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

Question Paper Code : X 60493

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Third Semester
Electrical and Electronics Engineering
EE 2201/ EE 33/ 10133 EE 302/080280016 – MEASUREMENTS AND INSTRUMENTATION
(Regulations 2008/2010)
(Common to PTEE 2201/10133EE302 – Measurements and Instrumentation for B.E. (Part-Time) Third Semester – Electrical and Electronics Engineering – Regulations – 2009/2010)

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. Write any four types of analog ammeter used for instrumentation.

4. What are the different methods used for frequency measurement in power frequency range ?

5. What is the use of earth loop ?

6. What is meant by self balancing bridges ? Give two examples.

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. State criteria for the transducer selection for different application.

10. What are all the different elements of DAS ?

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. **(4×4=16)**

12. a) Describe the construction and working of permanent magnet moving coil instrument. Also derive the expression for deflection. **(16)**

(OR)

b) Write short notes on :

i) Current transformer. **(8)**

ii) Weston frequency meter. **(8)**

13. a) i) In a balanced network, AB is a resistance of 500 Ω in series with an inductor of 0.18 H, BC and DA are non-inductive resistances of 1 kΩ each and CD consists of a resistance R in series with a capacitor C. A potential difference of 5 V at a frequency of $5000 / 2\pi$ is applied between points A and C. Determine the value of R and C. **(8)**

ii) Draw and explain the balance conditions of a Wheatstone bridge. **(8)**

(OR)

b) i) Explain the construction of Anderson's bridge. Derive the unknown quantities at balance condition. Also write its advantages and disadvantages. **(10)**

ii) Determine the insulation resistance of a short length of cable in which voltage falls from 125 to 100 V in 25 seconds. The capacity of the condenser is 600×10^{-12}F. **(6)**

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

(OR)

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

15. a) i) Explain the principle and different modes of operation of Piezo electric Transducer. **(10)**

ii) A piezo electric crystal has a thickness of 2 mm and voltage sensitivity of 056 v- m/N. It is subjected to pressure of 500K N/m^2. Calculate the voltage output. If the permittivity of quartz is 40.6 pf/m, what is the charge sensitivity ? **(6)**

(OR)

b) With a neat circuit explain the working principle of

i) Dual Slope ADC. **(6)**

ii) Flash Type ADC. **(6)**

iii) R-2R DAC. **(4)**

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