

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

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Uni. Roll No. ....

Program: B.Tech. EE (Sem. 5<sup>th</sup>)  
**MEASUREMENTS and INSTRUMENTATION**

EVENING

Subject Code: PCEE-112

12 JUN 2023

Paper ID:16464

Scientific Calculator is allowed

**Time Allowed: 03 Hours**

**Max. Marks: 60**

**Note:**

- 1) **Parts A and B are compulsory**
- 2) **Part C** has two questions **Q8** and **Q9**. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately

**Part – A**

**[ Marks: 02 each]**

**Q1.**

- a) Differentiate between accuracy and precision.
- b) State any **two** differences between null type and deflection type instruments.
- c) Enlist any **four** types of transducers used for measurement of temperature.
- d) Mention any **four** uses of DSO.
- e) What is the advantage of using clamp meter instead of AC ammeter?
- f) Which temperature based sensor has negative temperature of coefficient of resistance? What advantage does this property offer?

**Part – B**

**[ Marks: 04 each]**

- Q2.** Enlist and define any **four** static characteristics of analog measuring instruments.
- Q3.** Draw the block diagram of a typical instrumentation system. Briefly explain each block.
- Q4.** Diagrammatically explain the construction of D'Arsonval cum ballistic galvanometer.
- Q5.** Enlist different types of transducers used for measurement of flow. Explain anyone with a diagram citing principle, construction and working.
- Q6.** What types of sources and null detectors are used in a.c. bridges?
- Q7.** A 1000/5, 50Hz current transformer has a secondary burden comprising a non-inductive impedance of  $1.2 \Omega$ . The primary winding has one turn. Calculate the flux in the core and ratio error at full load. Neglect leakage reactance and assume that iron losses in the core to be 1.2W at full load. The magnetizing mmf is 100A.

## Part – C

[Marks: 12 each]

- Q8. With diagrams give differences between Moving iron and Moving coil instruments.

OR

Diagrammatically state the principle of Hall effect transducer. Explain the applications of Hall effect transducer.

- Q9. State the principle of strain gauge.

Derive the expression for a Guage factor of a given wire when stress 's' is applied to it. The wire has the following dimensions: Length=L (m), Area of cross-section=A (m<sup>2</sup>), Diameter =D (m), before being strained. The material of the wire has a resistivity= $\rho$ ( $\Omega$ m).

OR

*"Secondary terminal of the C.T. must not be left Open Circuited (O.C.)"*. Justify Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expressions for its ratio and phase angles.

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