PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester V - 2021

Course Code : EEE2012

Course Name : Electrical and Electronics Measurements and Instrumentation
Program : B.Tech.

Date : 10-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **5 X 2M = 10M**

1. Recall the concept of the departure of a given reading from the arithmetic mean of the data set.

   (CO1) [Knowledge]

2. List the components used in Moving Iron Instruments,

   (CO2) [Knowledge]

3. Define the concept of permeability

   (CO2) [Knowledge]

4. Compare and contrast the fundamental differences between a Cathode Ray Oscilloscope (CRO) and a Digital Storage Oscilloscope (DSO) in terms of their display technology, advantages, and limitations

   (CO3) [Knowledge]

5. Briefly explain the criteria used for the classification of transducers.

   (CO5) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **5 X 10M = 50M**

6. Measurement of high voltages has always been an arduous task and hence some special types of equipments are used for that purpose. High voltages must be stepped down to a safer level before feeding the measuring meters and protective relays as these are low voltage devices and will get damaged. An equipment was installed in a substation for measurement of high voltages and for overvoltage protection. In that context discuss about the different parts of those types of equipments

(CO3) [Comprehension]

7. Explore the journey from traditional analog voltmeters to the digital era, dissecting the inner workings of digital voltmeters. Reflect on how digitization affects measurement precision, signal processing, and the adaptability of DVMs in diverse electronic environments.

(CO4) [Comprehension]

8. Embark on a journey through advanced transducer technologies such as piezoelectric, Hall effect, optical, and digital transducers. By Exploring the unique principles underlying each type and discuss real-world applications where these transducers shine and how do these technologies contribute to precision and innovation in data acquisition?

(CO5) [Comprehension]

9. Discuss the working principles and applications of resistive, capacitive, and inductive transducers and how do these transducers convert physical phenomena into electrical signals, and in what scenarios is each type most effectively employed?

(CO5) [Comprehension]

10. Unpack the evolution from analog to digital oscilloscopes, highlighting how a digital storage oscilloscope transforms the very nature of signal analysis. Discuss memory depth, waveform capture, and the impact of digital technology on troubleshooting complex electronic systems

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   **2 X 20M = 40M**

11. The accuracy of five digital voltmeters are checked by using each of them to measure a standard 5.00V from a calibration instrument. The voltmeter readings are as follows. V1= 5.02V. V2=5.01V, V3= 4.98V, V4=4.99V and V5= 5V. Calculate the a) arithmetic mean, b) Average deviation, c) Standard deviation, d) Variance, e) Probable error.

(CO1) [Application]

12. A barium titanate piezoelectric material has dimensions of 5 mm*5mm*1.25mm. The force acting on it is 5 N. The charge sensitivity of barium titanate is 150 pC/N and its permittivity is 12.5*10^-9 F/m Young's modulus of barium titanate is 12*10^6 N/m^2.
    i) Identify the unknown parameters that could be computed from the given data
    ii) Compute the unknown paramters

(CO5) [Application]