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BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Tech.(ME)-2021/B.Tech.(ME)-2023

Course Name – Mechatronics

Course Code - PCC-ME602

(Semester VI)

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) A servo motor is a typical example of ____
 - a) Electronics system
 - b) Mechanical system
 - c) Computer system
 - d) Mechatronics system
- (ii) The function of an input signal conditioning unit is
 - a) To produce control signals
 - b) To amplify the signal and convert it into digital form
 - c) To perform mechanical work
 - d) To produce electrical signals
- (iii) The main function of Actuator is ____
 - a) To produce motion
 - b) Detect input
 - c) Detect output
 - d) Detect the state of the system
- (iv) The function of the data transmission element is ____
 - a) to transfer data from one element to another
 - b) to Modify the data
 - c) to process the data
 - d) to separate the signal hidden in the noise
- (v) Identify error that is also termed as measurement error
 - a) Static errors
 - b) Dynamic errors
 - c) Systematic errors
 - d) Statical error
- (vi) Identify that method that can reduce dynamic error
 - a) By increasing accuracy
 - b) By increasing precession
 - c) By reducing sensitivity
 - d) By reducing time lag
- (vii) Identify among the following that is not a dynamic characteristic
 - a) Precession
 - b) Measuring lag
 - c) Dynamic error
 - d) Fidelity
- (viii) Reading mechanism is available in
 - a) CD
 - b) Washing machine

- c) Digital camera
d) Camcorders

(ix) The chemical sensor in the washing machine is used
a) To count the quantity of detergent
b) To measure the amount of water
c) To measure the pH value of water
d) For Drying operations

(x) Select the following pins of a microcontroller are directly connected with 8255
a) WR
b) D0-D7
c) RD
d) All of the mentioned

(xi) LCALL instruction takes
a) 2 bytes
b) 4 bytes
c) 3 bytes
d) 1 byte

(xii) The type of systems which are characterized by input and the output quantized at certain levels are called as
a) analog
b) discrete
c) continuous
d) digital

(xiii) A time invariant system is a system whose output
a) increases with a delay in input
b) decreases with a delay in input
c) remains same with a delay in input
d) vanishes with a delay in input

(xiv) Choose the following places that would be LEAST likely to include operational robots
a) warehouse
b) factory
c) hospitals
d) private homes

(xv) LVDT is a
a) capacitive transducer
b) resistive transducer
c) inductive transducer
d) none of them.

Group-B

(Short Answer Type Questions)

$$3 \times 5 = 15$$

2. Explain briefly about Thermocouple. (3)
3. Describe the key elements of a mechatronics system. (3)
4. Explain how the I/O process is managed in a computing or control system. (3)
5. Compare open loop and closed loop control system. (3)
6. Compare microprocessor and microcontroller. (3)

OR

Illustrate various features of 8051 microcontroller.

(3)

Group-C

(Long Answer Type Questions)

$$5 \times 6 = 30$$

7. Develop the architecture of 8051 microcontroller using a block diagram. (5)
8. Explain the difference between zeroth, first, and second-order systems. (5)
9. Explain the addressing mode of 8051 microcontroller. (5)

10. Write about Pneumatic sysem with proper block diagram. (5)
11. Explain about open loop and closed loop system. (5)
12. Explain the components of a mechatronics system with block diagram. (5)

OR

- Mathemetically evaluate the transfer function of a closed loop system. (5)
