

**MICROPROCESSORS AND MICROCONTROLLER
(AEIE 2205)**

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) Which group of instructions does not affect the flags?
(a) Arithmetic operations (b) Logic operations
(c) Data transfer operations (d) Branch operations.
- (ii) Using JNZ 8000H instruction, program execution will be shifted to 8000H memory location only when
(a) CY=1 (b) Z=1 (c) CY=0 (d) Z=1
- (iii) The call location for RST 6.5 interrupt is
(a) 0024H (b) 002CH (c) 0034H (d) 003CH
- (iv) If CWR address of 8255 connected to 8085 is 90H, then address for Port C is
(a) 91H (b) 93H (c) 8EH (d) 8FH
- (v) Which will be content PC after execution of following set of instructions?
B12B: LXI H, 9100
MOV A, M
INR L
ADD M
(a) B12F (b) B130 (c) B131 (d) B231.
- (vi) If CS=2F45H and IP=1000H then the physical address is
(a) 12F45H (b) 2E450H (c) 30450H (d) None of these
- (vii) Register bank address by RS1=1 and RS0=1 of 8051 µC
(a) 00H-07H (b) 10H-17H
(c) 20H-28H (d) 18H-1FH
- (viii) If CWR address of 8255 connected to 8085 processor is FBH, then the address of PORT A will be
(a) F7H (b) F8H (c) F9H (d) FAH

- (ix) The RET instruction of 8085 processor at the end of the subroutine is executed
 (a) The information is transferred to the stack is initialized location
 (b) The memory address of RET instruction is transferred to PC.
 (c) The program memory address stored in stack is transferred to PC.
 (d) None of these
- (x) Which register is used as the base location for all executable instruction?
 (a) SI (b) CS (c) DI (d) IP.

Fill in the blanks with the correct word

- (xi) If ready pin of 8086 processor is grounded, it will introduce _____ states into the bus cycle.
- (xii) RLC is a/an _____ byte instruction.
- (xiii) Memory available in 8051 μ C _____.
- (xiv) In 8255 PPI, Mode 2 is also known as _____ mode.
- (xv) PIC16F877 operates in _____ addressing modes.

Group - B

2. (a) Write down the function of the following pin signals of 8085 μ P. (Any two)
 INTR, HOLD, $\overline{RESET\ IN}$, and X1-X2 [[C01](Understand/LOCQ)]
- (b) Explain the function of the following instructions of 8085 μ P with before and after execution of instruction. (Any two)
 LDA C200, LHLD C100, XRA A and DAD D [[C01](Understand/LOCQ)]
- (c) What will be the content of ACC and FR after execution of the following instructions? Calculate total execution time if $f_0 = 3\text{MHz}$ of 8085.
 MVI A, 0C
 MVI B, AC
 ADD B
 XRA A [[C02](Apply/IOCQ)]
- $4 + (2 \times 2) + (2 + 2) = 12$**

3. (a) Write an assembly language program to add all the even numbers in an array of ten data bytes starting from C100H location. Results will be stored at C200H, and C201H. [[C02](Create/HOCQ)]
- (b) Draw the timing diagram of the given instruction when content of SP=D000H.

Memory location (H)	Mnemonics	Hex code (H)
19EF	CALL C543	CD

[[C01](Apply/IOCQ)]
 $6 + 6 = 12$

Group - C

4. (a) Write down four number of 8085 μ P instructions where it will not function as sequential processor. [[C02](Analyse/HOCQ)]

- (b) Write down functions of the interrupts of 8085 μ P as vectored or not, masking or not and about triggering methods. [[C02](Remember/LOCQ)]
- (c) Write down an ALP to generate a square wave through SOD pin of 8085 μ P. [[C02](Apply/IOCQ)]
4 + 4 + 4 = 12
5. (a) In MODE 0 of 8255A PPI, port A and port C upper act as output ports whereas port B and port C lower act as input ports. Hence draw the corresponding interfacing diagram with control word address 83H.
 Write down an assembly language program to send the data from the input ports PB and PC_L to the output ports PA and PC_U respectively. [[C05](Apply/IOCQ)]
- (b) Discuss about the required hand shaking signals to configure PA of 8255A as an output port. [[C05](Remember/LOCQ)]
(3 + 5) + 4 = 12

Group - D

6. (a) Write a program for 8086 μ P to copy a block of 5 data bytes starting from memory location 1000H:2000H to another memory location started from 3000H:4000H in reverse order. [[C03](Create/HOCQ)]
- (b) Explain the function of following instructions of 8086 μ P (Any three).
 (i) XCHG AX, [BX] (ii) NEG CX (iii) MOVSW (iv) CMPSB [[C03](Remember/LOCQ)]
6 + 6 = 12
7. (a) Mention the job performed by BIU and EU of 8086 Processor. [[C03](Remember/LOCQ)]
- (b) What are the conditions for which 8086 processor enters into WAIT mode? [[C03](Analyse/HOCQ)]
- (c) What are the purposes of individual registers of GPR of 8086 processor? [[C03](Remember/LOCQ)]
4 + 4 + 4 = 12

Group - E

8. (a) Explain with example the Addressing Mode of 8051 μ C. [[C04](Remember/LOCQ)]
- (b) Explain PSW of 8051 μ C. [[C04](Remember/LOCQ)]
- (c) Write down the instructions of the following operation.
 (i) Add 23H to the content of Accumulator, (ii) increment the content of internal memory location by R₀ (iii) subtract immediately 45 from accumulator register with borrow, (iv) increment the data pointer register by one. [[C04](Apply/IOCQ)]
4 + 4 + 4 = 12
9. (a) Explain the alternative function of PORT 3 of 8051 μ C. [[C04](Remember/LOCQ)]
- (b) Two data 24H and 23H are stored in RAM location 40H AND 41H. Write a program to find sum and store at 42H using 8051 μ C. [[C04](Apply/IOCQ)]
- (c) Write the basic function of 16F877 PIC. [[C04](Remember/LOCQ)]
4 + 4 + 4 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	47.92	31.25	20.83

Course Outcome (CO):

After the completion of the course students will be able to

AEIE2205.1. Understand the architecture of 8-bit microprocessor (8085A).

AEIE2205.2. Develop the skill in program writing of 8-bit microprocessor (8085A).

AEIE2205.3. Understand the architecture and develop the skill in program writing of 16-bit microprocessor (8086).

AEIE2205.4. Understand the architecture and develop the skill in program writing of microtroller 8051 and PIC16F877.

AEIE2205.5 Understand the architecture and operation of programmable peripheral device 8255A.

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*