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# BRAINWARE UNIVERSITY



**Term End Examination 2025-2026**
**Programme – Dip.RA-2023**
**Course Name – Sensor and Actuator Devices for Robotics**
**Course Code - ECPC503**
**( Semester V )**

**Full Marks : 60** **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

## Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select, Sensor is a _______.

a) Subsystem b) Machine
c) Module d) All the above

(ii) Select, sensor effectiveness depends on ______ parameter.

a) Sensitivity b) Radiation
c) Restively d) All the above

(iii) Indicate, sensors convert signals from analog to _______ domain.

a) Digital b) Electrical
c) Mechanical d) Both a and b

(iv) Select, which of the following is a type of level sensor.

a) pH sensor b) Ultrasonic sensor
c) RTD d) Accelerometer

(v) Write the sensor which used to measure pressure.

a) Strain gauge b) Which of the following is an example of a contact-type sensor?
c) Piezoelectric sensor d) LVDT

(vi) Write an example of a passive sensor.

a) Ultrasonic sensor b) Capacitive sensor
c) Thermistor d) Piezoelectric sensor

(vii) Select an example of a strain gauge.

a) LVDT b) Load cell
c) Thermocouple d) Potentiometer

(viii) Select the primary function of a piezoelectric sensor.

a) Detecting pressure b) Measuring temperature
c) Measuring the angle of rotation d) Measuring deformation

(ix) Choose the sensors is used to detect the presence or absence of an object.

a) Pressure sensor
b) Temperature sensor
c) Proximity sensor
d) Accelerometer

(x) Choose the purpose of testing a sensor or transducer.

a) To ensure that it is properly calibrated
b) To verify that it is working correctly
c) To adjust its signal output
d) To improve its durability

(xi) Indicate, L293D is a/an ______________

a) Motor driver IC
b) Micro controller
c) Bluetooth module
d) IR receiver/transmitter

(xii) Long path optical measurement chooses __________

a) IR radiation
b) Ultraviolet radiation
c) Both IR and UV
d) None of the mentioned

(xiii) A _________ is connection between parts or links in a robot that develop motion.

a) Hinge
b) Joint
c) Dis joint
d) None of the mentioned

(xiv) Write the main function of an actuator in a robot.

a) Sensing environmental changes
b) Controlling data flow
c) Moving or controlling a mechanism
d) Storing electrical energy

(xv) Write the primary function of an accelerometer in a robotic system.

a) Measure temperature
b) Detect acceleration and tilt
c) Control rotational speed
d) Measure magnetic field



## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Describe sensors, and their working. (3)
3. Explain the difference between sensors and actuators. (3)
4. Describe the working principle of a thermistor. (3)
5. Describe servo control robots. (3)
6. Explain, how the inverse piezo effect works in micro actuators. (3)

**OR**

Explain the working principle of a piezoelectric sensor. (3)

## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the importance of proper sensor selection in a control system. (5)
8. Discuss the role of a controller in a feedback control system. (5)
9. What is the principle of gas thermometric sensors? Briefly explain aboutgas thermometric sensors. (5)
10. Describe relation between quartz crystal sensors and temperature sensors. Describe how is resonant frequency related to temperature. (5)
11. Discuss the piezoelectric effect and how it is used in micro sensors. (5)

12. Illustrate the factors to consider when selecting an actuator for a specific application. (5)

**OR**

Explain the Hall effect sensor, and how does it work. (5)

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