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PRESIDENCY UNIVERSITY BENGALURU

Department of Research & Development

Mid - Term Examinations - AUGUST 2024

Odd Semester: Ph.D. Course Work

Course Code: EEE821

Course Name: Industrial Instrumentation

Department: EEE

Date: 12-08-2024

Time: 02.00pm to 03.30pm

Max Marks: 50

Weightage: 25%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
 - (ii) Do not write any matter on the question paper other than roll number.
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PART A (THOUGHT PROVOKING)

Answer all the Questions. Each question carries 5 marks.

(4Qx 5M= 20M)

1. Explain the importance of dynamic characteristics in the performance of measuring instruments.
(CO:01 BL: Comprehension)
2. Classify instruments based on their various characteristics and provide examples for each category.
(CO:01 BL: Comprehension)
3. A manufacturing industry need a sensor for the remote monitoring of its plant temperature. The temperature has to be monitored continuously and is to be used for temperature control. Identify a sensor which is having a linear characteristic for this industry. With neat circuit diagram explain its working.
(CO:02 BL: Comprehension)
4. Suggest a temperature sensor that is to be used in industrial processes, HVAC systems etc which will generate a voltage when there is a temperature difference between two points. Explain its principle and working
(CO:02 BL: Comprehension)

PART B (PROBLEM SOLVING)

Answer all the Questions. Each question carries 10 marks.

(3Qx 10M= 30M)

1. The magnitude and phase response of instruments are critical aspects of their behavior, particularly in the context of signal processing and control systems. Understanding these responses helps in analyzing how instruments react to different frequencies of input signals. Explain the concept of magnitude and phase response of instruments
(CO:01 BL: Application)

2. The thermistor is a solid state temperature sensing device which acts a bit like an electrical resistor but is temperature sensitive. The working principle of a thermistor is that its resistance is dependent on its temperature. A $10\text{k}\Omega$ NTC thermistor has a " β " value of 3455 between the temperature range of 25o Celcius and 100degree Celcius. Calculate its resistive value at 25o Celcius and again at 100o Celcius.

(CO:02 BL: Application)

3. The resistance of platinum resistance thermometer varies with the temperature. This property is used for measuring the temperature. The resistance of a platinum wire of a platinum resistance thermometer at the ice point is 5Ω , and at steam point is 5.4Ω . When the thermometer is inserted in a hot bath, the resistance of the platinum wire is 6.2Ω . Find the temperature of the hot bath. List the advantages and disadvantages of platinum resistance thermometer. (CO:02 BL: Application)