Q.21 What are biosensors and how do they function? (CO5)

Q.22 Describe the operation of an electric motor as an actuator in control systems. (CO4)

## SECTION-D

**Note: Long answer questions. Attempt any two questions out of three Questions. (2x8=16)**

Q.23 Discuss the construction, operation and applications of capacitive transducers. (CO1)

Q.24 Describe the different types of flow sensors used in industrial applications and explain their working principles. (CO3)

Q.25 Explain in detail the working of different types of temperature sensors and their role in process control. (CO3)



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**4th Sem.**
**Branch : Automation & Robotics**
**Sub. Sensors & Actuators**

Time : 3 Hrs. M.M. : 60

## SECTION-A

**Note: Multiple choice Questions. All Questions are compulsory. (6x1=6)**

Q.1 Which of the following is a variable inductance transducer? (CO1)

a) Thermocouple b) LVDT

c) Hall effect sensor d) Piezoelectric transducer

Q.2 A photoelectric transducer converts: (CO1)

a) Heat into electricity b) Light into electricity

c) Pressure into voltage d) Sound into voltage

Q.3 A diaphragm pressure sensor works on the principle of a: (CO2)

a) Capacitance b) Resistance

c) Displacement d) Piezoelectricity

Q.4 Which sensor is used for non-contact temperature measurement? (CO3)

a) RTD b) Thermocouple

c) Thermistor d) Infrared thermography

Q.5 A solenoid is used for : (CO4)

a) Linear motion b) Rotary motion

c) Heat generation d) Fluid flow control

Q.6 Nano-sensor are typically used in : (CO5)

a) Aerospace applications

b) Food industry

c) Nanotechnology and biotechnology applications

d) Automobile industry

## SECTION-B

**Note: Objective/Completion type questions. All questions are compulsory. (6x1=6)**

Q.7 Hall effect transducers are used for measuring _____. (CO1)

Q.8 The Venturi tube is a device used to measure _____. (CO3)

Q.9 Thermistors change their resistance with _____. (CO3)



Q.10 Piezoelectrc sensors are widely used to measure _____. (CO2)

Q.11 _____ sensors are used for proximity detection in industrial applications. (CO2)

Q.12 A float sensor measures _____ level in a tank. (CO3)

## SECTION-C

**Note: Short answer type Questions. Attempt any eight questions out of ten Questions. (8x4=32)**

Q.13 Differentiate between static and dynamic sensors with examples. (CO1)

Q.14 Explain the working principle of a capacitive proximity sensor. (CO2)

Q.15 Describe the structure and application of thermistors. (CO3)

Q.16 How does an orifice plate flow sensor work? (CO3)

Q.17 Compare and contrast diaphragm and capsule pressure sensors. (CO2)

Q.18 What are the main difference between an ultrasonic flow sensor and an electromagnetic flow sensor? (CO3)

Q.19 Explain the working of a hydraulic actuator. (CO4)

Q.20 Discuss the advantages of smart sensors in industrial applications. (CO5)