ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009
MICROPROCESSOR AND MICROCONTROLLER
SEMESTER – 6

Time : 3 Hours] [Full Marks : 70

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) The number of register pairs of 8085 microprocessor are

a) 3 b) 4

c) 2 d) 5.

ii) When the instruction SHLD is executed, number of T-states required are

a) 10 b) 14

c) 13 d) 15.

iii) If the crystal with 8085 is 2 MHz, the time required to execute an instruction of 20 T-states is

a) 20 μs b) 10 μs

c) 40 μs d) 5 μs.

iv) PSW is a/an

a) 16 bit register b) 32 bit register

c) 8 bit register d) none of these.

v) Mode 5 of 8253 is/an

a) rate generator b) square wave generator

c) hardware triggered strobe d) software triggered strobe.

vi) An 8-bit A/D converter has a resolution of

a) $1/2^4$ b) $1/2^8$

c) $1/2^{12}$ d) $1/2^{16}$. ☐

vii) For 8255 PPI, the bi-directional mode of operation is supported in

a) Mode 1 b) Mode 2

c) Mode 0 d) either (a) or (b). ☐

viii) When the subroutine is called the address of the instruction next to 'CALL' is save in

a) stack pointer register b) program counter

c) stack d) PSW. ☐

ix) If a DMA request is sent to the microprocessor with a high signal to the HOLD pin, the microprocessor acknowledge the request

a) after completing the present cycle

b) immediately after receiving the signal

c) after completing the program

d) none of these. ☐

x) 8086 is called 16-bit microprocessor because

a) its data bus is 16 bit b) its address bus is 16 bit

c) its accumulator is 16 bit d) its memory is 16 bit. ☐

xi) In order to enable TRAP interrupt, which of the following instructions are needed ?

a) EI only b) SIM only

c) both EI and SIM d) None of these. ☐

xii) The vectored address corresponding to the software interrupt command RST 7 in 8085 microprocessor is

a) 0017H b) 0027H

c) 0038H d) 0700H. ☐

xiii) In an 8085 microprocessor, which one of the following is the correct sequence of the machine cycle for the execution of DCR M instruction ?

a) op-code fetch

b) op-code fetch, memory read, memory write

c) op-code fetch, memory read

d) op-code fetch, memory write, memory read. ☐

xiv) A microprocessor is said to be of 8-bit, 16-bit etc. depending on its

a) data bus b) address bus

c) ALU d) control bus. ☐

xv) The total I/O space available in 8085 if used peripheral mapped I/O is

a) 64 b) 128

c) 256 d) 512. ☐

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following questions. 3 × 5 = 15

2. How does ALE signal demultiplex the AD_0–AD_7 bus ? Explain with diagram. 5

3. Draw the timing diagram of 'IN' instruction. 5

4. Write an assembly language programme that display of the square of a number and its corresponding address from a LOOK-up table. 5

5. a) Define instruction cycle and machine cycle. 1 + 1

b) Specify the register contents and the flag status when the following instructions are executed :

```
MVI A, F2H
ADD A
MVI B, 7AH
ADC B
LXI D, 59A2H
LXI H, A259H
XCHG
MOV C, L
```

If the initial contents of Reg A = 00H, B = FFH, S = 0, Cy = 1, Z = 1 3

6. What is the function of the instruction "SHLD" ? Calculate the time required to execute the Opcode Fetch, Memory Read Cycles and the entire Instruction Cycle of the instruction "SHLD 2222H" if clock freq. is 2 MHz. 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following questions. 3 × 15 = 45

7. a) What are the differences between a microprocessor and a microcontroller ?

   b) Discuss the memory organization of 8051 microcontroller. What is the function of program status word (PSW) in 8051 ?

   c) What is the role of SFRs in 8051 microcontroller ? Explain.

   d) Write an 8051 assembly language program to add two 16-bit no. 2 + (4 + 3) + 3 + 3

8. a) What are the differences between 8086 μp and 8085 μp ?

   b) How many operating modes does 8086 has ? Discuss them in brief.

   c) What do you mean by segmented memory in 8086 μp ?

   d) What are the differences between the physical address and logical address of an instruction ? 4 + 6 + 3 + 2

9. a) List the operating modes of the 8255 programmable peripheral interface.

   b) Write the control word format of 8255 for I/O mode.

   c) Write the BSR control word of 8255 to set PC7, PC3 & PC0.

   d) Discuss the steps for data transfer process between a floppy disk and R/W memory of 8085 system using DMA.

   e) Describe the different modes of operation of 8253 timer. 1 + 3 + 3 + 4 + 4

10. a) What are the main functions of BIU and EU ? How does this separation in units speeds up the processing ?

b) What are the major segments in memory of an 8086 microprocessor system ? What are their functions ?

c) What is minimum and maximum mode of 8086 microprocessor ?

d) With example state the generation of 20 bit physical address in context to 8086 μp. 5 + 4 + 3 + 3

11. Write short notes on any *three* of the following : 3 × 5

a) Tri state devices

b) 'RAL' and 'RRC' instructions.

c) Mode of 8255.

d) 8254 programmable Interval Timer.

e) Serial operation using 8085.

END