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**Fourth Semester B.E. Degree Examination, Dec.2013/Jan.2014**  
**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 RISC and CISC processor. (06 Marks)  
b. With a neat format explain various fields of PSW of 8051. (06 Marks)  
c. With a neat diagram show interface of 8KB external EPROM and 16 KB external RAM to 8051 microcontroller. (08 Marks)
- 2 a. Explain various addressing modes of 8051 with examples. (08 Marks)  
b. Explain the various bit level instructions of 8051. (06 Marks)  
c. Write an 8051 assembly program to find average of five numbers stored starting from internal data memory address 40 H. (06 Marks)
- 3 a. Explain the sequence of events in 8051 when subroutine call and return is encountered. (06 Marks)  
b. Explain the effect on execution of following instructions:  
i) CJNE A, #n, raddr    ii) SWAP A    iii) PUSH addr    iv) DA A (08 Marks)  
c. Write a program to count number of even and odd numbers in an array of 10 numbers. (06 Marks)
- 4 a. Explain the various factors that affect delay in 8051 C. (06 Marks)  
b. Write an 8051 C program to toggle bits of Port 2 with an arbitrary delay between each toggle. Use logical operator for delay. (06 Marks)  
c. What is a checksum byte? How is checksum byte generated? Write an 8051C program to generate a checksum byte for an array of 5 nos. (08 Marks)

**PART – B**

- 5 a. Explain the various fields of TMOD SFR. Write the initialization required to configure Timer1 to operate in 8-bit autoreload mode. (06 Marks)  
b. Write an assembly program in 8051 to generate square wave on P1.0 of 2 kHz. Use Timer1 mode 1. Take crystal frequency = 11.0592 MHz. (08 Marks)  
c. Assuming that XTAL = 16 MHz indicate when TF flag is raised for the following program: (06 Marks)
  - i) MOV TMOD, #01  
MOV TLO, #12h  
MOV TH0, #1Ch  
SETB TRO
  - ii) MOV TMOD, #20h  
MOV TH1, # -92  
SETB TR1
- 6 a. Explain with neat sketch the connection of 8051 to RS232 using MAX 232. (06 Marks)  
b. Write the steps involved to program 8051 to transmit data serially. (06 Marks)  
c. Explain how baud rate can be doubled? Write a 8051C program to transmit message "Hello" at a baud rate of 9600 if switch connected at P1.0 = 0 and transmit message at baud rate of 19200 if switch connected at P1.0 = 1. (08 Marks)

- 7 a. Explain the sequence of events on occurrence of an interrupt in 8051. (06 Marks)  
b. Explain the various fields of IE-SFR. Write the initialization sequence required to enable external interrupt  $\overline{\text{INT1}}$ , Timer 0 overflow interrupt TFO. (06 Marks)  
c. Write a 8051C program that continuously reads single bit of data from P2.7 and sends to P1.0, while simultaneously generating a square wave of 200  $\mu\text{s}$  on P2.5. Use Timer 0 to generate square wave. (08 Marks)
- 8 a. With a neat sketch, show interface of 8051 to LCD interface. Write a program in 8051 C to display a message "VTU2011" on LCD interface. Explain the commands used. (10 Marks)  
b. With a neat sketch show interface of 8051 to DAC 0808. Write an 8051 C program to generate sine wave using DAC interface. (10 Marks)

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