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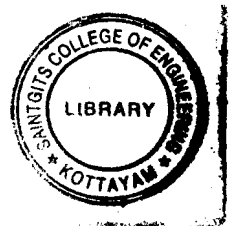
B.TECH. DEGREE EXAMINATION, MAY 2016

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. What are the essential features of indicating instruments ?

2. What is the importance of ratio of operating torque to weight of moving parts in an analog instrument ?

3. A moving coil instrument whose resistence is 25 Ω gives full scale deflection with a voltage of 25 mV. This instrument is to be used to measure 10 V.Calculate the error caused by 10°C rise in temperature. Temperature coefficient of copper is 0.004/°C and that of magnanin is 0.00015/°C.

4. Explain why PMMC instruments are the most widely used instruments. What are their merits and demerits ?

5. What do you mean by "creep" in energy meter ? How it can be compensated ?

6. An energy meter is designed to make 100 revolutions of disc for one unit of energy. Calculate the number of revolutions made by it when connected to load carrying 40 A at 230 V and 0.4 pf for an hour.

7. Explain the principle of attraction type electrostatic voltmeter.

8. Explain the role of saw-tooth wave in the operation of CRO.

9. What are the applications of synchroscope ? Explain.

10. Explain the working principle of phase sequence indicator.

(10 × 4 = 40 marks)

Turn over

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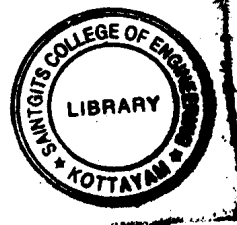
Part B

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

11. Explain various methods of damping used in analog indicating instrument. Explain their advantages and disadvantages.

Or

12. List the different types of torques in an indicating instrument. Explain any *two* types of controlling torque. Why overdamping is not used in indicating instruments ?

13. Explain the working principle of (i) attraction type and (ii) repulsion type of moving iron instruments with the help of neat diagrams. Derive equation for deflection when spring control is used.

Or

14. With neat diagrams, describe the construction and working of a PMMC instrument. Derive the expression for deflection for a PMMC ammeter if it is (i) spring controlled and (ii) gravity controlled. Comment on the shape of scale in both cases.

15. Describe the constructional details and operation of a single-phase induction type energy meter and also explain any two compensation methods.

Or

16. Describe the constructional details and working of a single-phase electrodynamometer type wattmeter. Derive the expression for deflection for a.c. operation if the instrument is spring controlled.

17. With detailed constructional diagram, explain the principle of R, L, C measurement using RLC meter.

Or

18. Draw the block diagram of a multichannel CRO and describe how different waveforms can be displayed.

19. Sketch and explain the working principle of three-phase power factor meter.

Or

20. Describe the stroboscopic method of speed measurement.

(5 × 12 = 60 marks)