is wound with 100 turns. The control spring constant is 0.378×10^{-6} Nm/degree. Find the flux density in the gap. Also find the diameter of copper wire of the coil winding if 30 % of the instrument resistance is due to coil winding. The specific resistance of copper is 1.7×10^{-8} Ωm. (12 marks)

Or

14. With the help of neat diagram, explain the working principle of a repulsion type moving iron voltmeter. Describe the different types of errors and how they are compensated ? (12 marks)

15. (a) Sketch and explain three-phase electrodynamometer power factor meter. (8 marks)

(b) Describe in detail the working of a Trivector meter. (4 marks)

16. Explain in detail, with neat sketches, the operation of 3-phase energy meters. (12 marks)

17. Describe the construction of a quadrant type of electrostatic voltmeter. Derive the expression for deflection when idiostatic type of connections are used. The meter is spring controlled. (12 marks)

Or

18. With the help of neat diagram, explain the main parts of a CRT ? What are the different types of sweeps used in a CRO ? (12 marks)

19. With neat sketches, describe the working principle of Weston frequency meter. Explain clearly whether the instrument performance will be affected or not by normal changes in the supply voltage. (12 marks)

Or

20. Clearly explain the construction and working of a synchroscope. (12 marks)

[5 × 12 = 60 marks]