

CBCS SCHEME

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17ME753

Seventh Semester B.E. Degree Examination, July/August 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. Briefly explain the multidisciplinary scenario leading to the development of mechatronics with a schematic representative. (10 Marks)
- b. Enumerate the stages through which the mechatronics discipline has evolved. (06 Marks)
- c. List the applications of mechatronics. (04 Marks)

OR

- 2 a. Differentiate between the following:
 - (i) Active and passive transducer.
 - (ii) Primary and secondary transducer. (04 Marks)
- b. What are proximity sensors? Illustrate with sketches the working principle of,
 - (i) Eddy current type proximity sensor. (10 Marks)
 - (ii) Proximity switches. (06 Marks)
- c. Define photoelectric effect? Explain photoconductive light sensors. (06 Marks)

Module-2

- 3 a. What is a Flag register? Explain the various types of flags present. Explain with an example. (08 Marks)
- b. What are interrupt signal? Explain with a block diagram how the microprocessor handler the interrupt signal? (07 Marks)
- c. Briefly explain the basic elements of a microprocessor based control system. (05 Marks)

OR

- 4 a. What is the significance of a "BUS" in a microprocessor? With block diagram, explain various types of Bus in a 8085 microprocessor. (08 Marks)
- b. Explain the following (with block diagram, wherever necessary) :
 - (i) Fetch cycle.
 - (ii) Input / Output Buffer register.
 - (iii) Instruction Register.
 - (iv) Assembler. (12 Marks)

Module-3

- 5 a. What are programmable logic controllers? Briefly explain the structure of a PLC. (07 Marks)
- b. Explain the concept of a Ladder diagram, represent schematically. (07 Marks)
- c. What is integration? Explain the various features that the mechatronics system should satisfy for integration purpose. (06 Marks)

OR

- 6 a. Write a note on the paradigm shift from a standard actuator to an advanced actuator. (06 Marks)
- b. Briefly explain any three types of Robotic Sensors. (06 Marks)
- c. What are End Effectors? Explain briefly the various forms of End Effectors. (08 Marks)

Module-4

- 7 a. Briefly explain with sketches, the various types of Cams and Cam followers. (10 Marks)
b. Explain with a sketch the working principle of 'Ratchet and Pawl' mechanism. (05 Marks)
c. List and explain the various types of Belts. (05 Marks)

OR

- 8 a. With their schematic structure and symbol, explain the following:
(i) Diodes
(ii) Traics.
Also explain their V-I characteristics. (10 Marks)
b. What are Relays? Explain various types of relays. (05 Marks)
c. List the specifications of a stepper motor. (05 Marks)

Module-5

- 9 a. Briefly enumerate with sketch, the elements of a typical hydraulic actuation system. (06 Marks)
b. What are direction control valves? With sketches, explain the sliding spool valve and poppet valve. (10 Marks)
c. Differentiate clearly between single acting cylinder and double acting cylinder with sketches. (04 Marks)

OR

- 10 a. With a neat sketch, explain how to control a double acting cylinder. (06 Marks)
b. Explain the basic principle of flow control valves. With sketch explain needle valve. (08 Marks)
c. Briefly explain with sketch, the working principle of pressure relief valve. (06 Marks)

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