Printed Pages :

EE405

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

PAPER ID :

Roll No.

B.TECH

Theory Examination (Semester-IV) 2015-16

SENSOR AND INSTRUMENTATION

Time : 3 Hours *Max. Marks : 100*

SECTION-A

1. Attempt all parts. All parts carry **equal** marks. **(2 x 10 =20)**

a) A pressure sensor has a span of 25 to 150 psi. Specify the error when measuring 107 psi, if the accuracy of the gauge is (a) ±1.5% of span, (b)±2% FSD.

b) A digital meter has 10-bit accuracy. What is the resolution on the 16V range?

c) What is the error between the set point and the variable?

d) What are the Ideal characteristics of Ideal OP-AMP.

e) Define V to I and I to V converters transfer functions.

f) Give the temperature range for J-type and K-type thermocouple respectively.

g) What do you mean by 'quantization'?

h) What is 'Amplitude Modulation ' & Modulation Index?

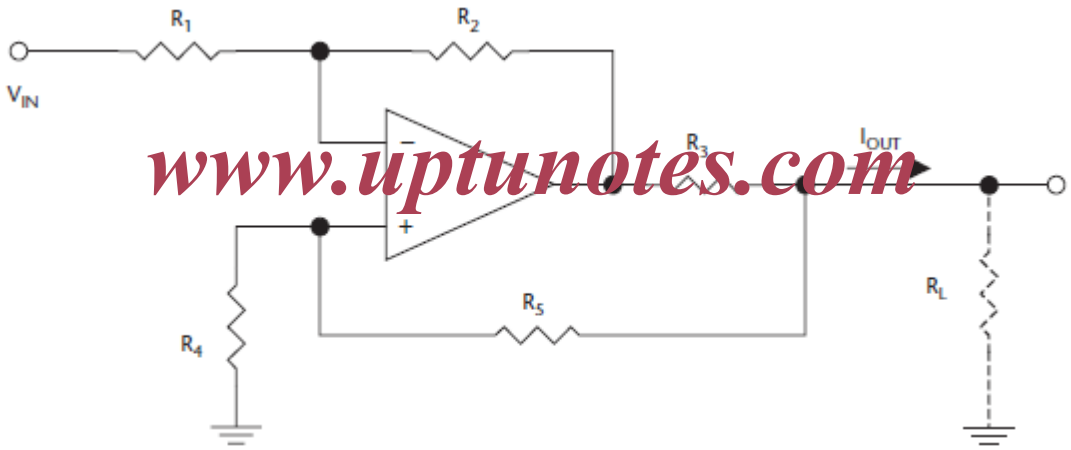
i) Define data Aquistion.

j) What do you understand by data logger?

SECTION-B

2. Attempt any **five** questions from this section. **(10 x 5 = 50)**

a) (i) In Figure , $R1 = R4 = 6.5\ k\Omega$, and $R2 = 97\ k\Omega$. What is the value of $R3$ and $R5$ if the op-amp is needed to convert an input of 2.2V to an output of 15 mA?



(ii) Explain the functionality of Piezoelectric Sensors and PZT Actuators.

b) Explain the different factors on the basis of which transducer can be selected for a particular application.

c) Draw and explain the main components of Cathode Ray Tube (CRT).

d) Why active filters are preferred over passive filters? Design a First order high pass filter with cut-off frequency 2 KHz.

e) Draw and explain the square-law modulator circuit for amplitude modulation wave.

f) Draw and explain the instrumentation system for "FLOW" measurement.

g) Draw and explain the block diagram of a PCM Telemetry system.

h) Draw the circuit diagram of Instrumentation Operational Amplifier. Derive the expression for its Voltage Gain.

SECTION-C

Attempt any **two** questions from this section. **(15 x 2 = 30)**

3. (i) Explain the software feature of LAB VIEW and how it can be used to measure the input signal.
   (ii) Enlist the Classifications of Recorders. Also explain the concept of Magnetic Tape Recorder.
4. (i) Draw a block digram for Voltmeter and explain each function in detail.
   (ii) With the help of a block diagram, explain a frequency modulation telemetry system. What are the disadvantages of frequency modulation ?
5. (i) Briefly describe a 'Capacitive-type' level sensor.
   (ii) Explain the functionality of (a) Humidity Sensor (b) Viscosity Sensor