Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 53318

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Mechanical Engineering

ME 6702 — MECHATRONICS

(Regulation 2013)

(Common to Manufacturing Engineering/Mechanical and Automation Engineering/Production Engineering)

(Also Common to : PTME 6702 – Mechatronics for B.E. (Part-Time) – Fifth Semester – Mechanical Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Classify the mechatronics systems.

2. What are the various elements in the Mechatronics system?

3. Write any two single byte instructions to clear the accumulator in 8085 microprocessor.

4. What are the features of 8051 Microcontroller?

5. List the need of data converters.

6. Write the working principle of stepper motor.

7. Draw the ladder diagram of latching in PLC.

8. What criteria should be considered while selecting PLC?

9. Mention the applications of servo motor.

10. What are the steps involved in the Mechatronics system design process.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the design consideration and steps involved in Mechatronics system development. (13)

Or

(b) Explain the working principle of hall effect sensor and its applications. (13)

12. (a) Draw and explain the architecture of 8085 Microprocessor and explain each blocks. (13)

Or

(b) Draw the timing diagram for the instruction IN 02. Opcode for IN is 'DB'. (13)

13. (a) Explain how 8085 microprocessor can be used to display a four digit number in seven segment LEDs with minimum power. (13)

Or

(b) Describe the general structure of ADC and explain the working of weighted resistor and R — 2R D/A convertors. (13)

14. (a) (i) Sketch and explain the architecture of a PLC. (8)

(ii) How PLC can be used for data handling operation? (5)

Or

(b) Explain in detail, how the timer and counter operations are carried out in PLC. (13)

15. (a) Explain the mechatronics involved in an Automatic car park barrier with suitable diagram. (13)

Or

(b) Explain the mechatronics involved in a car engine management system with block diagram. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Design a Mechatronics control for an escalator for moving people between two floors in a building. The escalator should stop if there are no people travelling for more than two minutes. It should start when people approach it. Discuss the sensors and other precautions to be taken. (15)

Or

(b) Design and explain the Mechatronics control for a Pick and place robot to transport parts between a conveyor and a CNC machine table. Also discuss the precautions to be taken during the transfer. (15)

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