

Subject: MICROPROCESSORS & MICROCONTROLLERS

Time: 3 Hours

Max. Marks: 100

DECEMBER 2010

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Instruction used for BCD arithmetic operation in 8085 is

- (A) DAA
- (B) ADD
- (C) SUB
- (D) ALL

b. When RESETIN' pin goes low in 8085, content of PC becomes

- (A) 0000H
- (B) FFFFH
- (C) FFF0H
- (D) not fixed

c. Register M points to data of memory location specified by

- (A) BC
- (B) DE
- (C) HL
- (D) none

d. The first machine cycle of every instruction cycle is

- (A) Memory read
- (B) Opcode fetch
- (C) IO read
- (D) depends on the instruction

e. Maximum size of memory which can be connected to 8051 is

- (A) 32K
- (B) 64K
- (C) 256 byte
- (D) 128 byte

f. If the last address of a memory of size 4K is 3FFFH, then the address of the first location would be

- (A) 3000H
- (B) 3100H
- (C) 3800H
- (D) 2FFFH

- g. PSW in 8085 stands for
- (A) accumulator only
 - (B) flag byte
 - (C) accumulator and flag byte
 - (D) accumulator and temporary register
- h. The program counter is used to
- (A) count the instructions executed
 - (B) to indicate the memory location
 - (C) to count the program waiting
 - (D) it is a general purpose register
- i. TRAP is a
- (A) highest priority interrupt
 - (B) nonmaskable interrupt
 - (C) vectored Interrupt
 - (D) all of the above
- j. IC 8257 works as a
- (A) interrupt controller
 - (B) DMA controller
 - (C) programmable timer
 - (D) microcontroller

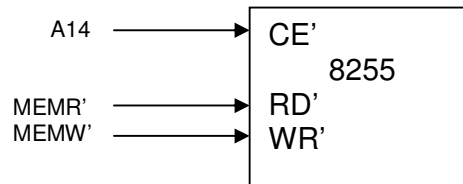
Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. Explain the function of the following pins of 8085 (4)
i) Ready ii) HLDA iii) ALE iv) SOD
- b. Write sequence of instruction required to compute 2's complement of a given 8 bit number. (6)
- c. Specify the register contents (A,B) and the flag status(CY,Z) as the following instructions are executed. (6)
- SUB A
MOV B,A
DCR B
INR A
SUI 01H
HLT
- Q.3** a. Give the status of different control signals with the help of timing diagram for the following machine cycles. (4)
- i) I/O Read ii) memory write

- b. i) Can the microprocessor differentiate between memory mapped I/O and memory mapped I/O addressing? Explain. (2)
- ii) Can an input and output port have the same address? Explain. (2)
- c. Interface 8K×8 memory to 8085 using 2K×8 memory chips. Select starting address as 8000H. Give address range of all the chips used. (8)

- Q.4**
- a. Write down sequence of instructions required to add two 16 bit numbers. (4)
 - b. A set of readings is stored in the memory starting at location 2000H. The last byte of the set is 0FH. Write a program in assembly language with proper comments to move this block to 3000H. The data is non overlapping. (8)
 - c. Draw the flow chart to find the HCF of two 8 bit numbers. (4)

- Q.5**
- a. Explain the control word of IC 8255 in I/O and BSR mode. Also, give different port addresses for the following configuration. (8)



- b. What is the utility of SIM instruction. Write down the content of accumulator required before SIM execution if
 - i) masking of R5.5 is enabled and of R6.5 & R7.5 is disabled.
 - ii) R7.5 is to be resetted
 - iii) serial data transfer to be disabled (8)

- Q.6**
- a. Write an assembly language program to simulate 4 bit ALU, which performs two arithmetic and two logical operations using logic controller interface. (6)
 - b. Explain the interfacing of simple keyboard using tristate buffers. What are the disadvantages of this method? (6)
 - c. Describe the status register of 8279. (4)

- Q.7**
- a. With the help of suitable diagram, explain the interfacing of IC 8257 with IC 8085. Also, explain the control and status register of IC 8257 (8)
 - b. Explain the function of the following in IC 8259 (8)
 - i) CAS0-2 ii) ICW1 and ICW2 iii) Registers in 8259

- Q.8**
- a. Write the control words for IC 8253 to
 - i) set counter 1 as BCD counter to work in mode 3 read fly for read operation
 - ii) set counter 2 as binary counter to work in mode 4 with read/write LS byte of counter option. (4)
 - b. Explain mode 1 and mode 3 of IC 8253. (4)

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- c. Describe the functions of the following pins of 8251
 - (i) RXRDY
 - (ii) RXC
 - (iii) DTR
 - (iv) CTS

(4)
 - d. Explain the control word for CI in IC 8251.

(4)

- Q.9**
- a. Draw and explain the functional block diagram IC 8051.

(8)
 - b. Write a program for IC 8051 to convert a BCD number stored at 0400H to binary number.

(8)