CBCS SCHEME

CF34

USN ☐☐☐☐☐☐☐☐☐☐ **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.
      (ii)   Proximity switches. **(10 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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