

MICROPROCESSORS AND MICROCONTROLLERS
(AEI2205)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

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

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) RISC architecture is used in
 - (a) Microprocessor 8085
 - (b) Microprocessor 8086
 - (c) PIC16F877
 - (d) PPI 8255A
- (ii) Instruction cycle of INX is composed with
 - (a) 4T
 - (b) 6T
 - (c) 7T
 - (d) 10 T
- (iii) During a memory read Machine cycle the CPU fetches.
 - (a) Opcode
 - (b) Another address
 - (c) Data itself
 - (d) all of the above
- (iv) JNZ 9000H requires 7Clock pulses
 - (a) If the Jump Condition Is True
 - (b) If the Jump Condition Is False
 - (c) Not at all true.
 - (d) Inside subroutine only
- (v) RST1 is actually
 - (a) RESET signal
 - (b) 3byte Restart instruction
 - (c) Ending program execution
 - (d) Software Interrupt.
- (vi) To establish communication between two Computers or Microprocessors, PPI 8255A
 - (a) Can't be used
 - (b) Used in Mode 2
 - (c) Used in Mode 1
 - (d) Used in Mode 0.
- (vii) In 8086 microprocessor, total numbers of
 - (a) Segment register=4, Indexed Register=3
 - (b) Segment register=4, Indexed Register=2
 - (c) Segment register=3, Indexed Register=3
 - (d) Segment register=3, Indexed Register=4

- (viii) In 8086 microprocessor, total number significant flags are
 (a) 5 (b) 8
 (c) 9 (d) 16
- (ix) In PIC 16F877 Microcontroller, number of addressing Modes and I/O ports are simultaneously
 (a) 2 and 4 (b) 2 and 5
 (c) 4 and 4 (d) 4 and 5
- (x) In Microcontroller 8051-MOVA, @R1
 (a) Copy data from register R1 to Register A
 (b) Copy data from memory pointed by register R1 to Register A
 (c) Cut and paste data from register R1 to Register A
 (d) Invalid Instruction.

Fill in the blanks with the correct word

- (xi) The LDAX is a _____ byte instruction.
- (xii) In microprocessor 8085, the Interrupt Requests are disabled by _____ .
- (xiii) In microprocessor 8085 _____ pin is used to send synchronising signal to its peripheral.
- (xiv) "MOV TMOD, #12H" is initialising T2 in Timer mode _____ in Microcontroller 8051.
- (xv) TCON Register in microcontroller 8051 is used to _____.

Group - B

2. (a) Draw and Explain the Timing Diagram of MOV A,H. [[CO1] (Remember/IOCQ)]
 (b) Write down the complete instruction and explain the following instructions of 8085 Microprocessor (Any three):
 LDAX, STA, RRC, CMP [[CO2] (Understand/LOCQ)]
 $6 + (2 \times 3) = 12$
3. (a) Write a program using the assembly codes of microprocessor 8085 to transfer 14 byte information stored in memory address 9000H onwards to A345H onwards. Write the output of the program. [[CO2](Explain/HOCQ)]
 (b) Write the significance of register PC and SP and Flag Register. [[CO1] (Analyse/IOCQ)]
 $6 + (3 + 3) = 12$

Group - C

4. (a) An 8085 microprocessor is connected with PPI8255A. A set of eight LEDs and eight DIP switches are connected at Port B and Port A of the same PPI8255A simultaneously. Write a program using the assembly codes of microprocessor 8085 to glow the LEDs as per switch pressed. [Control Word Register Port Address is 3FH] [[CO6](Design/HOCQ)]

- (b) Write down the significance of Port C pins during Mode1 setting of Port A of PPI8255A. (Describe for both input and output). [[C06](Understand/IOCQ)]
8 + 4 = 12
5. (a) Write an ALP to generate a square wave pulse of with time period of 100ms.[Consider that the operating frequency is 2 MHz]. [[C02](Analyse/HOCQ)]
 (b) Draw the block diagram to set PPI8255A Port B as output in Mode1. Explain how the handshaking signals generated by Port C signal lines. [[C06](Analyse/IOCQ)]
6 + 6 = 12

Group - D

6. (a) Describe the memory organisation for microprocessor 8086. Also mention the role of BHE and A0 to access the different memory banks. [[C03] (Remember/IOCQ)]
 (b) Calculate the 20 bit physical address of the program code stored in 8086 microprocessor with address of CS=6605_H, DS=2300_H and address of IP =5000_H. Find the starting and ending address of CS. Show Calculation. [[C03] (Solve/HOCQ)]
(3 + 5) + 4 = 12
7. (a) Compare the architecture of microprocessor 8086 with 8085. [[C03](Remember/IOCQ)]
 (b) Explain how the even and odd memory can be accessed by 8086 processor. [[C03](Explain/LOCQ)]
 (c) Write a program using the assembly codes of microprocessor 8086 to Divide numbers loaded in AX by BX. Store the results in RAM 1000H onwards. [[C04](Solve/HOCQ)]
4 + 4 + 4 = 12

Group - E

8. (a) Explain with example the addressing modes of Microcontroller 8051. [[C05] (Remember/LOCQ)]
 (b) Explain SFR of Microcontroller 8051. [[C05](Remember/LOCQ)]
 (c) Write down the instructions of Microcontroller 8051 for the following operation.
 (i) Add 3BH to the content of Accumulator,
 (ii) Push data into the Stack memory,
 (iii) Initialise port 2 as Input port,
 (iv) Select Register Bank. [[C05] (Apply/IOCQ)]
5 + 3 + 4 = 12
9. (a) Explain the following instructions for Microcontroller 8051:
 (i) MOV @R1, B
 (ii) DJNZ R2, Relative Add,
 (iii) MOVC A, @A+DPTR. [[C05](Analyse/IOCQ)]
 (b) Describe with diagram the 128byte RAM organisation of Microcontroller 8051. [[C05](Remember/LOCQ)]

(c) Compare: Microprocessor and Microcontroller.

[(C05)(Apply/IOCQ)]
(3 × 2) + 3 + 3 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	21.87	48.96	29.17