MICROPROCESSORS & MICROCONTROLLERS
(AEIE 2205)

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) Which pin of 8085 μP is used for slow peripheral device interfacing?
(a) ALE (b) INTR
(c) HOLD (d) READY

(ii) In 8085 μP, number of general purpose register is
(a) 5 (b) 6
(c) 7 (d) 8

(iii) If the operating frequency of 8085 is 2 MHz, then the time required to execute an instruction of 7T states is
(a) 3.5 μsec (b) 7 μsec
(c) 10 μsec (d) 14 μsec

(iv) In microprocessor 8085, when CALL instruction is executed, the stack pointer register is
(a) decremented by two (b) decremented by one
(c) incremented by two (d) incremented by one

(v) Among the following which one is a non-vectored interrupt?
(a) INTR (b) TRAP
(c) RST 5.5 (d) RST 7.5

(vi) CWR port address if is 1F H, determine the address of Port A of that 8255A
(a) 1C H (b) 20 H
(c) 10 H (d) Not possible to determine.

(vii) In microprocessor 8086, TEST instruction is used to
(a) perform bitwise AND operation
(b) perform bitwise OR operation
(c) check the two operands are equal or not
(d) none from the above

(viii) By MOV AX, [2000] instruction, 8086 μP transfers
(a) 8 bit data from 2000 H (b) 8 bit data from 2001 H
(c) 16 bit data from 2000 H and 2001 H (d) 16 bit data from 2000 H

(ix) 8051 μC will read instruction from its internal program memory if
(a) RST pin is at logic 0 (b) RST pin is at logic 1
(c) $\overline{EA}$ pin is at logic 0 (d) $\overline{EA}$ pin is at logic 1

(x) In 8051 μC, to access register bank 3 we can write codes
(a) SETb PSW.4 (b) SETb PSW.3
(c) both the (a) and (b) (d) none from the above

Group – B

2. (a) Write the name of different programmable registers of 8085 μP. Write one instruction where BC register pair is used as memory pointer.

(b) Discuss the function of following signal of 8085 μP (*any one*) –
(i) HOLD (ii) SOD.

(c) Explain the function of following instructions of 8085 μP (a*ny two*) –
(i) LHLD E000 H (ii) RAR (iii) JPE 8000 H

(d) Draw the flag register of 8085 μP and discuss AC flag bit.

(2 + 1) + 2 + (2 × 2) + 3 = 12

3. (a) Draw the timing diagram of ANI FF H 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 considering operating frequency of 8085 μP is 3 MHz.

(b) With one suitable example discuss the difference between JMP and CALL instructions.

(7 + 2) + 3 = 12

Group – C

4. (a) Describe the vectored interrupts of 8085 Microprocessors with a neat diagram.

(b) Write a program to generate 1 second delay using 16 bit counter. Let the clock period is 1 μs.

(c) Write a subroutine program assuming microprocessor 8085 has paused in the main programme and is completing an RST7.5 interrupt request. Now, check to see if RST6.5 is pending or not. IF RST6.5 is pending, enable it without affecting any other interrupts and then return to the main programme.

4 + 4 + 4 = 12

5. (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 Port C of 8255 PPI. Write a program to blink the LEDs alternately (with 1 sec delay) using BSR mode of operation.

(1 + 3) + (2 + 6) = 12

Group – D

6. (a) Explain the function of following instructions in 8086 μP (*any two*) –
(i) MOVSB (ii) LOOP 8050 H (iii) TEST AL, 02 H

(b) Write an ALP for 8086 μP to find the number of times 44 H data is present in a block of data. Let the block contains 10 number of byte data starting from 1000 H : 9000 H memory location. Store the result at memory location.

(c) Discuss how pipeline architecture is implemented in 8086 μP.

(2 × 2) + 6 + 2 = 12

7. (a) What is the difference between minimum and maximum mode of operation in 8086? What are the roles of S2, S1, S0 signals in Maximum mode operation in 8086?

(b) An ADC0809 is interfaced with 8086 Microprocessor. Draw the interfacing circuit and write an assembly level programme to convert 0V to 5V analog voltage into corresponding digital values between 00 H to FF H.

(2 + 2) + (4 + 4) = 12

Group – E

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

(b) List 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) How stack is accessed in Microcontroller 8051? Describe with examples: (i) Register indirect and (ii) Indexed addressing modes.

(b) Write a code to generate 10 ms delay using 8 bit timer operation in 8051 microcontroller.

(3 + 4) + 5 = 12

Department & Section	Submission Link
CSE [Sec **A]**	https://classroom.google.com/c/MzIxMzk5Mjc1NTk5/a/Mzc0Mzg5ODQwMzU5/details
CSE [Sec **B]**	https://classroom.google.com/c/MzEyNTA2OTc2NDUw/a/Mzc0NDQyNzg3MzAw/details
CSE [Sec **C]**	https://classroom.google.com/c/MzA2OTI3NTM0NTIw/a/MzczNjQ4NjM2NzQz/details