MICROPROCESSOR & MICROCONTROLLER
(AEI2105)

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) Find the in correct mnemonics
(a) LHLD C100H (b) DAA (c) LDAX H (d) ADC B

(iii) After 'ADD B' instruction if 'JNZ XXXX' is used, which register's content is checked to see if it is zero
(a) A (b) B (c) C (d) D

(iv) If a Memory IC have address distribution from X000H to X3FFH hen it is an IC of capacity
(a) 4 KB (b) 3 KB (c) 2 KB (d) 1 KB

(v) Highest priority is assigned to the input signal
(a) RST5.5 (b) HOLD (c) RST7.5 (d) TRAP

(vi) Port Address of Port A is 7CH. Port Address of the Port C for the PPI IC would be
(a) 80H (b) 7EH (c) 7FH (d) 8DH

(vii) In bidirectional mode of operation in PPI 8255A, Ports used for **data transfer** and *handshaking signal generation* are _____ and _____ simultaneously
(a) **Port C** and *Port B* (b) **Port B** and *Port C*
(c) **Port A** and *Port B* (d) **Port A** and *Port C*

(viii) In Synchronous mode of operation USART IC is used sending data byte
(a) With Clock pulses (b) Accompanied with Start and Stop bit
(c) With both(a) and (b) (d) None of these.

(ix) Register bank address by RS1=1 and RS0=1 of Microcontroller 8051.
(a) 00H-07H (b) 10H-17H (c) 20H-28H (d) 18H-1FH

(x) In Microcontroller 8051, to start the timer, T1 via hardware triggering in Mode 1, execute ALP:

(a) MOV TMOD, #90H (b) MOV TMOD, #80H
(c) MOV TCON, #90H (d) MOV TMOD, #C0H

Fill in the blanks with the correct word

(xi) AD0-AD7 is de-multiplexed though the Latch IC_____.

(xii) _____ signal is used to disable all the Interrupt Request.

(xiii) To initialise STACK memory from CDEF H memory address the Program code would be_____.

(xiv) In Microcontroller 8051, the instruction "MOV P1, #00H" is initialising PORT P1 as _____.

(xv) In-built ROM in Microcontroller 8051 is _____.

Group - B

2. (a) Describe the Flag Register 8 bit configuration. Write an instruction which does not affect any flag bit after execution. *[(CO1)(Explain/IOCQ)]*

(b) Write a program to Shift and paste 13 data from 9500H onwards to ABCD H in **reverse** manner. (9501H memory content to be shifted into ABCC H memory.) *[(CO3)(Solve/HOCQ)]*

(4 + 2) + 6 = 12

3. (a) First Ten odd numbers starting from 01H are stored in memory locations 8F00H onwards. Write a program to multiply the block of numbers by 4 and store them from memory locations 8B00H onwards sequentially. *[(CO3)(Solve/HOCQ)]*

(b) Discuss about the registers (8/16 bit) of Microprocessor 8085 that we can access. Also explain: CALL instruction in Microprocessor 8085. *[(CO2)(Remember/LOCQ)]*

6 + (4 +2) = 12

Group - C

4. (a) Write an ALP to load 56H in Flag Register. *[(CO2)(Apply/IOCQ)]*

(b) Write an ALP to send last digit of your Autonomy Roll number serially to a serial data receiver. Please incorporate some finite delay between two successive bits. *[(CO4)(Solve/HOCQ)]*

(c) Compare Subroutine and Service Routine. *[(CO4) (Compare/IOCQ)]*

2 + 7 + 3 = 12

5. (a) Interface 32 KB RAM using 8KB RAM IC and a NAND gate address decoder with the 8085. Calculate the final address of the 32 KB RAM whose initial address is 0000H. *[(CO5)(Design/HOCQ)]*

(b) Draw the circuit diagram that puts RST 1 instruction opcode (CFH) on acknowledging the interrupt and explain the same. *[(CO4)(Remember/IOCQ)]*

6 + 6 = 12

Group - D

6. (a) Explain the BSR Control Word Register Bit Significance. *[(CO6)(Explain/LOCQ)]*
   (b) Draw the block diagram to set PPI8255A Port A in Mode1. Set it in Input mode. Explain how the handshaking signals generated by Port C signal lines. Also draw a timing diagram to explain the operation. *[(CO4)(Analyse/IOCQ)]*

2 + (4 + 4 + 2) = 12

7. (a) With detailed block diagram explain the DMA operation performed by DMAC 8237A. *[(CO6)(Understand/IOCQ)]*
   (b) Describe the I/O mode control word bit significance of PPI 8255A. Also write an ALP to set Port A and Port B as I/P and Port C as O/P, all in Mode0. *[(CO6)(Remember/LOCQ)]*

(3 + 3) + (3 + 3) = 12

Group - E

8. (a) With example describe the Register Indirect and Indexed Addressing in Microcontroller 8051. *[(CO2)(Explain/IOCQ)]*
   (b) Describe with diagram the 128byte RAM organisation of Microcontroller 8051. *[(CO1)(Remember/LOCQ)]*
   (c) Write an Assembly language Program of Microcontroller 8051 to generate 5ms delay. *[(CO3)(Apply/IOCQ)]*

3 + 3 + 6 = 12

9. (a) What is the default value of Stack Pointer in Microcontroller 8051 and Why? *[(CO1)(Analyse/IOCQ)]*
   (b) There are 8 bytes loaded in register bank2. Shift it to RAM 60H onwards sequentially using Microcontroller 8051. *[(CO2)(Solve/HOCQ)]*
   (c) Explain the following instruction:
   (i) DIV (ii) DJNZ R6, Relative Add,
   (iii) ADD A, @R0 *[(CO2)(Explain/IOCQ)]*

2 + 4 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	17.7	45.8	36.5