2020

ELECTRONICS — HONOURS

Paper : CC-12

(Microprocessor and Microcontrollers)

Full Marks : 50

The figures in the margin indicate full marks.

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

Question no. 1 is compulsory. Answer **any four** questions from the rest.

1. Answer the following questions : 1×10

   (a) An example of an Accumulator based microprocessor is

   (i) Intel 8085   (ii) Motorola 6809

   (iii) Both (i) and (ii)   (iv) None of these.

   (b) The synchronization between microprocessor and memory is done by

   (i) ALE signal   (ii) HOLD signal

   (iii) READY signal   (iv) None of these.

   (c) Intel 8080A and 8085A differ in

   (i) Number of address lines   (ii) Number of data lines

   (iii) Instruction set   (iv) Number of Interrupts.

   (d) In 8085, the pins for SID and SOD are

   (i) 4 and 5   (ii) 5 and 4

   (iii) 3 and 4   (iv) 4 and 3.

   (e) In 8085 microprocessor system with memory mapped I/O, which of the following is true?

   (i) Devices have 8-bit address lines.

   (ii) Devices are accessed using IN and OUT instructions.

   (iii) Arithmetic and logic operations can be directly performed with the I/O data.

   (iv) There can be maximum of 256 input devices and 256 output devices.

Please Turn Over

  (f) The Arithmetic and Logic Unit (ALU) of 8085 microprocessor consists of

    (i) Accumulator, temporary register, arithmetic and logic circuits

    (ii) Accumulator, arithmetic and logic circuits and a flag register

    (iii) Accumulator, arithmetic and logic circuits

    (iv) Accumulator, temporary register, arithmetic and logic circuits and a flag register.

  (g) Which of the following instructions is not possible with 8085 μp?

    (i) POP PSW   (ii) POP B

    (iii) POP D   (iv) POP 30H.

  (h) How many T-states are required for execution of the OUT 80H instruction?

    (i) 7   (ii) 10   (iii) 13   (iv) 16

  (i) Which type of stack is used in 8085?

    (i) FIFO   (ii) LIFO   (iii) FILO   (iv) LILO.

  (j) The 8051 microcontroller has the following number of parallel I/O ports

    (i) 2   (ii) 3   (iii) 4   (iv) 5.

2. (a) Draw the functional block diagram of the 8085 microprocessor.

  (b) What are the roles played by the program counter and instruction register?

  (c) Name different addressing modes of 8085 and give an example for each mode.   5+2+3

3. Explain clearly the meaning of these instructions (*any five*) :   2×5

  (i) POP D (ii) STAX D   (iii) ANI 00_H (iv) CMC (v) XCHG (vi) PCHL (vii) JMP \<address>

4. (a) Write an assembly language program (ALP) for 8085 microprocessor to multiply two 8-bit numbers which are stored in two memory locations and place the result and the carry in the next two memory locations.

  (b) Explain the terms : Instruction cycle, machine cycle and T-states.

  (c) What is the role played by the following signals?

    (i) ALE   (ii) IO/$\overline{\text{M}}$ (iii) $\overline{\text{INTA}}$ 4+3+3

5. (a) Explain with a block diagram the functioning of a microcomputer through the exchange of signals, addresses and data between the processor, memory and I/O ports through the three types of buses.

  (b) What are the two types of I/O interfacing? Differentiate between the two.

  (c) Write the different interrupt signals for the 8085 microprocessor in the order of increasing priority.

                                                              (2+3)+(1+2)+2

6. (a) What is the use of a PPI device? What are the different modes of operation of the 8255A PPI device?

   (b) Write down the format of the control words for any two types of operating modes of 8255A.

   (c) It is required to use port A and C_{upper} as simple output ports and port B and C_{lower} as simple input ports. In which mode should we operate the 8255A device? What would the 8-bit control word for this mode be? (1+2)+(2+2)+(1+2)

7. (a) Draw the block diagram of Princeton architecture for microcontrollers.

   (b) What do 'RISC' and 'CISC' stand for? What is the real difference between 'RISC' and 'CISC'?

   (c) Name two peripheral devices that are connected with microcontrollers. 4+(2+2)+2

8. (a) Draw the pin-out diagram of PIC 16F887 microcontroller.

   (b) Draw the program memory map and stack for PIC 16F887 microcontroller.

   (c) Describe the function of Status register of PIC 16F887 microcontroller. 5+2+3

_____