

Roll No.

Total Pages : 3

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May 2024

M.Tech. (EEE) - II SEMESTER

Instrumentation in Energy and Environmental Systems

(MTEVE-203A-6)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Assume relevant data wherever required.*

PART-A

1. (a) Enlist the static characteristics of instruments. (1.5)
- (b) Differentiate between RTD and Thermistor. (1.5)
- (c) Explain the main function of a flow meter. (1.5)
- (d) Write the formula used for pH calculation. (1.5)
- (e) Explain the ideal characteristics of op-amp. (1.5)
- (f) Distinguish between accuracy and precision with suitable example. (1.5)

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- (g) Give the range of temperature measurement using pyrometer. (1.5)
- (h) Write the various application of anemometer. (1.5)
- (i) Explain any one method for the measurement of liquid level. (1.5)
- (j) Explain the concept of power factor. (1.5)

PART-B

2. (a) What are the classification of Transducers and explain the principle of each transducer. (8)

(b) Explain in detail, transient analysis of a control system. (7)

3. (a) Explain the principle of operation and construction of Thermocouple. (8)

(b) State and explain different pressure measurement techniques. (7)

4. Explain the working principle and construction of the following : (15)

(a) Electromagnetic flow meter.

(b) Ultrasonic flow meter.

5. (a) Explain Particulate Sampling Technique in detail. (8)

(b) Describe methods to measure different gases CO₂ and SO₂. (7)

6. (a) Derive the expression for deflecting torque in single phase energy meter. Show that the deflection is max. when the phase angle between two fluxes is 90 and when the disc is purely inductive. (8)

(b) Explain the working of data acquisition system with the help of block diagram. (7)

7. Explain the following digital to analog and analog to digital conversion technique in details.

(a) R-2R ladder network. (8)

(ii) Parallel comparator. (15)