

Assignment - 5

Section-A

Ques-① State any 2 peripheral devices.

Ans- Two peripheral devices are -

- 1) Printer
- 2) External Hard Drive

Ques-② In DMA transfers, the required signals and addresses are given by the ---.

- a) Processor
- b) Device drivers
- c) DMA controllers
- d) The program itself

Ans- c) DMA controllers

Ques-③ Which devices allows you to enter data and instructions into a computer?

- a) Input device
- b) Output device
- c) ALU
- d) CPU

Ans- a) Input device

Ques-④ Computer data is transmitted block by block in transmission is known as "block transmission" or "block-level transmission".

Write one uses of -

(5) Magnetic disk

Ans- One use of magnetic disks is for computer data storage and retrieve digital data in computer systems.

(6) Control Command

Ans- One common use of control commands is in operating systems to manage processes.

(7) Status command

Ans- One example use of the "status command" is System Monitoring.

(8) Address register

Ans- One use of an address register is to store memory addresses within a computer system.

(9) Word count register

Ans- One use of a word count register is in word processing software or text editors to track the number of words in a document or text selection.

⑩ Control register

Ans- Control registers are special-purpose registers that store control information and setting used by the processor or the computer system.

Section-B

Ques ① What is known as strobe signal?

Ans- A strobe signal refers to a brief, intense burst of light or electromagnetic radiation used for synchronization, timing, or capturing high-speed motion in fields such as photography, robotics and scientific measurements.

Ques ② What is a data bus?

Ans- A data bus is a communication pathway within a computer or electronic system that allows the transfer of data between different components such as the CPU, memory and peripherals. It carries digital signals and is responsible for transmitting and receiving data.

Ques ③ What is memory-mapped.

Ans- Memory-mapped refers to a technique where hardware devices or peripherals are accessed and treated as if they were part of the computer's memory space. This allows data to be read from or written to these devices using memory operations, simplifying communication between the CPU and peripherals.

Ques ④ What is handshaking.

Ans- Handshaking is a protocol or process used to establish and confirm a connection or agreement between two entities, often in communication systems. It involves exchanging predefined signals or messages to synchronize and ensure proper communication between the parties involved.

Section-c

Ques ① Explain the following terms : Bus grant and Bus request.

Ans- Bus grant :- A bus grant is a signal sent by a bus controller to grant permission to a device or module to access the system bus.

When multiple devices share a common bus, only one device can access the bus at a time. The bus grant is a mechanism to coordinate and allocate bus access among multiple devices, ensuring that only one device is granted permission to transmit data on the bus at any given time.

Bus Request:- A bus request is a signal sent by a device that wants to perform a data transfer but needs permission from the bus controller. Both signals are. It is used when a device wants to initiate a data transfer but currently doesn't have permission to use the bus. The bus request signal informs the bus controller that the device is awaiting its turn to access the bus.

In summary, a bus grant is a signal given by a device to obtain permission to use the bus, while a bus request is a signal sent by a device to express its desire for bus access when permission is not currently granted.

Ques ② What is valid data in terms of address bus and data bus.

Ans- In the context of address and data buses, valid data refers to the accurate and reliable information being transmitted over these buses during a computer system's operation.

The address bus carries the memory or device location information to identify a specific location in the system's memory or I/O space. Valid data on the address bus means that the address being transmitted is correct and corresponds to a valid memory or I/O location.

The data bus, on the other hand, is responsible for transferring the actual data between the system components. Valid data on the data bus implies that the data being transmitted is accurate, in fact and consistent with the intended information.

Ensuring valid data on both the address and data buses is crucial for proper communication and operation within a computer system, as any errors or inconsistencies could lead to incorrect results, system instability, or data corruption.

Section-D

Q. Explain in details about the DMA controller.

A DMA (Direct Memory Access) controller is a hardware device that enables data transfer between peripheral devices and main memory in a computer system. Its primary purpose is to offload the CPU, thereby freeing it up to perform other processing tasks.

The DMA controller works by directly accessing the system bus and by passing of the transfer of data to the CPU. It coordinates the transfer of data between devices and memory by utilizing channels or ports. These channels enable simultaneous data transfers, allowing multiple devices to transfer data independently of the CPU.

The DMA controller operates in several stages. First, the controller is programmed by the CPU to specify the source and destination addresses, transfer length, and other parameters. Next, the controller requests ownership of the bus from the CPU. Once granted, it initiates the transfer by

transferring data directly between the peripheral device and the memory. During the transfer, the CPU can continue executing other instructions.

After the transfer is complete, the DMA controller notifies the CPU, and the CPU can perform any necessary post-processing tasks. This process significantly reduces the CPU's involvement in data transfer operations, resulting in improved system performance and efficiency.

Overall, the DMA controller plays a crucial role in optimizing data transfers, enhancing system performance and reducing the burden on the CPU in computer systems.

Ques. ② Difference between isolated and memory mapped I/O.

Ans.

Isolated I/O

Memory and I/O have separable address space.

All address can be used by the memory.

Separate instruction control read & write operation in I/O memory.

In this I/O address are called separate buses.

More efficient due to separate buses.

Larger in size due to more buses.

If it is complex because separate logic is used to control both

Advantages -

Advantages -

Large I/O address space.
Faster I/O operations.

Advantage -

- Greater flexibility
 - Improved Reliability
- (ix) Disadvantages -
- Slower I/O operations
 - More complex programming

Advantage -

- Simplified Programming
 - Efficient use of memory space.
- (x) Applications -

- Graphics Processing
- Network communication
- Direct Memory Access (DMA)