

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

Paper ID : 121315

Roll No.

B.Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

SENSOR AND INSTRUMENTATION

[Time : 3 hours]

[Maximum Marks : 100]

**Note:** Attempt all questions as directed in section A, B & C.  
Assume any missing data.

**Section-A**

1. Attempt all sections. (2 × 10 = 20)

- Explain transducer and Sensor with suitable example.
- What is metrology?
- Explain non inverting OP-AMP with a suitable diagram?
- What is virtual instrumentation.

- Explain amplitude modulation with their waveform?
- What is Convolution?
- Explain the terms precision and accuracy.
- Explain Liquid in glass with reference to temperature sensor.
- Name two linear measurement devices.
- What is electroluminescence?

Section-B [uptuonline.com](http://uptuonline.com)

2. Attempt any five parts.

(10 × 5 = 50)

- Discuss the working of LVDT with the help of diagram. Also give the advantages and disadvantages.
- Explain Sample and Hold Circuit.
  - With the help of diagram explain ADC.
- Explain OPAMP as a non inverting Amplifier.
  - With the help of diagram explain voltage to frequency converter.
- Explain the working of Ultrasonic flow sensor.
  - Explain Proximity sensors.

(e) (i) Explain the basic components of a Data Acquisition system.

(ii) Explain Tool Makers microscope.

(f) Explain the working of strip chart recorder.

(g) Draw the circuit for first order Low Pass Filter. Also find its transfer function.

(h) Explain Amplitude Modulator with a circuit diagram

### Section-C

3. Attempt any two parts of the following. (2×15=30)

(For Branches CS/IT/EC TE/IC/EE) (Branch Code 10/13/30/31/33)

(a) (i) Explain the working of thermocouple temperature sensor

(ii) Draw the circuit for OPAMP as a inverting Amplifier. Also find its voltage gain.

(b) (i) Explain the concept of smart sensors.

(ii) Derive the expression for unknown capacitance of Schering's bridge.

(c) (i) Give the classification of Strain gauges. Explain semiconductor strain gauge

(ii) Explain Taylor's principle of Gauge design. Also explain Autocollimator.

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4. Attempt any two parts of the following: (15×2=30)

(For Branch Textile/TT)(Branch Code 61)

(a) Write the working principle of stroboscope & nep counting.

(b) What are function of tension meters. Explain its working principle.

(c) Explain different instrument for computer color matching.

5. Attempt any two parts of the following: (15×2=30)

(For Branch CE/AG)(Branch Code 00/80)

(a) Explain frequency modulation telemetry system with proper block diagram.

(b) Explain PAM telemetry system with the help of block diagram.

(c) Draw the block diagram of a complete telemetry scheme using frequency division multiplexing and de-multiplexing.

6. Attempt **any two** parts of the following: (15×2=30)

(For Branch Env)(Branch Code 97)

- (a) Ionic chromatography for analysis of inorganic ions in water and Infrared absorption Spectroscopy.
- (b) What are nano sensors Explain in detail. Also explain PH analysis and their application in detail.
- (c) Differentiate between portable and stationary analytical instruments.

7. Attempt **any two** parts of the following: (15×2=30)

(For Branch CHE)(Branch Code 51)

- (a) What are the different types of monometers? Explain the working of any one of them with a neat sketch.
- (b) Explain the principle, construction and working of McLeod gauge.
- (c) Explain classification of measuring instruments and also explain static and dynamic characteristics of instruments.

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