MICROPROCESSORS & MICROCONTROLLERS
(AEIE3103)

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) In 8085 μP number of register pair is
(a) 2 (b) 3 (c) 6 (d) 8.

(ii) AC flag is used in which following instruction?
(a) ADD C (b) DAD D (c) DAA (d) ADC C

(iii) Which pin of 8085 μP is used to acknowledge INTR?
(a) HLDA (b) $IO/\overline{M}$ (c) HOLD (d) $\overline{\text{INTA}}$

(iv) Among the followings which one is a vectored interrupt-?
(a) INTR (b) TRAP (c) READY (d) HOLD

(v) If the operating frequency of 8085 is 2 MHz, then the time required to execute ANA M instruction is
(a) 3.5 μsec (b) 7 μsec (c) 10 μsec (d) 14 μsec

(vi) In 8255 Mode 2 is called
(a) Bit set reset mode (b) Simple data transfer mode
(c) IO mode with handshake signal (d) Bidirectional mode.

(vii) In 8051 μC if RS_1=1 and RS_0=0 then the selected register bank is-
(a) Bank 0 (b) Bank 1 (c) Bank 2 (d) Bank 3.

(viii) If the operating frequency of 8085 is 2 MHz, then the time required to execute an instruction of 10T states is-
(a) 3 μsec (b) 5 μsec (c) 10 μsec (d) 15 μsec

(ix) In 8051 μC number of I/O port is
(a) 2 (b) 3 (c) 4 (d) 5

(x) After reset operation content of SP register in 8051 μC is
(a) 00H (b) 07H (c) 0000H (d) FFH.

Group – B

2. (a) Based on the size of the instruction classify the different instructions of 8085 μP with one suitable example.

   (b) Write a program to store the last two digits of your autonomy roll number and registration number in memory location 8000H and 8001H respectively. Multiply the content of 8000_H with 8001_H. Store the result in memory location starting from 8002_H.

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

3 + 7 + 2 = 12

3. (a) Define opcode and operand with one suitable example.

   (b) Store the last two digits of your registration number in memory location 8000_H. Write a program to count the number of 1's and 0's present in the content of memory location 8000_H. Store the result in memory location 9000_H.

   (c) With one suitable example explain the process of subroutine call in 8085 μP.

2 + 6 + 4 = 12

Group – C

4. (a) Draw the timing diagram of XRA M 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 are the differences between memory mapped IO and IO mapped IO schemes?

   (c) What is the advantage of partial address decoding over absolute address decoding?

(6 + 1) + 3 + 2 = 12

5. (a) Design an interface between 8085 μP and one 8KB ROM memory chip using 3:8 decoder to generate the chip select signal. The first address in the ROM memory chip is 0000_H.

   (b) Interface one 7 segment display and 8 DIP switches with 8085 μP. Select suitable address.

6 + 6 = 12

Group – D

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

   (b) Draw the interfacing circuit to connect two LEDs to 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.

(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.

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

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

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

(b) Explain Write a program to set PC_1 line and after some delay reset PC_3 line of 8255 PPI.

(c) Interface 8 LEDs to 8085 μP using 8255 PPI. Write a program blink the LEDs with delay continuously.

3 + 3 + (2 + 4) = 12

Group – E

8. (a) Write the main features of 8051 μC.

(b) Write the name of different general purpose registers in 8051 μC.

(c) What is the function of $\overline{EA}$ signal in 8051 μC?

(d) Draw and discuss the flag register of 8051 μC.

4 + 2 + 2 + 4 = 12

9. (a) Write an assembly level program for 8051 μC to *cut paste* a block of 10 byte data from one memory to another memory location (internal RAM) in reverse order.

(b) What is the function of RS0 and RS1 bits in the PSW register of 8051 μC?

(c) Write short notes on (*any one*)
(i) Internal RAM of 8051 μC.
(ii) Serial data communication in 8051 μC.

5 + 2 + 5 = 12

Department & Section	Submission link:
AEIE	https://classroom.google.com/c/MTIxODk4ODA4NzU1/a/MjcxMDE4NDk2NjQw/details