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

PAPER ID : 2054   Roll No. [| | | | | | | | |]

B.Tech.

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

MICROPROCESSOR

Time : 3 Hours   *Total Marks : 100*

Note :   *Attempt all questions.*

1.   Attempt **any four** parts of the following :   **(4x5=20)**

(a)   List the four categories of 8085 μp **3+2**
      instructions that manipulate data. For each
      of the following instructions explain the
      operation performed by them and also
      identify a category out of the above four.

(i)   MOV A, C

(ii)   MOV M,A

(iii) MVI, B, 4FH

(iv)   LDA 2050 H

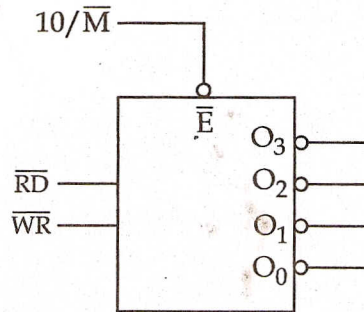(b) Identify appropriate control signals that are generated at the output of a 2-to-4 decoder in fig. 1. **5**

$$10/\overline{M}$$

$$\overline{E}$$

O_3

$\overline{RD}$ — O_2

$\overline{WR}$ — O_1

O_0

Fig. 1

(c) Explain the need to multiplex the bus AD_7 to AD_0 in a 8085 microprocessor. **5**

(d) Explain the function of following signals of 8086 microprocessor : **5**

(i) A_{16}/S_3, A_{17}/A_4, A_{18}/S_5, A_{19}/S_6

(ii) $\overline{BHE}/S_7$

(iii) ALE

(iv) $\overline{DEN}$

(e) Name and explain the specific CPU operations for which following memory locations are reserved in 8086 microprocessor : **5**

(i) FFFF0H to FFFFFH

(ii) 00000H to 003FFH

(f) Explain the difference between overlapping and non-overlapping memory segments. **5**

(c) Explain the five groups of interrupts supported on the 8086 microprocessor. What is the purpose of signals INT and $\overline{INTA}$ in 8259 ? Explain the need of Interrupt Controller (8259A). **4+3+3**

5. Attempt **any two** parts of the following : **(2x10=20)**

(a) Describe an interrupt request response of an 8086 system. How does 8259A differentiate between an 8-bit and 16-bit microprocessors ? **5+5**

(b) Explain the function of the following signals of 8257 : **10**

(i) $\overline{IOR}$ (ii) $\overline{IOW}$

(iii) HRQ   (iv) HLDA

(v) $\overline{MEMR}$ (vi) $\overline{MEMW}$

(vii) TC   (viii) AEN

(ix) ADSTB   (x) MARK

(c) Enlist the data types supported by 80486. Enlist its salient features also. What are four major architectural advancements in 80486 over 80386 ? **3+4+3**

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2. Attempt **any two** parts of the following : (2x10=20)

(a) Determine which of the following instructions are illegal and state why ? **10**

mov al, cx

mov 1234H, ax

mov dx, al

mov cs, 1234H

mov [1234H], [5678H]

mov [cx], ax

mov ax, [bp + bx]

mov [si + di], cx

mov 1234H, [bx]

mov cs, [si]

(b) Explain the operation of logical NOT instruction of 8086. Explain why in case of NOT instruction, "No segment register may be the destination". **7+3**

(c) Explain the actions performed by each of the instructions given below : **10**

SBB ax, [5678H]

SBB [3598H], di

SBB [658EH], [bx]

SBB dx, si

3. Attempt **any two** parts of the following : (2x10=20)

(a) Describe execution of a CALL instruction in detail. **10**

(b) Draw and discuss interrupt structure of 8086 in detail. **10**

(c) What do you mean by maskable and non-maskable interrupts ? Discuss in detail specifically for 8086. **10**

4. Attempt **any two** parts of the following : (2x10=20)

(a) Interface an 8255 with 8086 to work as an I/O port. Initialize port A as output port, port B as input port and port C as output port. Port A address should be 0740H. Write a program to sense switch position SW_0 - SW_7 connected at port B. The sensed pattern is to be displayed on port A, to which 8 LEDs are connected, while the port C lower displays number of on switches out of the total eight switches. **10**

(b) Design an 8086 microprocessor based stop-watch using 8253 and 8255. The stop-watch counts upto 100 seconds in the step of 10 ms and displays the time on a 4-digit, 7-segment multiplexed display. The CLK input frequency to 8253 is 2.4 MHz. Draw the required hardware scheme and write the required assembly language program. Select suitable addresses for 8253 and 8255. **10**