



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

PAPER ID : 120501

Roll No.

--	--	--	--	--	--	--	--	--	--

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 100MN/m^2 . The modulus of elasticity of steel is 200GN/m^2 . Calculate the percentage change in the value of the gauge resistance due to applied stress.
 - d) A copper resistor at 20°C is used to indicate the temperature of bearings of a machine. What resistance should not be exceed 150°C ? The resistance temperature co-efficient of copper is $0.00393/^\circ\text{C}$ at 20°C .

- 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 50Ω and a current of 0.1mA gives full scale deflection. The resistance of the junctions and leads R_c is 12Ω. 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.