USN

18ME744

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Mechatronics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1   a. Define Mechatronics. Explain with block diagram, the basic elements of feedback control system. **(10 Marks)**
     b. What is a sequential controller? Explain with neat block diagram, the working of an automated washing machine. **(10 Marks)**

OR

2   a. Explain the working principle of hall effect sensor. Discuss how a hall effect sensor is used in fluid level detector. **(10 Marks)**
     b. How does the following work : (i) Photo diode (ii) Photo transistor (iii) Photo resistor. **(06 Marks)**
     c. Explain how an Eddy current proximity sensor works. **(04 Marks)**

Module-2

3   a. Explain with neat sketch the working of a 741 op amp. **(05 Marks)**
     b. Explain the signal conditioning process. **(07 Marks)**
     c. What is a filter? How are filters classified? Write brief note on types of filters. **(08 Marks)**

OR

4   a. What is a relay? Explain different types of electromagnetic relays and its working with circuit symbol. **(06 Marks)**
     b. With neat block diagram, explain how speed control in DC motors is achieved. **(06 Marks)**
     c. Explain the working of variable reluctance stepper motor with neat sketch. **(08 Marks)**

Module-3

5   a. Differentiate between microprocessor and a microcontroller. **(05 Marks)**
     b. Explain briefly the following forms of memory units :
     ROM ; PROM ; EPROM ; EEPROM ; RAM **(10 Marks)**
     c. Explain basic elements of a control system with neat sketch. **(05 Marks)**

OR

6   a. Explain with neat layout the internal architecture of INTEL 8085A microprocessor. **(10 Marks)**
     b. Write short notes on "BUS" related to 8085 microprocessor. **(05 Marks)**
     c. How does a program counter work? **(05 Marks)**

Module-4

7   a. Explain in detail the criteria used for selection of a PLC. **(10 Marks)**
     b. What is a PLC? Explain the basic structure of PLC with block diagram. **(10 Marks)**

OR

8 a. Design a pneumatic circuit for the sequence A+ B+ A- B- and write a ladder program for the same. **(10 Marks)**

   b. Explain with ladder program a Latch circuit and an internal relay. **(10 Marks)**

Module-5

9 a. Differentiate between ball screw and roller screw. **(05 Marks)**

   b. Discuss a traditional and mechatronics design concepts. **(05 Marks)**

   c. Explain the working of hydrostatic bearing with neat sketch. **(10 Marks)**

OR

10 a. Explain any two most commonly used antifriction guideways in CNC machines. **(10 Marks)**

   b. Design a mechatronic system for automatic car park barrier. **(10 Marks)**

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