BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – Dip.RA-2022
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) Choose the following carry out the overall control of a system is
a) Graphical display b) Sensors
c) Actuators d) Digital controls

(iv) Select the feedback generated by sensors in a mechatronics system is
a) Input sensors b) Comparators
c) Mechanical actuators d) Output sensors

(v) Prototyping involves ____
a) Conceptual design b) Replacing non-computer systems with actual hardware
c) Database for maintaining project information d) Sub models for eventual reuse

(vi) The light emitting diodes are used as a/an ____
a) intelligence b) display
c) transducer d) sensor

(vii) The largest value for which the instrument output remains zero is ____
a) hysteresis error b) resolution

c) sensitivity
d) dead zone

(viii) Analyze the effect on properties of LDR when light falls on it

a) Its resistance remains same
b) Its resistance changes
c) Its capacitance changes
d) Its inductance changes

(ix) Select the nature of resistance to light intensity graph of an LDR (Light dependent resistor) is

a) Increasing
b) Decreasing
c) Parabolic
d) Constant

(x) In capacitive sensors the displacement is measured with respect to change in which internal factor of the sensor?

a) Capacitance
b) Resistance
c) Inductance
d) Effervescence

(xi) Capacitive transducers can be used by _____

a) Measuring change in distance between plates
b) Measuring change in area of plates
c) Change in a dielectric material
d) All of the mentioned

(xii) For a material capacitance increases with _____

a) Decrease in area of plates, all other factors constant
b) Increase in distance between plates, all other factors constant
c) Decrease in distance between plates, all other factors constant
d) None of the mentioned

(xiii) The 8255 is a _____ chip.

a) Digital to analog
b) Input/Output
c) Analog to Digital
d) None of the mentioned

(xiv) "DJNZ R0, label" is _____ byte instruction.

a) 2
b) 3
c) 1
d) Can't be determined

(xv) Select when we add two numbers the destination address must always be.

a) some immediate data
b) any register
c) accumulator
d) memory

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define Mechatronics. (3)
3. Describe the key elements of a mechatronics system. (3)
4. Express the working principle of hydraulic system. (3)

5. Explain how the I/O process is managed in a computing or control system. (3)

6. Briefly explain different unconditional jump instructions of 8051. (3)

OR

Compare MOVX and MOVC instructions. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Explain force voltage analogy. (5)

8. Illustrate the classification of transducers. (5)

9. Explain the addressing mode of 8051 microcontroller. (5)

10. Explain, the Challenges and Future Trends in Mechatronics and Automation. (5)

11. Explain advantages and disadvantages of using fluid power via a hydraulic system. (5)

12. Write some of the challenges faced in implementing a Mechatronics system in a manufacturing setting and how can they be addressed. (5)

OR

Give some examples of successful implementations of Mechatronics systems in manufacturing, and what benefits have they provided. (5)

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