

AP 5101 Sensors, Actuators and Interface Electronics

Important 13 Marks Questions

Unit I

1. Discuss in detail various types of errors associated in measurements and how these errors can be minimized.
2. Explain the instrumentation amplifier and its application in detail.
3. Explain the static and dynamic characteristics of measurement systems.
4. Obtain the time response of second order instruments for unit step input, under damped condition and list its specification.
5. Explain the instrumentation amplifier and its application in detail.

Unit II

1. With necessary sketch explain the operating principle and characteristics of LVDT.
2. Explain different strain gauges with their principle of operation.
3. Explain the instrumentation amplifier and its application in detail.
4. Differentiate capacitive and inductive sensors.
5. Discuss about the sources of interference and reduction of the same.

Unit III

1. With help of circuit diagram explain any two amplifiers used in signal conditioning for self-generating sensors and give its significance.
2. Write technical notes on following sensors:
 - (i) Pyroelectric sensors.
 - (ii) Photovoltaic sensors.
3. Write notes on:
 - (i) Chopper and low drift amplifiers.
 - (ii) Electrometer amplifiers.
4. Demonstrate the types, working principle and requirements of thermoelectric and piezoelectric sensors.
5. Contrast between offset and drift amplifiers.

Unit IV

1. Explain the principle and applications of syncros and inductosyn.
2. Explain the following with diagram:
 - (i) Hydraulic actuators.
 - (ii) Solenoid drive.
3. Describe the operation of digital to resolver converters.
4. Reorganize the features of voice-coil and hydraulic actuators.
5. Stepper motor control as an actuator.

Unit V

1. Explain following digital sensors principle of operation and application.
 - (i) Position encoder.
 - (ii) Vibrating cylinder sensors.
2. With necessary sketch explain principle and applications of
 - (i) Ultrasonic sensors.
 - (ii) Fiber-optic sensors.
3. Explain the vibrating wire strain gauges and vibrating cylinder sensors.
4. Illustrate the features of sensors based on semiconductor junctions.
5. Discuss the details of photodiode and phototransistors.