

END SEMESTER EXAMINATIONS, November /December 2011.
IV semester , BE (Full Time) Electrical and Electronics Engineering
ANNA UNIVERSITY, CHENNAI

Time : 3 Hours

EE9252 Microprocessors and Microcontrollers

Max Marks :100

Answer ALL Questions

Part-A

10 x 2 = 20

1. Define bit, byte, word and instruction.
2. How many data lines are necessary in a 16 bit microprocessor and what is the magnitude of the largest number that can be placed on the data bus..
3. Assume that memory location 2075H has a data byte 57H. Specify the contents of the address bus $A_{15}-A_8$ and the multiplexed bus AD_7-AD_0 when the MPU reads that location. Specify the contents of the program counter when the MPU is reading location 2075H.
4. What happens when (i) RET instruction at the end of the subroutine is executed and (ii) POP H instruction is executed.
5. How does the microprocessor communicate and transfer data with the peripherals?
6. What is meant by maximum and minimum modes of operation of 8086 microprocessor?
7. Why is a microcontroller also called Microcomputer?
8. What are the hardware assigned default priorities in various interrupt sources of 8051?
9. How Timer 0 can be used as a counter of external events in an 8051 microcontroller?
10. In a 8051 microcontroller how Ports A and B can be programmed for the Programmed I/O transfer?.

PART – B

5 x 16=80

11. (i) Draw the block diagram and explain the features of 8085 microprocessor (8)
(ii) Explain the functions of ALE and $\overline{IO/\overline{M}}$ signals of 8085 microprocessor (4)
(iii) List the sequence of events that occurs when the 8085 MPU reads from memory (4).
- 12.(a) (i) Draw the 8085 timing diagram for the execution of the instruction MVI A,32H. (8)
(ii) Read the following instructions and specify the register contents and the status of S,Z and CY flags after the execution of each instruction. (Assume all flags are cleared initially) (8)

MVI A, 00 H
ORA A
SUI 01 H
HLT

(OR)

- 12.(b)(i) List the four categories of 8085 instructions that manipulate data. Explain the operation of any two instructions under each category with suitable examples. (12)
- (ii) Write the machine code for the instruction MOV H,A if the opcode= 01, the register code for H = 100_2 and the register code A = 111_2 (4)

13(a) (i) Write a program to generate a square wave with period $400\mu\text{s}$. Use the data bit D_1 to output the square wave. The system clock period is $0.33\mu\text{s}$. (8)

(ii) Write a subroutine to multiply two unsigned numbers placed in registers H and L and then return the result into HL pair. (8)

(OR)

13(b) (i) Draw and explain the functional block diagram of 8253 (8)

(ii) List the major components of 8259A interrupt controller and explain their functions. (8)

14(a) Briefly explain the following with reference to MCS51

- (i) Special Peripheral functions
- (ii) Memory map
- (iii) Program status word
- (iv) Fetch and execute sequences

(OR)

14.(b)(i) Explain in detail about the programmable timers available in MCS51. (10)

(ii) A timer is of 8 bits. It is programmed to receive internal pulses at the rate of $4\mu\text{s}$. What should be the pre loaded count so that it generates overflow interrupt after $100\mu\text{s}$. If the internal clock pulses are at the rate of $1\mu\text{s}$, what should be the pre scaling factor?. (6)

15.(a) Develop a block diagram and explain the control of DC motor current and direction using the internal PWM in an MCU.

(OR)

15.(b) Explain how a four pole stepper motor can be interfaced to an MCU. Draw the interface diagram and write a program to move the stepper motor one step at each instance using 8051 Instructions.