Using IRQ of 0512877 to activate the 8051 interrupt We can connect the IRQ of the DS12887 to the external interrupt pin of the 8051 (INTO). This allows us to perform a task once per day, once per minute, and so on. The program given in the next two pages will (a) sound the buzzer connected to SQW pin, and (b) will send the message "YES" to the serial port once per minute at exactly 8 seconds past the minute. The buzzer will stay on for 7 seconds before it is turned off.

LIST OF QUESTIONS
PART A

1. What is the need for interrupt controller?

When two or more device sends interrupt at the same time the interrupt controller will select one of the interrupt based on the priority.

2. What is keyboard debouncing?

When a key is depressed and released, the contact is not broken permanently. In fact, the key makes and breaks the contacts several times for a few milliseconds before the contact is broken permanently. If a key depression is detected by a microprocessor, it is possible that the depression may be false, i.e. it may be due to the bouncing of the key. It is, thus necessary to de bounce the key after depression.

3. What is settling or conversion time in DAC?

The time required to convert digital signal to analog signal is called as conversion time or settling time in DAC.

4. What is meant by two key lockout?

In two key lock out if another key is depressed while the first key is being debounced, the key which is released last will be entered into FIFO.

5. What is meant by N key roll over?

N-key roll over treats each key depression independently. If more than one key is depressed, after they were depressed they are all entered in the order they were sensed.

6. What is the necessity of programmable interval timer?

One of the most common problem in any microcomputer system is the generation of accurate time delay under software control. In many application the processor has to wait for some time. In keyboard interface, the CPU waits about 5 ms in case of each key depression, in order to check for false depression. 8253 solves this problem by facilitating three 16-bit programmable counters on the same chip.

7. What is the need for keyboard and display controller?

In the keyboard interface, the microprocessor scans the various keys, performs software debouncing and finally finds out the code of the depressed key. In the display interface, the microprocessor is busy in sending bit-by-bit information to the shift registers regarding the display of various segments. This puts the load on the CPU, which it may not be

able to take in certain environments where the CPU has to handle a number of tasks in a very short duration.

The system designer, therefore needs an interface that can control these functions without placing the load on the CPU. The 8279 provides these function for the microprocessor.

8. *Name the modes available in 8255.*
    i)   Bit set reset mode
    ii)   I/O mode
              a)   Mode 0: Simple I/O
              b)   Mode 1: Strobed I/O
              c)   Mode 2: Strobed bidirectional bus

9. *What are the functions of DMA controller?*
It has four independent channels with each channel capable of transferring 64K bytes. The controller manages the data transfer between memory and a peripheral under its control, thus bypassing the microprocessor. It also resolves priority among the requested devices.

PART B

1. **Explain about keyboard and display controller with a neat sketch.(16)**
2. **Explain the operation of traffic light controller. (8)**
3. **Draw the block diagram of 8255. Mention its operating modes. (16)**
4. **Explain the interfacing of D/A converter and A/D converter with microprocessor. (16)**
5. **With a neat block diagram explain the working of 8251 UART? (8)**
6. **Draw the internal architecture of 8353 timer and explain its operating modes in detail. (16)**
7. **Discuss in detail the working of programmable interrupt controller? (8)**
8. **Explain the working of DMA controller in detail? (16)**