B.TECH/CSE/5TH SEM/AEIE 3105/2018
MICROPROCESSORS & MICROCONTROLLERS
(AEIE 3105)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Data bus of 8086 µP is-
(a) 8 bit unidirectional (b) 8 bit bi-directional
(c) 16 bit bi-directional (d) 16 bit unidirectional.

(ii) Control signal used to distinguish between I/O operation and memory operation in 8085 µP is-
(a) ALE (b) IO/$\overline{M}$ (c) $\overline{IO}$/M (d) $\overline{RD}$.

(iii) Among the followings which one is a non-vectored interrupt-
(a) INTR (b) TRAP (c) HOLD (d) RST 7.5.

(iv) MOV AX, [2001] instruction transfer -
(a) 8 bit data from 2001 offset address
(b) 8 bit data from 2000 offset address
(c) Lower 8 bit data from 2001 and higher 8 bit from 2002 offset address
(d) Lower 8 bit data from 2000 and higher 8 bit from 2001 offset address.

(v) Size of internal program memory in 8051 µC chip is-
(a) 128 byte (b) 256 byte (c) 2KB (d) 4KB.

(vi) The no of T-States required for 'LDA 9500H" is
(a) 13 (b) 7 (c) 10 (d) None of them.

(vii) In 8086 microprocessor, Instruction queue is _____bytes
(a) 16 (b)6 (c) 8 (d) 4.

(viii) If CWR port address is 73 H, determine the address of Port B of that 8255A
(a) 7C H (b) 71H
(c) 70H (d) Not possible to determine.

(ix) In 8086 Instruction set, after execution of DIV instruction on two 8 bit data the quotient is stored in
(a) AL (b) AH (c) DL (d) BL

(x) MEMR signal in 8085A is activated when-
(a) IO / $\overline{M}$ = 0 and $\overline{RD}$ = 0 (b) IO / $\overline{M}$ = 1 and $\overline{RD}$ = 1
(c) IO / $\overline{M}$ = 0 and $\overline{RD}$ = 1 (d) IO / $\overline{M}$ = 1 and $\overline{RD}$ = 0

Group – B

2. (a) Draw the flag register of 8085 µP and discuss the function of AC, Z and S flag bits.

(b) Discuss the function of following signals of 8085 µP (any three) –
i) ALE ii) RST 7.5 iii) READY iv) HOLD

(c) Explain the function of following instructions of 8085 µP (any two) –
i) SHLD $E000_H$ ii) RAR iii) DAA

(d) Write a program to find the 2's complement of an 8 bit number stored at memory location 8100_H and store the result in the same memory location.

(1 + 3) +3 + 2 + 3 = 12

3.(a) Draw the timing diagram of ADI $4F_H$ instruction. Assume that the opcode of the instruction is XX_H and it is stored in memory location 8000_H. Also calculate the time required to execute the instruction where the clock frequency is 3 MHz.

(b) What do you mean by Non- Maskable (NMI) and Vectored Interrupt?

(c) Write a program to enable the interrupts in 8085 µP and to mask RST 5.5, RST 7.5 and unmask RST 6.5 interrupts.

(6 +1) +2 + 3 = 12

Group – C

4. (a) What is the significance of BIU in 8086 Microprocessor? What is the role of instruction queue? How QS1 and QS0 represents the internal status of it?

(b) Describe the Flag register's bit significance of 8086 microprocessor.

(c) If the content of DS and BX registers are 4500and 1C00H respectively, on which memory location will the 8086 put the data while executing instruction MOV BX, 1234h?

(2+ 2 + 2) +4 + 2=12

5. (a) If the content of CS and IP registers in 8086 μP is 2100_H and $0FFF_H$, respectively, then calculate the 20 bit physical address.

(b) Write a program for 8086 μP to transfer (cut-paste) a block of 10 byte data from one memory location to another memory location in reverse order.

(c) Write the name of different interrupts in 8086 μP.

(d) Write the name of different addressing modes of 8086 μP.

2+ 6 +2 + 2= 12

Group – D

6. (a) Distinguish between a microprocessor & microcontroller.

(b) Write the main features of 8051 μC.

(c) Discuss the function of following signals of 8051 μC (any two)
i) RST ii) $\overline{EA}$ iii) RXD

(d) Explain the function of following instructions of 8051 μC (any three)
i) DJNZ L1 ii) SETB C iii) CPL A iv) SJMP L1

3+ 4 +2 +3 = 12

7. (a) How many Addressing modes are there in 8051? Explain with example.

(b) Write down the features of PIC16F877 microcontroller.

(c) What is the purpose of Watch dog timer? Explain with example.

5+ 3 + 4 = 12

Group – E

8. (a) Explain the control word for IO mode in PPI8255A. Also explain the operation by PPI 8255A ,port-A in Mode 1 as input port.

(b) Write short notes on **any one:**
DMA Controller, USART 8251, ICW1 and ICW2 of 8259.

2+ 5 + 5= 12

9.(a) Draw and discus the control word register (CWR) format of 8255 PPI in I/O mode.

(b) Describe the purpose of various bits of port-C of an 8255 PPI when port A and port B both are set as input port in mode 1.

(c) Two LEDs are connected at PC_0 and PC_7 line of 8255 PPI. Write an assembly language program for 8085 μP to periodically turn ON and OFF two LEDs by setting 8255 PPI in BSR mode.

3+ 5 + 4 = 12