Roll No. ..... Total Pages : 03

BT-7/D-19 37012

MICROCONTROLLERS

ECE-415E (Opt.-2)

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What is Microcontroller ? Explain with an example. What are the minimum structural units and devices needed in a microcontroller ? Why is it important for a microcontroller to have a CPU ? **12**

(b) Discuss the different applications of microcontrollers. **8**

2. Discuss the various features, examples and uses of 4-bit, 8-bit, 16-bit, 32-bit microcontrollers. **20**

Unit II

3. Design architectural block diagram and explain various features of 8051 microcontroller. **20**

4. What are the need and uses of timers in microcontrollers ? Explain, how a timer works. Describe the operating modes of timers of 8051 and its associated registers. **20**

Unit III

5. (a) Discuss the need and uses of interrupts in the microcontrollers. Explain the meaning of each bit of IE and IP registers in 8051 MC. **10**

(b) Write instructions to :

(i) Enable Timer 0 and External Interrupt 1.

(ii) Disable external interrupt 0.

(iii) Disable and enable all interrupt using single instruction.

(iv) Program the IP register to assign the highest priority to TF0 and then discuss what happens if INT0, INT1 and TF0 are activated at the same time ? http://www.kuonline.in **10**

6. (a) Write a program to toggle all the bits of P1 every 200 ms. Find the size of time delay for the delay subroutine. Assume that the crystal frequency is 11.0592 MHz for an 8051 system. **10**

(b) Describe different types of data transfer instructions in 8051 MC. Explain the difference between MOV, MOVC, MOVX instructions. **10**

Unit IV

7. Explain in detail the operation of various serial data communication modes i.e., mode 0, mode 1, mode 2 and mode 3 of 8051 MC. **20**

8. Design a system which contains a 16-key matrix keyboard and 8 LEDS interfaced with 8051. Develop a program to detect the key press (key closure) and key identification. The binary code of the pressed key should be displayed on LEDs. **20**