2021

ELECTRONICS — GENERAL

Paper : GE/CC-4

(Microprocessors 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.

Answer ***question no.* 1** and ***any four*** from the rest.

1. Answer ***any ten*** questions : 1×10

(a) How many address lines are there in the address bus of 8085 μp?:

(i) 8 (ii) 16

(iii) 32 (iv) 64.

(b) $\overline{RD}$ is a/an :

(i) Status signal (ii) Control signal

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

(c) Stack pointer is a :

(i) 8 bit register (ii) 16 bit register

(iii) 32 bit register (iv) 64 bit register.

(d) Flag register of 8085 μp contains :

(i) 8 flip flops (ii) 6 flip flops

(iii) 5 flip flops (iv) 4 flip flops.

(e) During Opcode fetching, bit pattern of S_0 and S_1 are :

(i) 00 (ii) 01

(iii) 10 (iv) 11.

(f) 'STA F050H' is a/an :

(i) One byte instruction (ii) Two byte instruction

(iii) Three byte instruction (iv) None of these.

(g) 'Memory Write' machine cycle requires :

(i) 3 T-states (ii) 4 T-states

(iii) 6 T-states (iv) 10 T-states.

(h) Which of the following instruction(s) represent(s) direct addressing :

(i) MOV C,A (ii) MVI A, 05H

(iii) IN 01H (iv) LXI H, F050H.

(i) After of XRA A execution, the value of accumulator will be :

(i) 00H (ii) 11H

(iii) 10H (iv) 01H.

(j) What is the on-chip ROM size of 8051 microcontroller?

(i) 1K byte (ii) 4K bytes

(iii) 8K bytes (iv) None of these.

(k) DPTR (Data pointer) of 8051 is a :

(i) 8 bit register (ii) 16 bit register

(iii) 32 bit register (iv) 64 bit register.

(l) The flag register of 8051 is called :

(i) Accumulator (ii) Program status word (PSW)

(iii) Program counter (PC) (iv) Stack pointer (SP).

2. (a) Why is data bus bidirectional?

(b) How many minimum address lines are necessary to address a 16K memory?

(c) What is the role of flag register in assembly language programming?

(d) Why is program counter a 16-bit register?

(e) If the memory chip size is of (1024x 2) bits, how many chips are required to make up 4K bytes of memory? 2+2+2+2+2

3. (a) Discuss the role of various control and status signals commonly used by the 8085 MPU.

(b) The instruction code 3E is stored in memory location F050H. List the sequence of events when the instruction code is fetched by the MPU.

(c) Differentiate memory-mapped I/O and peripheral-mapped I/O. 4+4+2

4. (a) Explain with circuit diagram how lower order address lines (AD0 to AD7) can be demultiplexed.

(b) Explain the role of the following units of 8085 microprocessor :

(i) ALU (ii) General purpose register (iii) Timing and control unit. 4+(2+2+2)

5. (a) Differentiate machine and instruction cycles.

(b) Draw the timing diagram for executing the instruction MOV C, A (Opcode : 4FH) stored in F000H memory location. Mention all the status and control signals in the diagram.

(c) Calculate the time required to execute the instruction MVI A, 05H by 8085 MPU. 2+5+3

6. (a) Discuss various types of addressing modes of Intel by 8085μP with suitable examples.

(b) Calculate the total numbers of machine cycles and T-states of the following part of a program :

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MVI B, 05H
MOV A, B
ADI 06H
ADD B
STA F050H
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(c) Show the flag status after performing the following addition : FFH + 05H. 4+4+2

7. Explain the following instructions of 8085μP : 2×5

(a) IND H

(b) ADI 05H

(c) CMA

(d) CMP M

(e) RRC.

8. (a) Why 8051 is called an 8-bit microcontroller?

(b) List the basic features of 8051 microcontroller chip.

(c) What are Special Function Registers (SFR)?

(d) What are the types of interrupts in 8051? 2+3+2+3