USN | | | | | | | | | | 10ES42

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Microcontrollers

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Differentiate between a microprocessor and a microcontroller. **(06 Marks)**
   b. With the neat sketch of 8051 architecture, explain the CPU registers. **(08 Marks)**
   c. With the help of timing diagram, explain how to interface 8K EPROM and 4K RAM to 8051. **(06 Marks)**

2 a. Write a program to swap the contents of Registers R_7 and R_6 in register block 0, in four different ways. **(06 Marks)**
   b. List bit level logical instructions and their operation in 8051. **(08 Marks)**
   c. Explain different ranges for Jump instruction available in 8051 microcontroller. **(06 Marks)**

3 a. Write a program to exchange the lower nibble of data present in external memory 6000H and 6001H. **(06 Marks)**
   b. An 8-bit code word is stored in location 1000H of external data memory. Code word is valid, if three MSB's are zero and it contains two ones in the remaining five bits. If code word is valid, store FF, else store OO in 1001H. **(08 Marks)**
   c. Write a program to blink the LED's alternatively connected to port 0 with a delay of 1 mS. Assume XTAL = 12 MHz. **(06 Marks)**

4 a. Write the circuit diagram for port 0, explain the operations of 8051 using port 0. **(06 Marks)**
   b. Show a simple keyboard interface with port of 8051 and explain its operation. **(08 Marks)**
   c. Write a program to rotate a stepper motor 64° in the clockwise direction. The motor has a step angle of 2°. **(06 Marks)**

PART – B

5 a. Explain IE and IP registers with its bit pattern. **(06 Marks)**
   b. Explain different modes of operation of timer/counter of 8051 with relevant block diagram and steps to program the modes. **(08 Marks)**
   c. Write an Assembly (or) C-program to generate a frequency of 100 Hz square wave, using timer 0 in mode-1. Assume crystal frequency = 11.0592 MHz (Assume any pin number). **(06 Marks)**

6 a. Write an 8051 program to send the message of "SAVE POWER" to the serial port continuously. Assume XTAL = 11.0592 MHz, 9600 baud rate, 8-bit data and one stop bit. **(06 Marks)**
   b. Explain RS-232 hand shaking signals and specify the purpose of Max – 232 while interfacing. **(08 Marks)**
   c. Explain the control word of 8255A. **(06 Marks)**

7 a. Briefly discuss the features of MSP 430 microcontrollers. **(06 Marks)**
   b. Explain different addressing modes of MSP 430 with examples. **(08 Marks)**
   c. Write a MSP430 assembly program to find the largest in the given array of 'n' bytes. **(06 Marks)**

8   Write short note on with respect to MSP430:
   a. Watch dog timer.
   b. Real Time Clock (RTC).
   c. Significance of Gate in Tmode Register of 8051.
   d. Internal RAM structure of 8051. **(20 Marks)**

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