[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 8760 **C** **Roll No.....**

Unique Paper Code : 251501

Name of the Paper : ELHT 501 : Microprocessors and Microcontrollers

Name of the Course : B.Sc. [H] Electronics, Part III

Semester : V

Duration : 3 hours

Maximum Marks : 75

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

Instructions for candidates

Attempt five questions in all including Question No. 1which is compulsory.Use of non-programmable scientific calculator is allowed. Control word Formats for various peripheral chips are given at the end.

1.(a) Briefly explain the function of following pins

(i) MN/$\overline{MX}$
(ii) HOLD
(iii) DT/ $\overline{R}$ 3

(b) The opcode for MOV DL,[DI] instruction is 8A15 H .Give the opcode for

(i) MOV [DI+6],DL
(ii) MOV DX,[DI+6] 3

(c) State whether the following instructions are correct or incorrect with reference to 8086 microprocessor. Give reasons if they are incorrect.

(i) IN BL, 20H
(ii) MOV SS, DS
(iii)MOV AL,[CX] 3

(d) Differentiate between fully nested mode and automatic rotation mode of 8259 programmable interrupt controller. 3

(e) Specify the function of DPTR register and F0 flag in 8051 microcontroller. 3

2. (a) Give the software architecture of 8086 microprocessor and specify the default 16 bit combination of segment register with other registers. 5

P.T.O.

(b) Trace the execution of the following program segment and specify the contents of registers and stack after execution of each instruction

```
MOV SP, 2000H
MOV AX, 1234H
MOV BX, 5678H
PUSH AX
PUSH BX
POP AX
POP BX
```

5

(c) Give an example of each of the following addressing modes:

(i) Immediate
(ii) Direct
(iii)register indirect
(iv)register relative
(v) base index

5

3.(a) Differentiate between intrasegment and intersegment Jump instruction. Explain with an example of each type. 4

(b) Write a program segment to set and reset the trap flag. (It is the least significant bit of higher order byte of Flag register in 8086 processor). 5

(c) Write instructions to accomplish the following

(i) Multiply the contents of BX register by 8 without using MUL instruction.
(ii) Fill 50 memory locations starting from ES:0100 with 20H
(iii) Convert unpacked BCD 0604 into its binary equivalent. 6

4. (a) Write a program to add only positive numbers from a block of 20 numbers stored at starting address DS:0200H. 4

(b) Compute the frequency and draw the output waveform of the following program segment of 8253 timer . Counter0 operates on clock frequency of 2MHz.

```
MOV AL, 37H
OUT CONTROLREG, AL
MOV AL, 20
OUT  COUNTER0,AL
MOV AL,00
OUT  COUNTER0,AL
```

5

(c) Differentiate between the following instructions

(i) AND and TEST
(ii) JG and JA
(iii) DAS and AAS

6

5. (a) Design a circuit to interface 8255 with 8086 microprocessor using I/O mapped I/O.Port A should have the address 0400H.Connect 8 keys to Port A ,8 keys to Port B and 8 LEDs to Port C. 5

(b) With reference to circuit designed in part (a), write a program to compare the input data from Port A and Port B. Display the greater of the two on Port C. 5

(c) Draw a block diagram to connect Port A to a keyboard (having DAV pin which goes low when a key is pressed) using handshaking signals.Write a program segment to read the key by polling IBF signal (bit position PC5). Assume Port A address to be 80H. 5

6. (a) Write a program to configure the 8279 in encoded scan,2 key lockout, left entry ,8 character display. It should operate at 100 kHz. Clock input to 8279 is 2.5 MHz and address of command port is 41H. 5

(b) Write a program to initialise 8259 in 8086 system with the following parameters - Level triggered, address interval of 4 bytes in AEOI Mode, non- buffered, no special fully nested mode .Read the status of IRR and store at memory DS:2000H.IR0 will have type 20H interrupt. Assume address for ICW_1 as 20H. 5

(c) Why are some address pins in 8257 are bidirectional? Identify them. Specify the function of ADSTB and AEN pins. 5

7. (a) Briefly explain the organisation of internal RAM in 8051. 4

(b) Briefly explain the special features of Pentium processor. 5

(c) Draw the internal architecture of 8051 microcontroller. 6

Control Word Format of 8255

IO	mode	for-A	Port A	Port C_U	Mode -B	Port-B	Port C_L

BSR	X	X	X	B_2	B_1	B_0	S/R

Control Word Format for 8253

SC_1	SC_0	RL_1	RL_0	M_2	M_1	M_0	BCD

Control Word Format of 8279

Keyboard/Display mode Set

0	0	0	D	D	K	K	K

P.T.O.

Programmable Clock

0	0	1	P	P	P	P	P

Control Word Formats of 8251

S_2	S_1	EP	PEN	L_2	L_1	B_2	B_1

Control Word Formats of 8259

ICW_1

x	x	x	1	LTIM	ADI	SNGL	IC4

ICW_2

T_7	T_6	T_5	T_4	T_3	X	X	X

ICW_3 (for master)

S_7	S_6	S_5	S_4	S_3	S_2	S_1	S_0

ICW_3 (slave)

0	0	0	0	0	ID_2	ID_1	ID_0

ICW4

0	0	0	SFNM	BUF	M/S	AEOI	μP

OCW_1

M_7	M_6	M_5	M_4	M_3	M_2	M_1	M_0

OCW_2

R	SL	EOI	0	0	L_2	L_1	L_0

OCW_3

0	ESMM	SMM	0	1	P	RR	RIS