Printed pages: 01 **Sub Code: EEN701**

Paper Id: | 2 | 0 | 2 | 6 | **Roll No:** | | | | | | | | | | |

B TECH
(SEM VII) THEORY EXAMINATION 2017-18
ELECTRICAL INSTRUMENTATION AND PROCESS CONTROL

Time: 3 Hours ***Total Marks: 100***

Notes: *Attempt all Sections. Assume any missing data.*

Q. 1) Attempt any four parts from the following: **5x4=20**

(a) What is loading effect in the potentiometer? Derive the equation for the error in potentiometer due to loading effect.
(b) Define the following with reference to the transducer.
(i) Zero error (ii) sensitivity error (iii) non-conformity error (iv) hysteresis error (v) dynamic error.
(c) Explain construction of wire wound strain gauge. Derive the expression for the gauge factor.
(d) Explain the working of LVDT as a transducer with its advantages and disadvantages.
(e) Describe the construction, theory and working of thermo-couples.
(f) Define the following:
(i) Transducer (ii) Inverse-transducer (iii) Output transducer
Give suitable examples of each.

Q. 2) Attempt any four parts from the following. **5x4=20**

(a) Define different electrical methods for measurement of liquid level. Explain any one method.
(b) A quartz piezo-electric crystal having a thickness of 2mm and voltage sensitivity of 0.055 V-m/N is subjected to a pressure of $1.5MN/m^2$. Calculate the voltage output. If the permittivity of quartz is $40.6\times10^{-12}F/m$, calculate its charge sensitivity.
(c) Explain the theory of radiation pyrometers. Describe the different radiation receiving elements.
(d) Explain how by using a differential arrangement, a capacitive transducer which works on the principle of variation of capacitance with displacement between two plates, the response can be made linear.
(e) Describe the working and theory of an ultrasonic flow meter. List its advantages.
(f) Describe the method of measurement of differential pressure using an inductive transducer.

Q. 3) Attempt any two parts from the following. **10x2=20**

(a) Define "time division multiplexing" and "frequency division multiplexes" as applied to telemetry.
(b) What is a Data Acquisition System (DAS)? Explain the role played by different elements.
(c) Define telemetry system with the help of block diagram. Explain the different types of landline telemetry system.

Q. 4) Attempt any two parts from the following. **10x2=20**

(a) With the help of block diagram, explain the working principle of spectrum analyzer.
(b) With the help of block diagram, explain XY recorder. List advantages and applications of the XY recorder.
(c) Explain different types of fiber optic sensors and differentiate between micro-sensor and smart sensor.

Q. 5) Write notes on any two of the following. **10x2=20**

(a) PID control and ON-Off control.
(b) Pneumatic control
(c) Elements of process control