

CBCS SCHEME

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18EI731

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Mechatronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What do you mean by sequential control? Illustrate your answer with an example. (10 Marks)
b. Briefly explain various stages of the design process in mechatronics. (10 Marks)

OR

- 2 a. With necessary diagrams, describe the four stroke sequence of an engine management system. (08 Marks)
b. Distinguish between open loop and close loop systems. (04 Marks)
c. Explain the operation of various proximity switches. (08 Marks)

Module-2

- 3 a. Briefly describe the construction and working of a hydraulic system. (08 Marks)
b. Describe the construction and working of various air compressors. (12 Marks)

OR

- 4 a. Describe the construction and working of the following directional control valves:
i) The spool valve ii) The poppet valve. (10 Marks)
b. Describe the working of two basic forms of kinematic chains. (10 Marks)

Module-3

- 5 a. With neat diagrams, explain the construction and working of a brushed DC motor. (10 Marks)
b. What is a stepper motor? List and explain the various types of stepper motors. (10 Marks)

OR

- 6 a. Explain the concepts of Emulation and Simulation. (05 Marks)
b. Explain how faults can be found in microprocessor-based systems with the help of following techniques and devices:
i) Logic probe ii) Logic pulser iii) Logic dip iv) Logic analyser. (08 Marks)
c. List and discuss the various types of parity and error coding checks. (07 Marks)

Module-4

- 7 a. With a neat block diagram, explain the interfacing of solenoids with a microcontroller. (10 Marks)
b. With a neat block diagram, explain the method of interfacing permanent magnet motors with a microcontroller using relay. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 a. With a neat diagram, explain the interfacing of following sensors with a microcontroller:
i) Diode/phototransistor pair ii) Photoreflector sensor. **(08 Marks)**
- b. Draw the reliability 'bath tub' life curve of a product and discuss its 3 phases of life. **(06 Marks)**
- c. Develop a model for reliability of a combination system. **(06 Marks)**

Module-5

- 9 a. Discuss various principles of validation scheme. **(12 Marks)**
- b. With neat diagram, explain various types of component of machine control system. **(08 Marks)**

OR

- 10 a. What is a Robot? With a neat schematic explain the various types of Robots. **(10 Marks)**
- b. Design the control architecture of the Drilling Machine by adopting DCS philosophy and by implementing fieldbus technology. **(10 Marks)**

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