BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.RA-2022
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) Indicate, which of the following are examples of sensors?
   a) Tactile sensor b) MARG sensor
   c) Biosensor d) All the above

(iii) Write the application of Tactile sensors - _____.
   a) Elevator touch-sensitive buttons b) Smart mobile phones
   c) Cars d) Both a and b

(iv) Write, MARG sensor is also called as _____.
   a) AHRS b) BHRS
   c) AHHS d) ARRS

(v) Indicate, sensors convert signals from analog to _____ domain.
   a) Digital b) Electrical
   c) Mechanical d) Both a and b

(vi) Select, which of the following is a type of pressure sensor?
   a) Strain gauge b) pH sensor
   c) Temperature sensor d) Flow sensor

(vii) Select, which of the following is a type of flow sensor?
   a) Thermocouple b) Strain gauge
   c) pH sensor d) Turbine flow meter

(viii) Select, which of the following is a type of proximity sensor?

a) Photoelectric sensor
b) Strain gauge
c) Turbine flow meter
d) Accelerometer

(ix) 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

(x) Write transducer is used to convert force into electrical signals.

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

(xi) 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

(xii) Choose the principle of operation of a capacitive transducer.

a) Change in resistance
b) Change in capacitance
c) Change in inductance
d) Change in voltage

(xiii) Long path optical measurement chooses _____

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

(xiv) Describe the basic components of robot:

a) The mechanical linkage
b) Sensors and controllers
c) User interface and power conversion unit
d) All of the mentioned

(xv) 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

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. Discuss the main types of sensors. (3)
5. Explain about the different mechanisms used in rotary actuators. (3)
6. Write about precision and resolution of a sensor. (3)

OR

Write the principle of operation for a magnetic micro actuator. (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. Explain the mechanism of magnetic micro actuators and describe a real-world application where they are used. (5)

9. Discuss the piezoelectric effect and how it is used in micro sensors. (5)

10. Describe how a flow micro sensor operates and give an example of its use in industrial applications. (5)

11. Discuss the difference between position and speed micro sensors. Provide examples where each is used. (5)

12. Write the different types of flow sensors. (5)

OR

Write the different types of level sensors. (5)

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