B.TECH/AEIE/5TH SEM/AEIE 3102/2018
MICRO-ELECTRONIC DEVICES AND CIRCUITS
(AEIE 3102)

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) The number of address lines required to interface 16KB memory chip with 8085 microprocessor is
(a) 13 (b) 14 (c) 15 (d) 16.

(ii) The interrupt having highest priority is
(a) RST 7.5 (b) TRAP (c) HOLD (d) INTR.

(iii) The vector address corresponding to software interrupt command RST 7 in 8085 microprocessor is
(a) 0017H (b) 0027H (c) 0038H (d) 0700H.

(iv) Indirect addressing mode applied in
(a) Move A, M (b) STAX D (c) INR M (d) all of the above.

(v) BSR mode of 8255A PPI device is applicable for
(a) Port A (b) Port B (c) Port C (d) Port A and Port C.

(vi) Data bus of 8085 µP is
(a) 8 bit unidirectional (b) 8 bit bi-directional
(c) 16 bit bi-directional (d) 16 bit unidirectional.

(vii) Control signal used to de-multiplex address and data of 8085 µP is
(a) ALE (b) IO / $\overline{M}$ (c) SID (d) READY.

(viii) 8259 IC is called
(a) Programmable peripheral interface
(b) Programmable interval timer
(c) Programmable interrupt controller
(d) USART.

(ix) In IO mapped I/O scheme, I/O devices are identified with ___ address
(a) 8 bit (b) 10 bit (c) 16 bit (d) 24 bit.

(x) Which of the following is a invalid instruction -
(a)DAD H (b) XCHG (c) ADC M (d) STAX H.

Group – B

2. (a) Write the name of different registers of 8085 µP. What is the function of SP, PC and PSW register?

(b) What is the function of READY signal? With suitable diagram discuss the function of ALE signal.

(c) Explain the function of following instructions (any three) –
i) RAR ii) LHLD 9000_H iii) JNZ 9000_H iv) DAD H

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

3. (a) What do you mean by subroutine? Explain the execution procedure of the given instruction where SP has been initialized at E100 H.

Memory address	Mnemonics	Hex code
CEFF H	CALL 1234 H	CD H

(b) Write down an assembly language program to store and add only even numbers in an array of ten numbers of data. The array is stored in memory staring from C100H. Result will be stored C200H, C201H.

(2 + 4) + 6 = 12

Group – C

4. (a) What do you mean by absolute and partial decoding?

(b) What is the difference between memory mapped I/O and peripheral mapped I/O.

(c) Design an Interfacing circuit to interface a 256×8 RAM to 8085 microprocessor using a 3 to 8 decoder having primary address range 2000 H to 20FFH. Also determine the mirror address range of the memory chip.

3+ 3 + 6 =12

5. (a) Draw the timing diagram of STAX B instruction. Assume that the opcode of the instruction is XX_H and it is stored at memory location 8000_H. Also calculate the time required to execute the instruction where the operating frequency is 3 MHz.

(b) With suitable example explain the process of data storage in a stack memory.

(7 + 2) + 3 = 12

Group – D

6. (a) Explain about the different methods of microprocessor controlled data transfer process.

(b) What are the necessary steps to implement interrupt process through INTR line of 8085 microprocessor. What do you mean by vectored and non-vectored interrupts?

6 + (4 + 2)= 12

7.(a) Interface one 7-segment display with 8085 μP, where the I/O port address is FAH. Write a program to display 0 to 9 continuously with a delay.

(b) What is the limitation of memory mapped I/O technique?

(3 + 7) + 2 = 12

Group – E

8.(a) Draw and discus the control word register (CWR) format of 8255 PPI in BSR mode.

(b) Describe the purpose of various bits of Port C of an 8255 when Port A is set as input and Port B is set as output port in mode 1.

(c) Write the control word value of 8255 PPI to set Port A as input in mode 1 and Port B as output in mode 1.

(d) Write the 8085 μP instructions to load the above control word value in the CWR register. Assume Port A address is $F0_H$.

(1 + 2) + 6 + (1 + 2) = 12

9. (a) Write an assembly language program to generate a 2KHz square wave from counter 2 of 8254 programmable interval timer of which operating frequency is 2MHz and $\overline{cs}$ pin is connected to A_7 address line of the 8085 microprocessor through an inverter.

(b) What do you mean by DMA operation? What is Baud rate?

6+ 4 + 2 = 12