Printed Pages: 4 **NEE-405**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 1211412	**Roll No.**

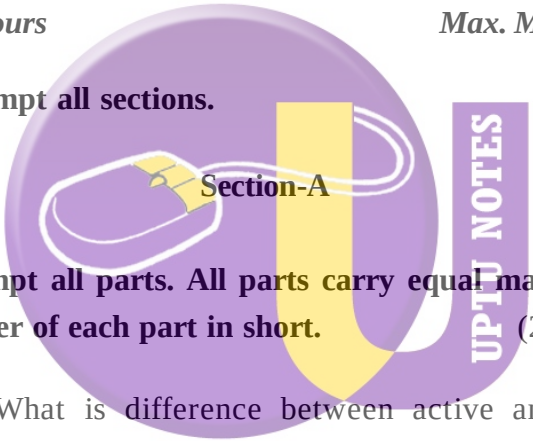
B.TECH.

Theory Examination (Semester-IV) 2015-16

SENSOR AND INSTRUMENTATION

Time : 3 Hours ***Max. Marks : 100***

Note: Attempt all sections.



Section-A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10 = 20)

(a) What is difference between active and passive transducers?

(b) What is smart sensor? Give appropriate block diagram.

(c) Define Amplitude Modulation & Demodulation.

(d) Describe the working of weighted resister DAC.

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(e) What is Operational Amplifier? Describe the characteristics of an ideal OP-AMP.

(f) What is the difference between active & passive filters? Explain briefly active low pass filter.

(g) Determine the convolution of two discrete time signal given by x(n)={1,2,3,4} andh(n)={2,4,6,8}.

(h) Write a short note on liquid crystal displays (LCD).

(i) What is difference between accuracy and precision?

(j) What is multiplexing?

Section-B

2. Attempt any five questions from this section. [10×5=50]

(a) What is piezoelectric effect? Describe different modes of operation of piezoelectric transducer with appropriate diagram. List the name of four piezoelectric materials.

(b) Describe in details the successive approximation method of analog to digital (A/D) converter. Find the Successive Approximation A/D output for a 3 bit converter to 5.2 volt input if the reference is 5V. Explain the principle working of Voltage to Frequency converter.

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(c) Draw and explain briefly the resistance temp characteristics of conductor and semiconductor.

(d) (i) Explain Square Law Modulator method for the generation of AM. Explain spectrum of AM wave.

(ii) Explain Sample and Hold circuit with appropriate diagram. Write application of S/H circuit.

(e) Explain basic virtual instrumentation system with the help of block diagram.

(f) Describe the construction and working principle of Electromagnetic flowmeter. Explain its merits and demerits.

(g) Write short note on any two of the following:

(a) LED Seven segment display

(b) Pulse Code Modulation

(c) Convolution & Digital Filters

(h) Describe the following type of passive RC filters

(i) Low Pass

(ii) High Pass

(iii) Band Pass filter

(iv) Band Reject Filter

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Section-C

Note: Attempt any two questions from this section. (15×2=30)

3. Write short note on

   (a) Analog and Digital display devices

   (b) Frequency to voltage converter

   (c) Analog type recorder

4. (a) What is the construction and working principle of thermocouple for the temperature measurement? Give the brief explanation of law of thermocouples. (10)

   (b) Explain different types of error occur in the measurements. (5)

5. Illustrate about the following terms:

   (a) Necessity of sensors and instrumentation for Food processing.

   (b) Application of Sensors and instrumentation in Food Packaging.

   (c) Food quality and Food safety.

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