Reg. No.

Question Paper Code : **51497**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Third Semester

Electrical and Electronics Engineering

EE 2201/131301/EE 33/EI 1202/10133 EE 302/080280016 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2008/2010)

(Common to PTEE 2201 – Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering – Regulations 2009)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1.   Define the term 'Sensitivity' of an instrument.

2.   The true value of a voltage is 100 V. The values indicated by a measuring instrument are 104, 103, 105, 103 and 105 Volts. Find the accuracy and precision of the measurement.

3.   What is meant by creeping in energy meters ?

4.   List out the methods used for measurement of iron loss in ferromagnetic materials.

5.   What are the applications of potentiometers ?

6.   What are the sources of Electromagnetic interference ?

7.   What are the various components of a recording instrument ?

8. Reason out why today's commercial LED monitor have become more popular than their LCD counterparts.

9. Define primary type of transducer.

10. What is the principle of operation of optical transducer ?

PART – B (5 × 16 = 80 Marks)

11. (a) Describe the functional elements of an instrument with a block diagram and draw the static and dynamic characteristics. **(16)**

OR

(b) A circuit was tuned for resonance by eight different students and the values of resonant frequency in KHz were recorded as 532, 548, 543 535 546, 531, 543 and 536. Calculate

    (i) Arithmetic mean

    (ii) Deviation

    (iii) Average deviation

    (iv) Standard deviation **(16)**

12. (a) (i) Discuss the working principle of operation of Electrodynamometer type of instruments with its constructional diagram. **(8)**

    (ii) A PMMC ammeter gives reading of 40 mA when connected across two opposite corners of a bridge rectifier, the other two corners of which are connected in series with a capacitor to 100 k, 50 Hz supply. Determine the capacitance. **(8)**

OR

(b) (i) The coil of instrument has 42.5 turns. The mean width of the coil is 2.5 cm and the axial length of the coil is 2 cm. If the flux density is 0.1 Wb/m^2, calculate the torque on the moving coil in Nm. **(6)**

    (ii) A 100/5A current transformer having a rated burden of 25 VA has an iron loss of 0.4 W and a magnetizing current of 2 A.. Calculate its ratio error and phase angle error when supplying rated output current to a meter having a ratio of resistance to reactance 5. **(10)**

13. (a) With a circuit diagram, explain the principle of operation of Duo-range DC Potentiometer. **(16)**

<div align="center">**OR**</div>

(b) (i) Draw a neat diagram of Kelvin double bridge and explain how to measure low resistance. **(8)**

(ii) Obtain an expression for measurement of inductance using, Maxwell's Inductance Bridge with a neat circuit diagram. **(8)**

14. (a) What is the advantage of using a magnetic tape recorder ? Explain how the tape recorder works with suitable diagrams. **(16)**

<div align="center">**OR**</div>

(b) Bring out how data loggers measure and record data effortlessly, accurately and quickly explaining the working of them. **(16)**

15. (a) Explain the principle of the following transducers :

(i) Thermistors **(8)**

(ii) LVDT **(8)**

<div align="center">**OR**</div>

(b) What is data acquisition system ? Give the block diagram arrangement of a data acquisition system and describe the function of each component. **(16)**

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