

B.TECH.**THEORY EXAMINATION (SEM-IV) 2016-17
SENSOR & INSTRUMENTATION****Time : 3 Hours****Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION-A**

- 1 **Explain the following:** (10×2=20)
- a) Compare Transducer & Inverse Transducer with example.
 - b) Draw characteristics for Thermocouple.
 - c) Explain Peltier effect in thermocouple?
 - d) Write OP-Amp Ideal characteristics.
 - e) What is need of modulation?
 - f) Explain different performance parameters of Digital to Analog converter.
 - g) What is meant by high level and low level multiplexing? Explain the features of both processes.
 - h) An 8 bit DAC has output voltage range 0-5V.find its resolution, accuracy
 - i) Draw Sample & Hold circuit & explain its purpose in Instrumentation
 - j) Explain different pressure sensor with examples.

SECTION-B

- 2 **Attempt any five of the following:** (10×5=50)
- a) Derive the Expression for Output voltage for an Active high pass filter, also find cutoff Frequency and draw its frequency response.
 - b) Explain the working of Hall Effect Transducer.
 - c) Explain the purpose of frequency division multiplexing in telemetry system with block diagram.
 - d) Explain the Working of LCD and differentiate between light scattering and field effect types of LCD.
 - e) A Strain Gauge having a Resistance of 120Ω gauge factor of 2 is connected in series with a ballast resistance of 120Ω across a 12v supply. Calculate the difference between the output voltage (voltage across strain gauge) with no stress applied & with a stress of 140 MN/m^2 Modulus of elasticity of the member undergoing strain is 200 GN/m^2
 - f) Describe the working of Different Digital to Analog Conversion techniques
 - g) With the help of neat sketch explain different types of level meters also write its advantage & disadvantages.
 - h) Classify different Transducer with example.

SECTION-C**Attempt any two of the following: (15×2=30)**

- 3 Write short note on Thermocouple, write temperature range of different material - wire use in it. Write its advantage 7 disadvantages.
- 4 Derive expression for gauge factor of strain gauge ,A resistance strain gauge with gauge factor 2 is fastened to steel subjected to stress 500 kg/sq. cm .if modulus of elasticity of steel is $2 \times 10^6\text{ kg/cm}^2$,calculate change in resistance if strain gauge element applied due to applied stress.
- 5 **(Branch Food Tech FT)**

Explain different elements of food packaging plant & explain role of robotics in the plant?

5 (Branch CS/IT/EC/EI/IC/AEI)

Draw A Maxwell inductance bridge ,it is use to measure inductance in comparison with capacitance .the various value at balance are-Arm AD $R_2=300\ \Omega$, BC $R_3=500\ \Omega$, CD $R_4=800\ \Omega$, CD $C_4=0.5\ \mu\text{F}$ find R_1 , L_1 and storage factor at 1000Hz.

5 (Branch ME)

What do you mean by interference, explain working of Interferometer use to detect the linear movement.

5 (Branch EE/EN)

Explain digital modulation - Pulse code modulation techniques.

5 (Branch CH)

Write short notes on -

(a) Radiation pyrometer

(b) McLeod gauge

5 (Branch CE /AG)

What is current telemetry system? Describe motion and force balance current telemetering systems with the help of neat sketches.

5 (Branch Textile /TT)

Explain working principle of stroboscope used in textile industry.

5 (Branch ENV)

Explain different Nano sensors are used in environment.