

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 2123**

Roll No.

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**B. Tech.**

**(SEMESTER-V) THEORY EXAMINATION, 2012-13**

**MICROPROCESSORS**

**Time : 2 Hours ]**

**[ Total Marks : 50**

**Section – A**

1. Attempt **all** parts : **5 × 2 = 10**
- (a) List the functions of ALE and IO/M signals of the 8085 microprocessor.
  - (b) How does a microprocessor differentiate among a positive number, a negative number and a bit pattern ?
  - (c) If the memory chip size is  $1024 \times 4$  bits, how many chips are required to make up 2048 bytes of memory ?
  - (d) List the function of the two DMA signals HOLD and HLDA.
  - (e) What determine the number of bytes to be fetched from memory to execute on instruction ?

**Section – B**

2. Attempt any **three** parts : **3 × 5 = 15**
- (a) Describe the functions of different flags of ALU of INTEL 8085 microprocessor.
  - (b) (i) List the sequence of events that occurs when the 8085 MPU reads from a memory.
  - (ii) What are tri-state devices and why are they essential in a bus-oriented system ?

- (c) (i) List all the issues in implementing interrupts in MPU.
- (ii) Write assembly program, assuming the microprocessor is completing an RST 7.5 interrupt request, check to see if RST 6.5 is pending. If it is pending, enable RST 6.5 without affecting any other interrupts; otherwise, return to the main program.
- (d) A set of ten current readings are stored in memory location starting at XX60H. The readings are expected to be positive ( $<127_{10}$ ). Write an 8085 assembly program to
- (i) Check each reading to determine whether it is positive or negative.
- (ii) Reject all negative readings.
- (iii) Add all positive readings.
- (iv) Output FFH to PORT1 at any time when the sum exceeds eight bits to indicate overload, otherwise display sum.
- (e) Illustrate the interfacing I/O devices to 8255 for the MCTS project using an ADC0831. Implement I/O schematic, Control Words and subroutine.

### Section – C

Attempt **all** parts :

$5 \times 5 = 25$

3. Attempt any **one** part :

- (a) Draw the architecture of 8085 and mention its various functions.
- (b) Draw the block schematic of a typical instruction word flow diagram and explain the same.

4. Attempt any **one** part.

- (a) Design an address decoding logic using a 3 : 8 decoder (74138) to interface a total of 64k memory locations in the address range from F0000 to FFFFF. Divide 64k memory locations in eight blocks of 8 k locations each and generate eight chip select signals.
- (b) What are the contents of data bus and the states of  $A_0$  and  $BHE'$  when the following instructions are executed in 8086 :
- (i) CPU writes a byte 11H at memory locations 1000 : 0002H.
- (ii) CPU writes a word 2211H at memory location 1000 : 0003H.

5. Attempt any **one** part :

- (a) Write an assembly language program for a Microprocessor – Controlled Manufacturing process. (Make your own assumptions). Justify your answer with schematic, conditions and flow chart.
- (b) Write an assembly language program to turn on the appliances from any one of the input ports, the microprocessor read the switches at both the ports and logically **or** the switch positions. (Make your own assumptions). Justify your answer with schematic, conditions and flow chart.

6. Attempt any **one** part.

- (a) A set of three packed BCD numbers representing time and temperature are stored in memory locations starting at XX50H. The seven-segment codes of the digits 0 to 9 for a common cathode LED are stored in memory locations starting at XX70H, and the Output Buffer memory is reserved at XX90H. Write a main program and two subroutines to unpack the BCD numbers and select an appropriate seven segment code for each digit. The codes should be stored in the Output Buffer memory.
- (b) A multiplicand is stored in memory location XX50H and a multiplier is stored in location XX51H. Write a main program to
  - (1) Transfer the two numbers from memory locations to the HL registers.
  - (2) Store the product in the Output Buffer at XX90H.

Write a subroutine to

- (1) Multiply two unsigned numbers placed in registers H and L.
- (2) Return the result into the HL pair.

7. Attempt any **one** part.

- (a) Design an interfacing circuit to set up bidirectional data communication in the master-slave format between two 8085A computers. Use the 8255A as the interfacing device. Write an assembly code for communication.
- (b) Explain how the 8254 can be used as a square wave generator. Write an 8085 assembly code for it.