UNIT-III I/O INTERFACING

1. What is memory mapped I/O?
This is one of the techniques for interfacing I/O devices with μp. In memory mapped I/O, the I/O devices assigned and identified by 16-bit addresses. To transfer the data between MPU and I/O devices memory related instructions (such as LDA, STA etc.) and memory control signals (MEMR,MEMW) are used.

2. What is I/O mapped I/O?
This is one of the techniques for interfacing I/O devices with μp. In I/O mapped I/O, the I/O devices assigned and identified by 8-bit addresses. To transfer the data between MPU and I/O devices I/O related instructions (IN and OUT) and I/O control signals (IOR, IOW) are used.
3. What is simplex and duplex transmission?
Simplex transmission: data are transmitted in only one direction. Duplex transmission: data flow in both directions. If the transmission goes one way at a time, it is called half duplex; if it goes both way simultaneously, then it is called full duplex

4. Define Baud.
The rate at which the bits are transmitted, bits per second is called Baud.
5. What are the signals available for serial communication?
SID – serial input data
SOD – serial output data

6. What is USART?
It is a programmable device. Its function and specification for serial I/O can be determined by writing instructions in its internal registers. The Intel 8251A USART is a device widely used in serial I/O.

7. Write the features of 8255A.
The 8255A has 24 I/O pins that can be primarily grouped primarily in two 8-bit Parallel ports: A and B, with eight bits as port C. The 8-bits of port C can be used as two 4-bit ports:C UPPER CU and CLOWER CL.

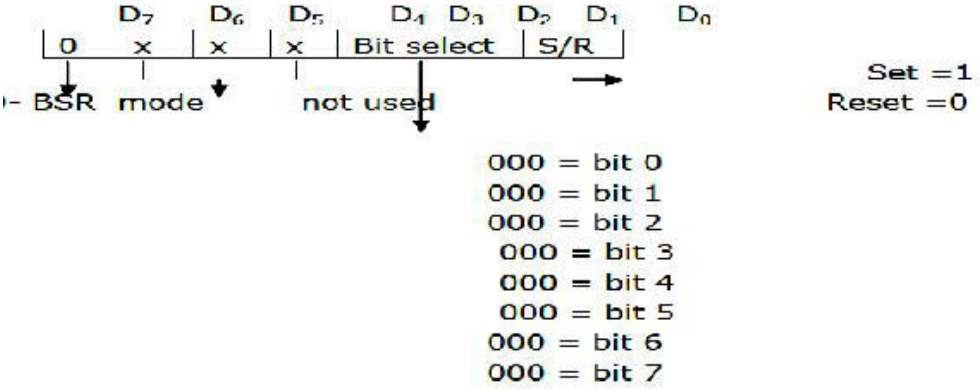
8. What is BSR mode?
All functions of 8255 are classified according to 2 modes. In the control word, if D7 = 0, then it represents bit set reset mode operation. The BSR mode is used to set or reset the bits in port C.

9. What is mode 0 operation of 8255?
In this mode, ports A and B are used as two simple 8-bit I/O ports and port C as two 4-bit ports. Each port can be programmed to function as an input port or an output port. The input/ output features in mode 0 as
follows:
i. outputs are latched
ii. inputs are not latched
iii. ports do not have handshake or interrupt capability.

10. What are the modes of operation supported by 8255?

i. Bit set reset mode(BSR)
ii. I/O mode
Mode 0
Mode1
Mode2

11. Write the control word format for BSR mode.



12. What is ADC and DAC?
The electronic circuit that translates an analog signal into a digital signal is called analog-to-digital converter (ADC). The electronic circuit translates a digital signal into an analog signal is called Digital-to-analog converter (DAC).

13. Define conversion time.
It is defined as the total time required to convert an analog signal into a digital output. It is determined the conversion technique used and by the propagation delay in various circuits.

14. What are the functions to be performed by µp while interfacing an ADC?
i. Send a pulse to the START pin.
ii. Wait until the end of conversion
iii. Read the digital signal at an input port

15. Write the different types of ADC.
i. Single slope ADC
ii. Dual slope ADC
iii. Successive approximation ADC
iv. Parallel comparator type ADC
v. Counter type ADC

16. What is resolution time in ADC?
It is defined as a ratio of change in value of input voltage Vi, needed to change the digital output by 1 LSB. If the full scale input voltage required to cause a digital output of all 1‟s is V_{iFS}. Then the resolution can be given as
Resolution = V_{iFS} / (2n-1)

17. List the functions performed by 8279.

i. It has built-in hardware to provide key debounce.
ii. It provides a scanned interface to a 64 contact key matrix.
iii. It provides multiplexed display interface with blanking and inhibit options.
iv. It provides three input modes for keyboard interface.

18. What is key debounce?
The push button keys when pressed, bounces a few times, closing and opening the contacts before providing a steady reading. So reading taken during bouncing may be faulty. Therefore the microprocessor must wait until the key reach to steady state. This is known as key debounce.

19. What are the operating modes in 8279?
i. Scanned keyboard mode
ii. Scanned sensor matrix
iii. Strobed input

20. What is N-key rollover?
In N-key rollover each key depression is treated independently from all others. When a key is depressed, the debounce logic is set and 8279 checks for key depress during next two scans.

21. Find the program clock command word if external clock frequency is 2 MHz.
Prescalar value = (2 x106) / (100 x 103) = (10100)2
Therefore command word = (00110100)2

22. What is multiple interrupt processing capability?
Whenever a number of devices interrupt a CPU at a time, and id the processor is able to handle them properly, it is said to have multiple interrupt processing capability

23. What is hardware interrupt?
An 8086 interrupt can come from any one of three sources. One sources is an external signal applied to the nonmaskable interrupt(NMI) input in or to the interrupt (INTR) input pin. An interrupt caused by the signal applied to one of these input is referred to as hardware interrupt.

24. What is software interrupt?
The interrupt caused due to execution of interrupt instruction is called software interrupt.

25. What are the two types of interrupts in 8086?
The two types of interrupts are:
i. External interrupts: In this, the interrupt is generated outside the processor.
Example: Keyboard interrupt.
ii. Internal interrupts: It is generated internally by the processor circuit or by the execution of an interrupt instruction.
Example: Zero interrupt, overflow interrupt.