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10ES42

Fourth Semester B.E. Degree Examination, June/July 2017
Microcontrollers

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Give comparison between microprocessor and microcontroller. **(06 Marks)**

b. Explain with neat diagram, Harvard architecture and Van-Neumann architecture. **(06 Marks)**

c. With the help of block diagram, list the specific features of 8051 microcontroller. **(08 Marks)**

2 a. Explain the following instructions with suitable examples:
i) MOVX A, @dptr ii) ACALL Target iii) DJNZ R1, up **(06 Marks)**

b. Differentiate between jump and CALL instructions. **(06 Marks)**

c. Write an assembly language program with comments using 8051 mnemonics to convert ASCII to hexadecimal. **(08 Marks)**

3 a. Briefly explain the different assembler directives used in an assembly language program. **(04 Marks)**

b. Write an ALP to find the number of negative and positive numbers in a given array of ten bytes of data. The number is available from memory location 8000 h. **(08 Marks)**

c. Write an 8051 software time delay subroutine to generate a time delay of 1 second when called. Assume crystal frequency as 11.0592 MHz. Show delay calculations. Do not use timers? **(08 Marks)**

4 a. Explain with a diagram, how the DAC 0808 can be interfaced to 8051 microcontroller. Write an 8051 C program to create the triangular wave. **(10 Marks)**

b. With a neat diagram show how a stepper motor is interfaced to 8051. Write a program to rotate it continuously. **(10 Marks)**

PART – B

5 a. Differentiate between a counter and timer. Explain the timer modes of operation in 8051. **(04 Marks)**

b. Assuming that XTAL = 11.0592 MHz, write a program to generate a square wave of 2 kHz frequency on pin P1.5. Use timer 1 and mode 1 operation. Duty cycle = 50%. **(08 Marks)**

c. Explain TMOD and TCON registers with its bit pattern. **(08 Marks)**

6 a. Explain briefly the interrupts of 8051, indicate their vector addresses. **(05 Marks)**

b. Explain the format of SCON register in details. **(05 Marks)**

c. Write a program with proper comments to transfer the message "YES" serially at 9600 baud rate, 8 bit data, 1 stop bit. Do this continuously. **(10 Marks)**

7 a. Write the steps required for programming 8051 to receive data serially. **(08 Marks)**

b. With a block schematic, explain the features of 8255 PPI chip and its mode of operation. **(06 Marks)**

c. What is the need for serial communication? Explain half duplex and full duplex transmission. **(06 Marks)**

8 a. Explain the architecture of MSP 430 CPU with its internal block schematic. **(10 Marks)**

b. Mention the features and functions of the watch-dog timer and explain. **(10 Marks)**

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