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15ME753

Seventh Semester B.E. Degree Examination, July/August 2022 Mechatronics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define Mechatronics. Briefly enumerate the evolution stages of mechatronics. (08 Marks)
- b. List the advantages of mechatronics systems. (04 Marks)
- c. Differentiate between the following:
 - (i) Primary and Secondary transducers.
 - (ii) Active and Passive transducers. (04 Marks)

OR

- 2 a. With a neat sketch, explain the working principle of Eddy current type proximity sensor and photoelectric type proximity sensor. (10 Marks)
- b. Explain the principle of operation of Hall Effect Sensor. (06 Marks)

Module-2

- 3 a. What are microcontrollers? Differentiate clearly between microprocessor and microcontroller. (08 Marks)
- b. What do you mean by 'Bus'? With block diagram, explain the different types of Bus used in 8085 micro processor. (08 Marks)

OR

- 4 a. Explain with block diagram, the architecture of Intel's 8085A microprocessor. (10 Marks)
- b. What are Interrupts? With block diagram, explain how an interrupt signal communicates with the microprocessor. (06 Marks)

Module-3

- 5 a. Briefly explain the basic architecture of a PLC. (08 Marks)
- b. List the criteria's needed for the selection of a PLC. (04 Marks)
- c. Briefly explain how a latching circuit works. (04 Marks)

OR

- 6 a. What is the meaning of integration? Highlight some of the features, which a real-time mechatronic control system should satisfy. (08 Marks)
- b. Explain the role of sensors in an industrial robot. Briefly explain its classification of Robot sensors. (08 Marks)

Module-4

- 7 a. What are Cams? With sketches, explain the various types of Cam followers. (06 Marks)
- b. Write a note on Belt drive system. Also explain the types of belts. (06 Marks)
- c. With sketch, explain Ratchet and Pawl mechanism. (04 Marks)

OR

- 8 a. List and explain the stepper motor specifications. (08 Marks)
b. Explain the characteristics curve of a diode. (04 Marks)
c. Explain the principle of operation of a Relay. (04 Marks)

Module-5

- 9 a. With a block diagram, explain the various components and their functions of a typical hydraulic system. (06 Marks)
b. What are directional control valves? Explain with sketches sliding spool valve and poppet valve. (10 Marks)

OR

- 10 a. What is the basic principle of operation of a Flow Control Valves? With sketches, explain needle valve and globe valve. (10 Marks)
b. With sketch, explain how the single acting cylinder is controlled. (06 Marks)

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