

**B.TECH.**  
**(SEM IV) THEORY EXAMINATION 2022-23**  
**SENSORS & INSTRUMENTATION**

Time: 3 Hours

Total Marks: 100

**Note:** Attempt all Sections. If you require any missing data, then choose suitably.

**SECTION A**

**1. Attempt all questions in brief. 2x10 = 20**

- (a) Define transducers.
- (b) Define stress and strain?
- (c) Discuss primary and secondary transducer.
- (d) Define proximity sensor.
- (e) Define sensitivity and resolution of ADC.
- (f) Describe thermal imaging.
- (g) Write application of digital counter.
- (h) Discuss clusters and arrays?
- (i) Define data socket and their importance for network communication.
- (j) Give two advantages Intelligent sensor.

**SECTION B**

**2. Attempt any three of the following: 10x3 = 30**

- (a) Explain measurement of force using strain gauge.
- (b) Illustrate sigma delta type analog to digital converter.
- (c) Define structure in Lab View in Virtual instrumentation. Discuss Flat sequence structure in Lab View.
- (d) Design 3-bit asynchronous counter.
- (e) Explain in detail.
  - (i) RTD
  - (ii) Thermistor

**SECTION C**

**3. Attempt any one part of the following: 10x1 = 10**

- (a) A linear resistance potentiometer is 5 cm long and uniformly wound with a wire having a resistance of 10 K $\Omega$ . Under normal conditions, the slider is at the center of potentiometer. What still the linear displacement be when the resistance of potentiometer as measured by bridge circuit at i) 3.8 k $\Omega$  ii) 8.3 k $\Omega$
- (b) Explain working of Optical Encoder and write one application of optical encoder.

- 4. Attempt any *one* part of the following: 10 x1 = 10**
- (a) Discuss the measurement of pressure using LVDT based diaphragm.
  - (b) A platinum resistance thermometer has a resistance of  $100\ \Omega$  at  $0^\circ\text{C}$ . What is the resistance when the temperature is  $150^\circ\text{C}$ ? When the temperature has a resistance of  $250\ \Omega$ , what is the value of temperature? Platinum has a resistance temperature coefficient of  $0.0039/^\circ\text{C}$ .
- 5. Attempt any *one* part of the following: 10x1 = 10**
- (a) Write an example of case and sequence structure in graphical programming.
  - (b) Discuss DAQ in details with its type.
- 6. Attempt any *one* part of the following: 10x1 = 10**
- (a) Discuss Successive approximation types (SAR) ADC with one example.
  - (b) Explain working of binary weighted resistor type digital to analog converter.
- 7. Attempt any *one* part of the following: 10x1 = 10**
- (a) Illustrate LabVIEW. Discuss different windows associated with it. Write its advantages.
  - (b) Discuss application of smart sensors as automatic engine control.

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