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BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.RA-2023
Course Name – Mechatronics
Course Code - ECOE501A
(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) A servo motor is a typical example of _____

a) Electronics system
b) Mechanical system
c) Computer system
d) Mechatronics system

(ii) Analyze 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) Example of 'Stand-alonesystem' is _____

a) Machining centres
b) Washing machine
c) Robots for parts handling
d) Automated inspection stations

(v) Choose the following carry out the overall control of a system is

a) Graphical display
b) Sensors
c) Actuators
d) Digital controls

(vi) Transducers are

a) They convert power from one form to another
b) They convert work from one form to another
c) They convert work to power
d) They convert energy from one form to another

(vii) Identify the type of energy conversion does a piezoelectric transducer perform

a) It converts mechanical energy to sound energy
b) It converts sound energy to mechanical energy
c) It converts mechanical energy to electrical energy
d) It converts electrical energy to mechanical energy

(viii) Pirani Gauge is an example of _________ type of transducer

a) Pressure transducer
b) Temperature transducer
c) Light transducer
d) Mechanical transducer

(ix) Identify the range of frequency of the waves produced by the Ultrasonic transducer

a) 20 Kilohertz to several Gigahertz
b) 1 Kilohertz to several Gigahertz
c) 40 Kilohertz to several Megahertz
d) less than 20 Kilohertz

(x) Illustrate the full form of LVDT with respect to displacement transducer

a) Linear variable differential temperature
b) Linear variable differential transformer
c) Liquid visible differential transformer
d) Liquified visible differential transformer

(xi) The applications of PLC in mechatronics are

a) Timing, counting, logic, arithmetic and sequencing
b) Storing data
c) Managing, commanding and directing
d) Processing

(xii) The main of DAS (data acquisition system) is

a) Storing data
b) It converts analog to digital data
c) It converts digital to analog data
d) Processes the data

(xiii) Reading mechanism is available in

a) CD
b) Washing machine
c) Digital camera
d) Camcorders

(xiv) 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

(xv) Identify the following should a microcontroller at-least consist of

a) CPU, ROM, I/O ports, and timers
b) RAM, ROM, I/O ports, and timers
c) CPU, RAM, I/O ports, and timers
d) CPU, RAM, ROM, I/O ports, and timers

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define Mechatronics. (3)
3. Explain the features of Servo-mechanism. (3)

4. List the characteristics and features of microprocessor. (3)

5. Define Real Time Interface. (3)

6. Explain AI in the context of mechatronics and give some applications of AI in mechatronics. (3)

OR

Explain types of microsensors are commonly used in mechatronics applications. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain about force current analogy. (5)

8. Explain Special Function Register in 8051 microcontroller. (5)

9. Explain the purposes of Data Acquisition System. (5)

10. How can system modeling and simulation reduce Mechatronics costs and risks? (5)

11. Explain the different types of I/O operations. (5)

12. Explain force voltage analogy. (5)

OR

Explain about the measurement system with an practical example. (5)

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