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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 120 Ω 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 200GN/ 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 *10^6 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 R2=300 Ω, BC R3=500 Ω, CD R4= 800 Ω, CD C4=0.5μ F find R1, L1 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.