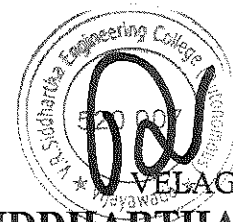


VR20



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VELAGAPUDI RAMAKRISHNA  
**SIDDHARTHA ENGINEERING COLLEGE**  
(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, March, 2022

Third Semester

**ELECTRONICS AND INSTRUMENTATION ENGINEERING**

20EI3304 SENSORS AND TRANSDUCERS

*Time: 3 hours*

*Max. Marks: 70*

*Part-A is compulsory*

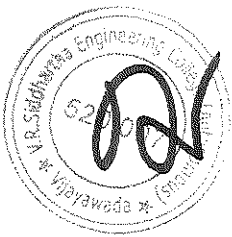
*Answer One Question from each Unit of Part - B*

*Answer to any single question or its part shall be written at one place only*

**PART-A**

10 x 1 = 10M

1.
  - a. Define accuracy of measuring instrument.
  - b. Classify the characteristics of transducers.
  - c. List few transducers based on change in resistance principle.
  - d. Summarize the examples of active and passive transducers.
  - e. What is the working principle of LVDT?
  - f. Mention the applications of inductive transducers.
  - g. State the importance of micro sensors.
  - h. Outline the working principle of biosensor.
  - i. Specify the significance of signal conditioning circuit.
  - j. Classify the curve fitting methods.



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**PART-B**

**4 x 15 = 60M**

**UNIT-I**

2. a. Define hysteresis, error, dead zone, precision, accuracy, speed of response. What is the basis for static and dynamic characteristics? Which of these come under static and dynamic? **8M**
- b. A set of independent current measurements were taken by six observers and were recorded as 12.8 A, 12.2 A, 12.5 A, 13.1 A, 12.9 A, and 12.4 A. Calculate **7M**
- i) Arithmetic mean,  
ii) Deviations from the mean,  
iii) Standard deviation.

(or)

3. a. Build a measurement system with required functional elements and explain the necessity of each element in detail with example. **8M**
- b. Derive the transfer function of second order system with step input and plot response with neat sketch. **7M**

**UNIT-II**

4. a. Select a suitable temperature transducer with negative temperature coefficient of resistance and explain its working in detail with neat sketch. **8M**
- b. Describe signal conditioning circuits used for resistive transducer and explain any one circuit in detail. **7M**

(or)

**VR20**



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5. a. With a neat sketch explain the working of resistance potentiometers in detail. **7M**
- b. Outline the working of hot-wire anemometer and photovoltaic cell. **8M**

**UNIT-III**

6. a. Derive the relationship between linear displacement and change in overlapping area of the plates of capacitor and prove that sensitivity of the sensor is constant. **8M**
- b. Select a suitable inductive transducer to convert linear displacement in to voltage and explain its working with neat sketch. **7M**

(or)

7. a. Explain the signal condition circuit of inductive transducers in detail. **7M**
- b. Outline the working of variable reluctance accelerometer and RVDT in detail. **8M**

**UNIT-IV**

8. a. Explain the construction and working of IR sensor in detail. **7M**
- b. Illustrate the construction of chemical sensor and explain its importance in day today life. **8M**

(or)

9. a. Explain the working of smart sensor with suitable application. **8M**
- b. Describe the construction and working of ultrasonic sensors in detail. **7M**

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