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J 3332

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Sixth Semester

Mechatronics Engineering

MH 1352 — MICRO CONTROLLER AND PLC

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the function of $\overline{EA}$ pin in 8051?

2. What is the function of ITX bit in TCON register of 8051?

3. Write a software delay program to create a time delay of 100 μs in 8051 if a 12 MHz crystal is used.

4. Write the expression for baud rate in mode 1 operation of serial port in 8051.

5. What do you mean by debouncing?

6. Define conversion time in ADC.

7. Write the difference between discrete I/O module and analog I/O module in a PLC.

8. What is meant by seal-in contact in a PLC? Give an example.

9. What is cascade counter?

10. List out the PLC control instructions.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the architecture of 8051 microcontroller with neat functional diagram. (10)

(ii) Explain the various interrupts in 8051. (6)

Or

(b) Write about the four modes of timer operations with the control registers used in 8051. (16)

12. (a) Design a 8051 based system with 8K bytes of program ROM and 8K bytes of data ROM. (16)

Or

(b) (i) Explain briefly the timing subroutine in 8051. (8)

(ii) Write the steps involved in serial port programming to transfer character bytes serially. (8)

13. (a) Draw the flow chart and write 8051 program to identify the key pressed in the 4×4 matrix keyboard that is interfaced with 8051 and display the key number in Port 0. (16)

Or

(b) Draw the interfacing diagram to interface an 8-bit DAC with 8051 and write 8051 program to generate a sine wave of 2 KHz having a peak to peak value of 10 Volts. (16)

14. (a) Explain the principle of operation and components of PLC with block diagram. (16)

Or

(b) (i) Describe the working principle of any one type of proximity switch and mention its application. (8)

(ii) Explain the development of PLC ladder diagram for a simple process with an example. (8)

15. (a) (i) Explain the principle of operation of non-retentive OFF delay timer with an example. (8)

(ii) Describe the function of any three math instructions in a PLC. (8)

Or

(b) Explain the application of PLC in automatic control of warehouse door with necessary diagrams. (16)
