

M.Sc. (INFORMATICS) 1st Sem. – 2016
Paper IT15 – MICROPROCESSOR AND INTERFACE PROGRAMMING

Time: 3 hrs.

Attempt any 5 questions.

Max Marks: 75

Question No.1 is compulsory.

(Write your Roll No. on the top immediately on receipt of this question paper)

1. Attempt any five :

(a) Write results after execution of following instructions:

(i) MOV AL,22; MOV BL,44; ADD AL,BL

(ii) MOV CL,34; MOV AL,FF; SUB AL,CL

(iii) MOV AX,8796; MOV CL,2; ROR AX,CL

(b) Write the procedure to determine physical address for the following instructions as given below :

(i) MOV AL,CS:[BX+0400]

(ii) MOV AX,[3000]

(iii) MOV AL,[BX+SI+22]

Assume CS = 4000H, IP=2300H, SI=2300H and DS= 5000H

(c) Write the difference between following instructions:

(i) CBW and CWD

(ii) MOV reg,immediate and LEA reg,address

(iii) RCL and ROL

(d) Determine the control word for the following configuration of the ports of Intel 8255 for Mode 1 operation :

Port A is used as input and operation mode of port A is Mode 1.

Port B is used as output and operates in Mode 1.

PC₆ and PC₇ act as input.

(e) Write a program to use counter 1 of 8254 in mode 3 as a square wave generator. Assume N=16. The counter operates as a binary counter.

(f) What should be the OCW code if interrupt inputs IR₀ through IR₃ are to be marked and IR₄ through IR₇ are to be unmarked ? (5×3)

2. (a) Discuss string instructions with suitable examples. Explain why REP prefix is added with string instructions. Which string instruction should be used to ensure that two strings in the memory are equal?

(b) Explain with example various addressing modes of 8086 microprocessor. What do you understand by overlapping segment.

(c) Write an assembly language program to calculate the following :

$$W \leftarrow X + Y - 24 + Z$$

Where X, Y and Z are defined as double words.

(5,5,5)

$$\left. \begin{array}{l} [] \\ [] \\ [] \end{array} \right\}$$

1800
 7
 2

AX : AX
 2+2 2

3. (a) Explain various branch instructions.
 (b) What is interrupt? Explain all the defined interrupts. (9,6)

4. (a) What is BHE pin in 8086 microprocessor? Explain how it is used along with A_{00} bit of Address line to access bytes and words from even and odd addresses.

(b) Interface four $2K \times 8$ EPROMS and two $2K \times 8$ RAM chips with 8086. Select a suitable Map.

(c) Configure PPI – 8255 such that port A is an output port, and both port B and C are input ports. All three ports are set up for mode 0 operation. Write a program that will input the data at port B and C, find the difference (Port C)-(Port B), and output this difference to port A. The base address for port A is given as 38H. (4,4,7) MSB
LSB

5. (a) Interface DAC AD 7523 with an 8086 CPU running at 8 MHz and write an assembly language program to generate a sawtooth waveform of period 2ms with $V_{max} = 5V$. Given that time required to execute one loop is $4 \mu s$.

(b) Explain various modes of operation of programmable interval timer 8254.

(c) Explain the following signal description of 8251 USART.

(i) \overline{TXD} (ii) \overline{RXC} (iii) \overline{TXRDY} (iv) \overline{DTR}
 (v) \overline{CTS} (5,5,5)

6. (a) Given an array of 100 16-bit signed integer numbers, write a program to generate a new array B(I) so that

$$B(I) = A(I) \quad \text{for } I = 1 \text{ and } 100$$

$$\text{and } B(I) = \frac{1}{4}[A(I-1) - 5A(I) + 9A(I+1)], \quad \text{for all other } I's$$

(b) Explain the control signal definitions of stroked bidirectional I/O (mode 2)

(c) How would the integer +500 and -1000 be stored in memory starting at address 0A000H? (8,4,3)

$$\begin{array}{r} 1 \\ 32 \\ 16 \\ 8 \\ \hline 2 \end{array}$$