T.E. Sem VI (REV) (EXTC) - November 2006 - Microcontrollers & Embedded programming

on. 4887-06. (REVISED COURSE) YM-7162

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. 1 is **compulsory**.
(2) Sove any **four** from remaining **six** questions.

1. (a) Explain the clock timings of 8051 in detail. Also justify the choice of resonator for the clock generation. Give and explain the formula for calculating instruction cycle time for 8051. 10
   (b) Explain in detail operation of the following instructions. 10
      (i) BMOVI
      (ii) DIVUB
      (iii) JNH
      (iv) LDBSE
      (v) NORML.

2. (a) Explain in detail SFRs used for controlling the timer operation of 8051 microcontroller. 12
   (b) Explain the various modes of operation of serial port in 8051. 8

3. (a) Explain the working of port 0,1,2 & 3 in detail for 8051 microcontroller. 16
   (b) After the execution of the following program what will be the contents of R3. 4

```
        MOV   R3, # 00H
        MOV   R1, # 02H
        MOV   R2, # 04H
UP :    INC   03H
        DJN2  R2,UP
        DJN2  R1,UP
HERE :  SJMP  HERE
```

4. (a) Explain the working of PWM black and write a program to generate a waveform having 60% duty cycle. 8
   (b) Explain the significance of following pins of 80C196. 12
      (i) $\overline{\text{RESET}}$
      (ii) $\overline{\text{BUSWIDTH}}$
      (iii) $\overline{\text{INST}}$
      (iv) EA
      (v) READY
      (vi) T2CAP.

5. (a) Write short notes on : 20
      (i) Timers of 80C196KB
      (ii) High speed input unit
      (iii) High speed output unit
      (iv) A to D converter.

6. (a) Justify the choice of microcontroller as against that of microprocessor for the developement of 'embedded system'. 10
   (b) What are semaphores ? Explain their types and ways in which they are used to protect shared data. 10

7. With reference to real time embedded software, explain the following :— 20
   (i) Event driven I/O
   (ii) Context switching
   (iii) CPU Loads
   (iv) Pre-Emptive and Non-Preemptive Multi-tasking.