

**MICROPROCESSORS AND MICROCONTROLLER
(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) IO-write operation is executed when the status signals
(a) S1=0, S0=0 (b) S1=0, S0=1
(c) S1=1, S0=0 (d) S1=1 S0=1
- (ii) L1: 'XRA A
ADD B
JZ L2
DCR B
JMP L1
L2: RST1'
After execution of above codes, Register B content would be
(a) 00H (b) Non zero value
(c) 01H (d) Incomplete information to predict value of Register B.
- (iii) TRAP in 8085 microprocessor is a
(a) Level triggered signal (b) Edge triggered signal
(c) Both Edge and Level triggered signal (d) None
- (iv) PSW in 8085 microprocessor indicates
(a) Flag Register (b) W-Z register
(c) A-F Register (d) None of These.
- (v) Port Address of Port B is 7DH. Port Address of the Control Word Register for the particular PPI 8255A IC would be
(a) 80H (b) 7EH (c) 7FH (d) 8DH
- (vi) In 8086 microprocessor if CS=3000H, DS=2000H and IP=1000H, the 20 bit physical address of the program code is
(a) 32000H (b) 32100H
(c) 31000H (d) 31200

- (vii) In 8085 microprocessor at the end of subroutine when the RET instruction is executed, the program control is transferred to the
 (a) Initial address of main program
 (b) End line of main program
 (c) Memory address stored in stack currently
 (d) Unspecified memory address.
- (viii) In 8086 microprocessor the 8 bit data is stored in even memory bank, when
 (a) $\overline{BHE}=0, A0=0$ (b) $\overline{BHE}=0, A0=1$
 (c) $\overline{BHE}=1, A0=0$ (d) $\overline{BHE}=1, A0=1$
- (ix) Microcontroller 8051 is using
 (a) RISC and Von-Neumann Architectures
 (b) RISC and Harvard Architectures
 (c) CISC and Princeton Architecture
 (d) CISC and Von-Neumann Architecture
- (x) Microcontroller 8051 has inbuilt memory of
 (a) 128 byte RAM (b) 4 kb ROM
 (c) Both (a) and (b) (d) 64 KB of total memory.

Fill in the blanks with the correct word

- (xi) 'LXI SP, DFFFH'- means accessible stack memory address is_____.
- (xii) To set Port A and C of PPI 8255A as input in Mode 0 the Control word is_____.
- (xiii) The maximum System memory supported in Microprocessor 8086 is_____.
- (xiv) In microcontroller 8051, the instruction "MOV P2, #0FFH" is setting PORT2 as_____.
- (xv) DPTR in microcontroller 8051 is a_____.

Group - B

2. (a) Write the significance of Multiplexed Address Data Bus. Explain the purpose of ALE signal in the de-multiplexing of address information. Also write the significance of Program Counter. [[CO1] (Understand/IOCQ)]
- (b) Explain the following addressing modes of 8085 Microprocessor with example:
 (i) Direct Addressing Mode
 (ii) Register Indirect Addressing Mode
 (iii) Implicit Addressing Mode. [[CO2] (Apply/IOCQ)]
- $(2 + 2 + 2) + (2 \times 3) = 12$**
3. (a) Write down the function of the following pin signals of 8085 Microprocessor (Any three):
 INTR, HLDA, $\overline{RESET\ IN}$, and X1-X2. [[CO1] (Understand/LOCQ)]
- (b) Write an Assembly Language Program(ALP) of 8085 microprocessor to Sort five numbers stored in memory locations C050H in descending order in 8085 Microprocessor. [[CO2](Solve/HOCQ)]
- $(2 \times 3) + 6 = 12$**

Group - C

4. (a) Explain the term 'Subroutine'. Describe with example how we can use subroutine with our main program? Why stack pointer is initialised when subroutine is used in program? [[CO2](Understand/IOCQ)]
(b) Write down features of various vectored interrupts of 8085 μ P. [[CO1](Remember/LOCQ)]
(c) Write an ALP to check the masking status of RST6.5 and set the mask for RST5.5. [[CO1](Solve/IOCQ)]
(2 + 2 + 1) + 4 + 3 = 12
5. (a) Write the result stored in registers A, B, C after the execution of following code. Calculate total execution time if operating frequency $f_0 = 3\text{MHz}$ of 8085.
LXI B, 2384H
DCX B
L1: MOV A, B
ORA C
JNZ L1 [[CO2](Apply/HOCQ)]
(b) Write a BSR control word subroutine to set bits PC7 and PC0 of 8255 and reset them after 20 millisecond. Assume that subroutine is available and address of 8255 CWR is 83H. [[CO6](Solve/HOCQ)]
6 + 6 = 12

Group - D

6. (a) Explain the EU and BIU of Microprocessor 8086 with block diagram? [[CO3](Explain/IOCQ)]
(b) Explain the function of any two from OF, DF, and TF of flag register of Microprocessor 8086. [[CO3](Remember/LOCQ)]
(c) Explain with diagram how a 20 bit physical address is generated in 8086 microprocessor. If address of CS=5505_H and address of IP=0500_H and BP=2000_H. Find the starting and ending address of CS. [[CO3](Analyse/HOCQ)]
4 + 4 + 4 = 12
7. (a) Explain the functions of the following signals of 8086. (Any two):
MIN/ $\overline{\text{MAX}}$, DT/ $\overline{\text{R}}$, $\overline{\text{LOCK}}$, $\overline{\text{DEN}}$, QS1-QS0. [[CO3](Remember/LOCQ)]
(b) Write an Assembly Language Program (ALP) of 8086 microprocessor to add two 32 bit Data stored in Internal Registers. Store the result in AX, BX and CX. [Two numbers are: 12ABCD34H and DEFC8765H]. [[CO4](Solve/HOCQ)]
(c) Write the significance of different segment registers in 8086 microprocessor. [[CO3](Understand/IOCQ)]
(2 + 2) + 5 + 3 = 12

Group - E

8. (a) Describe the operation performed by ALU with suitable block diagram in Microcontroller 8051. [[CO5](Explain/IOCQ)]

- (b) Draw and explain the bit pattern of PSW register of Microcontroller 8051.
[[C05](Remember/LOCQ)]
- (c) Write an Assembly language Program of Microcontroller 8051 to generate 5ms delay.
[[C05](Apply/IOCQ)]
3 + 3 + 6 = 12
9. (a) Explain the purposes of following signal line(s) in Microcontroller 8051:
 (i) $\overline{OE}$
 (ii) PSEN
 (iii) XTAL1-XTAL2
[[C05](Analyse/LOCQ)]
- (b) Write an ALP to add 8 bytes of data from RAM address 60H onwards and store the result in next available RAM address using Microcontroller 8051.
[[C05](Solve/HOCQ)]
(2 × 3) + 6 = 12
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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	28.12	37.50	34.38