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B.TECH.

THEORY EXAMINATION (SEM-IV) 2016-17

SENSOR & INSTRUMENTATION

Time : 3 Hours

Max. Marks : 100

 $(10 \times 2 = 20)$

 $(10 \times 5 = 50)$

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION-A

1 Explain the following:

- 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:

- 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/m². Modulus of elasticity of the member undergoing strain is 200GN/m²
- 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/ cm² ,calculate change in resistance if strain gauge element applied due to applied stress.

5



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. .er. MarkinstRank