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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