Time: 2 ½ Hours **Total Marks : 60**

N.B. : (1) **All** questions are **compulsory**.

(2) **Figures** to the **right** indicate **full** marks.

(3) Draw **neat** diagrams wherever **necessary**.

(4) Symbols have usual meanings unless otherwise stated.

(5) Use of **non-programmable** calculator is allowed.

1. (a) Attempt any **one:**---

(i) With reference to µp 8085 explain the difference in software and hardware interrupt. What are the different hardware and software Interrupts available in µp 8085? **8**

(ii) With help of neat schematic diagram explain how you can interface IC 8255 with a 4 x 4 Keypad. **8**

(b) Attempt any **one:**---

(i) List and explain any four features each of the Keyboard section and Display section in IC 8279. **4**

(ii) Explain the function of following registers/blocks with reference to IC 8259 **4**
(a) In Service Register (ISR) (b) Priority Resolver
(c) Interrupt Request Register (IRR) (d) Interrupt Mask Register (IMR)

2. (a) Attempt any **one:**---

(i) Explain the concept of ODD and EVEN Banks. **8**

(ii) Explain the functions of the following 8086 pins: **8**
I) HOLD, HLDA II) READY III) ALE IV) RESET

(b) Attempt any **one:**---

(i) Five data words are stored in consecutive memory locations having offset 0500H. Write an assembly language program in 8086 to find the smallest amongst these data words. **4**

(ii) Explain the SIGN and OVERFLOW Flag of 8086. **4**

3. (a) Attempt any **one:**---

(i) Write a program using Timer Interrupts of 8051 microcontroller to generate two square waves – one of 5KHz frequency at pin P1.3 and another of frequency 25KHz at pin P2.3. Assume that XTAL = 22MHz. **8**

(ii) Give the characteristics of mode 1 of Timer in 8051 microcontrollers. Describe the steps in programming the Timer of microcontroller 8051 in mode 1. **8**

(b) Attempt any **one:**---

(i) Draw a block diagram of MAX 232 and its connection to 8051 microcontroller. Hence describe the working of MAX 232. **4**

(ii) In the given program, calculate the frequency of the square wave generated on pin P1.5. Include overhead due to instructions in the loop. Assume XTAL = 11.0592 MHz. **4**

```
HERE:   MOV TL0,#0F2H
        MOV TH0,#0FFH
        CPL  P1.5
        ACALL DELAY
        SJMP HERE
DELAY: SETB TR0
AGAIN: JNB TF0, AGAIN
        CLR TR0
        CLR TF0
        RET
```

4. (a) Attempt any **one:**---

(i) Explain any eight core features of Microcontroller chip Family 16C6X. **8**

(ii) Explain the Memory organization in PIC with reference to 16C6X family. **8**

(b) Attempt any **one:**---

(i) What is Byte-oriented and Bit-oriented instructions in PIC chip instruction set. Give example in each case. **4**

(ii) What is the role of STATUS register in PIC chip 16C61? What are the different bits represented in it? **4**

5. Attempt any **four:**---

(a) Explain the three different types of transfers which can happen in active transfer mode in IC 8237. **3**

(b) Explain the term serial communication and parallel communication with suitable example. **3**

(c) Fifty data words are stored in consecutive memory locations having offset 0500H. Write an assembly language program in 8086 to transfer the entire block of data words to a new offset beginning from 0700H. **3**

(d) Explain the meaning of the following 8086 instructions with suitable examples: **3**

A. REPNZ B. LOOPZ

(e) Describe 'data framing' with the help of suitable example. **3**

(f) Explain the use of RI flag in serial communication in 8051 microcontroller. **3**

(g) Explain the role of FSR and INDF special purpose file registers in PIC chip. **3**

(h) What is Watchdog timer and it's used in PIC chip? **3**
