B.E./ B.Tech (Full Time) Degree End Semester Examinations, OCT/ NOV 2013

ELECTRICAL & ELECTRONICS ENGINEERING,

Fourth Semester – (Regulation 2008)

EE 9252 MICROPROCESSORS AND MICRO CONTROLLERS

Time : 3 hr   Answer ALL questions   Max. marks : 100.

PART – A (10 x 2 = 20)

1. What is the operation performed by the instruction 'DAA' available in 8085?.
2. What is the purpose for which the signal 'ALE' is available in μP 8085/ μC 8051?.
3. Given a 8Kbyte sized EPROM along with two number of 74138 ICs, how would you interface the memory to the 8085 with a required memory mapping of 4000 – 5FFF$_H$?
4. Distinguish between Carry flag and Overflow flag?.
5. Distinguish between the operation performed by the instructions: INR H and INX H?
6. Distinguish between memory mapped I/O and the peripheral mapped I/O?
7. What are the roles for the signal BHE of μP 8086?.
8. Discuss the operation performed by the 8051 instruction DIV AB. How does this instruction affect the overflow flag?
9. What is/are the status/ error indicating bits available in 8251?
10. What is the purpose for employing IC 8279 in the μP 8085 and μC 8051 trainer kits?

Distinguish between the opPART – B (5 x 16 = 80)

11. Along with a neat sketch of the functional block diagram / architecture, describe the salient features available in the 8-bit micro-controller 8051. List down its Special Function Registers, mentioning which of them are bit-addressable?.

12. a) i) Draw the timing diagram showing fetching and complete execution of the μP 8085 instruction INR M. Assume that this instruction is fetched from memory location 4567$_H$ and that the register pair HL contains 789A$_H$.
    ii) Along with a neat sketch of the functional block diagram / architecture, describe the salient features available in the 8-bit μP 8085.   (8 + 8)
                                    OR
    b) i) Write a subroutine for generating a time delay in μP 8085, using software delay loop. Also evaluate the count required to obtain a time delay of about 1 sec. Assume a μP clock frequency of 2 MHz.
    ii) Discuss how would you generate a time delay of 1.2 sec, using 8253 in its Mode0 with 'Reading on fly/ Latch on count' feature? Assume that the clock to the 8253 counter to be of frequency: 1kHz.
    iii) Using μC 8051 assembly language, write a time delay subroutine, which generates a delay of 0.2 sec. Use one of its internal timers in any suitable mode. Assume the crystal frequency to be 12 MHz.   (6+5+5)

13. a) i) Write an assembly language program which receives the 8-bit number made available serially at the SID pin? Store the received byte at the memory location 5000h. Assume that there is a delay subroutine available providing delay for half bit-time.
ii) Draw the functional block diagram of 8251 – USART IC, and describe the role for each block?

(6 + 10)

OR

b) i) Discuss a scheme for measuring the room temperature with a resolution of $1^{\circ}C$? Use ADC 0801 and LM 135 as temperature sensor.
ii) Draw the functional block diagram of 8259 – Programmable Interrupt Controller IC, and describe the role for each block? (8 + 8)

14. a) Given two 8-bit numbers in memory locations 4500_H and 4501_H, write an assembly language program which finds the sum, difference, product and division of the given numbers and stores the results in the subsequent locations. You may employ 8085 or 8051's assembly language.

OR

b) i) A thumb wheel switch is connected as the input device, and one 7-segment LED connected through 7447 decoder forms the output device. Both these are interfaced to µP 8085 through 8255 PPI. Assume suitable port connection. 8255 PPI itself is required to be connected following peripheral mapped I/O with address range of 90- 93_H. Draw the hardware connections. Also write a program which reads in the BCD input from thumb wheel switch and displays the value of its 9'complement at the 7-segment display.
ii) Discuss the control word format of 8255 used in the program. (12 + 4)

15. a) What are the base and index registers available in µP 8086. Explain how are these useful, considering typical addressing modes? Also explain the roles of the units BIU and EU, along with a neat sketch of the functional block diagram of intel 8086.

OR

b) Along with external hardware circuit and the machine cross-sectional diagram, explain how a stepper motor interface can be controlled from µC 8051. Use the port-1 of µC 8051. Assuming variable reluctance type stepper motor is available with a step angle of 3 degrees, write a program using 8051 assembly language for deflecting the stepper motor shaft by 45 degrees.