



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 120501**

Roll No.

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**B. Tech.**

(SEM. V) (ODD SEM.) THEORY  
EXAMINATION, 2014-15

**ELECTRICAL INSTRUMENTATION AND  
PROCESS CONTROL**

Time : 3 Hours]

[Total Marks : 100

1 Attempt any **FOUR** parts : 5×4=20

- a) Explain the classifications of transducer in detail.
- b) What are the factors influencing the choice of transducer?  
Explain it in detail.
- c) A resistance, wire strain gauge with a gauge factor of 2 is bonded to steel structural member subjected to a stress of  $100\text{MN/m}^2$ . The modulus of elasticity of steel is  $200\text{GN/m}^2$ . Calculate the percentage change in the value of the gauge resistance due to applied stress.
- d) A copper resistor at  $20^\circ\text{C}$  is used to indicate the temperature of bearings of a machine. What resistance should not be exceed  $150^\circ\text{C}$ ? The resistance temperature co-efficient of copper is  $0.00393/^\circ\text{C}$  at  $20^\circ\text{C}$ .

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- e) A thermocouple circuit uses a chromel - alumel thermocouple which gives an emf of 33.3V when measuring a temperature of 800°C with reference temperature of 800°C with reference temperature 0°C. the resistance of the meter coil,  $R_m$  is  $50\Omega$  and a current of 0.1mA gives full scale deflection. The resistance of the junctions and leads  $R_c$  is  $12\Omega$ . Calculate resistance of the series resistance if a temperature of 800°C is to give full scale deflection.
- f) What are the advantages of Electrical Transducer?

2 Attempt any **TWO** parts : **10×2=20**

- a) Explain the different principles involved in working of capacitive transducer. Give some applications of capacitive transducer.
- b) What is opto-electronic principle ? Explain any two optoelectronic transducer in detail.
- c) Describe the methods for measurement of flow using (i) Venturimeters and (ii) orifice plates. Derive the expressions for flow rate in each case.

3 Attempt any **TWO** parts : **10×2=20**

- a) Explain why is it essential to use radio frequency (R.F.) telemetry. Describe it with some relevant examples.
- b) Differentiate Digital Data Acquisition System and Modern Digital Data Acquisition System. Describe briefly about the building blocks of Modern Digital Data Acquisition system.
- c) Describe in detail about the various common communication channels used for telemetering.



- 4 Attempt any **TWO** parts : **10×2=20**
- a) Describe the basic concepts and principle of magnetic tape recorder and also state the various methods involved in magnetic tape recording.
  - b) Explain the different methods used for digital tape recording. Give its advantages and disadvantages.
  - c)
    - i) Write detail note on fiber optic transducer.
    - ii) What are the applications of fiber optic transducer?  
How fiber optic transducer is differs from other?

- 5 Attempt any **TWO** parts : **10×2=20**
- a) Describe the process characteristics of temperature control system in heating furnace.
  - b) Illustrate the various methods involved in Electronic controller realization.
  - c) Construct a block diagram of room heating system and also state the functions of each block in the constructed system.