



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

PAPER ID : 121412

Roll No.

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B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15
SENSOR & INSTRUMENTATION

Time : 3 Hours]

[Total Marks : 100

- Note :**
- (i) Attempt **all** questions.
 - (ii) **All** questions carry equal marks.

1 Attempt any **four** parts of the following : **(5×4=20)**

- (a) Write short note on smart sensor.
- (b) Explain the working principle of LVDT with the help of neat sketch and characteristics. Explain the advantages and disadvantages of LVDT.
- (c) Explain the working of ultrasonic flow meter in brief.
- (d) Discuss the working of thermocouple sensor for the measurement of temperature.
- (e) Explain piezoelectric pressure transducers. Write its advantages and disadvantages.

- (f) A linear resistance potentiometer is 5 cm long and uniformly wound with a wire having a resistance of $10\text{k}\Omega$. Under normal conditions the slider is at centre of the potentiometer. What will the linear displacement when resistance of potentiometer is measured as (i) $3.8\text{k}\Omega$ (ii) $8.3\text{k}\Omega$.

2 Attempt any **two** parts of the following : **(10×2=20)**

- (a) Draw the circuit diagram of a first order low pass filter and derive its transfer function.
- (b) Explain the working of envelop detector with circuit diagram.
- (c) Explain the Wheatstone Bridge used for the measurement of resistance.

3 Attempt any **two** parts of the following : **(10×2=20)**

- (a) Explain the purpose of Time division multiplexing in telemetry system.
- (b) Explain the working of LCD and differentiate between light scattering and field effect types of LCD.
- (c) Describe the working of Successive approximation technique used in ADC.

4 Attempt any **two** parts of the following : (10×2=20)

- (a) Explain the typical features and advantages of LABVIEW.
- (b) Draw and explain the difference between traditional instruments and software based virtual instruments
- (c) Two resistors have the following rating :

$R_1=36\ \Omega + 5\%$ and $R_2= 75\ \Omega + 5\%$, calculate

- (i) The magnitude of errors in each resistor.
- (ii) The limiting error in ohm and in percentage when the resistors are connected in series
- (iii) Relative error and percentage relative error when resistors are connected in parallel.

5 Attempt any **two** parts of the following : (10×2=20)

- (a) Describe fruits &vegetable processing through a neat diagram.
- (b) Explain electronic Nose system & how it is useful for food industry.
- (c) Explain different elements of food packaging plant & explain role of robotics in the plant?
