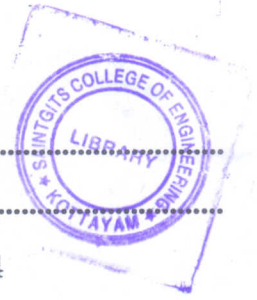


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Reg. No.....

Name.....



B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Third Semester

Branch : Electrical and Electronics Engineering

EE 010 304—ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions briefly.
Each question carries 3 marks.*

1. State and briefly explain the classification of electrical measuring instruments.
2. What is the condition to get maximum sensitivity for a Wheatstone bridge ?
3. Explain the sources of errors in single-phase induction type energy meter.
4. Draw the circuit diagram to show how a d.c. potentiometer can be used for calibration of a voltmeter.
5. What are permeameters ? List any two types.

(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. A moving coil instrument gives a full scale deflection of 10 mA. When the potential difference across its terminals is 100 mV, calculate :
 - (i) The shunt resistance for a full scale deflection corresponding to 100 A.
 - (ii) The series resistance for full scale reading with 1000 V.
7. Explain the working of Crompton's d.c. potentiometer with a neat diagram.
8. What are the errors in dynamometer type wattmeter ?
9. Derive expressions for the ratio and phase angle errors of a current transformer.
10. Explain the working of a flux meter.

(5 × 5 = 25 marks)

Turn over

**Part C**

Answer all questions.

Each full question carries 12 marks.

11. Explain underdamping, critical damping and overdamping in indicating instruments. The best operating conditions are obtained with the meter that is either critically damped or slightly underdamped. Why?

Or

12. (a) With a neat diagram, explain hot wire ammeter (thermal). What are its limitations? (7 marks)
- (b) Describe with neat figures the working of air friction damping devices. (5 marks)
13. With neat diagrams, describe how Wien bridge can be used for the measurement of frequency. Derive the condition for its resonance.

Or

14. (a) What are the problems associated with an a.c. potentiometer? Explain with neat diagram, any one a.c. potentiometer. (6 marks)

- (b) Using neat circuit diagram, describe how will you calibrate a d.c. ammeter with the help of a direct reading d.c. potentiometer. (6 marks)

15. With a neat block diagram, explain the working of electronic energy meter. What are its merits compared to the induction type energy meter.

Or

16. Explain the construction and operation of M.I. type power factor meter.
17. A current transformer has a single turn primary and has 200 turns secondary winding. The secondary supplies a current of 5A to a non-inductive burden of 1Ω resistance. The requisite flux is set up in the core by 80 amp-turns in the primary winding. The frequency is 50 Hz and the cross-sectional area of the core is 10 cm^2 and the stacking factor 0.9. Calculate the (i) ratio and phase angle errors of the C.T. ; (ii) the flux density in the core. Neglect the effects of magnetic leakage and iron and copper losses.

Or

18. Derive the expressions for the actual transformation (voltage) ratio and phase angle in the case of a potential transformer.

19. With a neat block diagram, explain the working of a digital storage oscilloscope.

Or

20. With a block diagram, describe the working of an electronic voltmeter. How autoranging is effected?

(5 × 12 = 60 marks)