Part - A

1.) Types of locality of references.

There are two basic types of reference locality - temporal and spatial locality. Temporal locality refers to the reuse of specific data and/or resources within a relatively small time duration. Spatial locality (also termed data locality) refers to the use of data elements within relatively close storage locations.

2.) Define the structure of memory hierarchy in a typical computer system and draw its diagram

In the computer system Design, Memory Hierarchy is an enhancement to organize the memory such that it can minimize the access time. The memory hierarchy was developed based on a program behaviour known as locality of reference. The figure below clearly demonstrates the different levels of memory hierarchy.
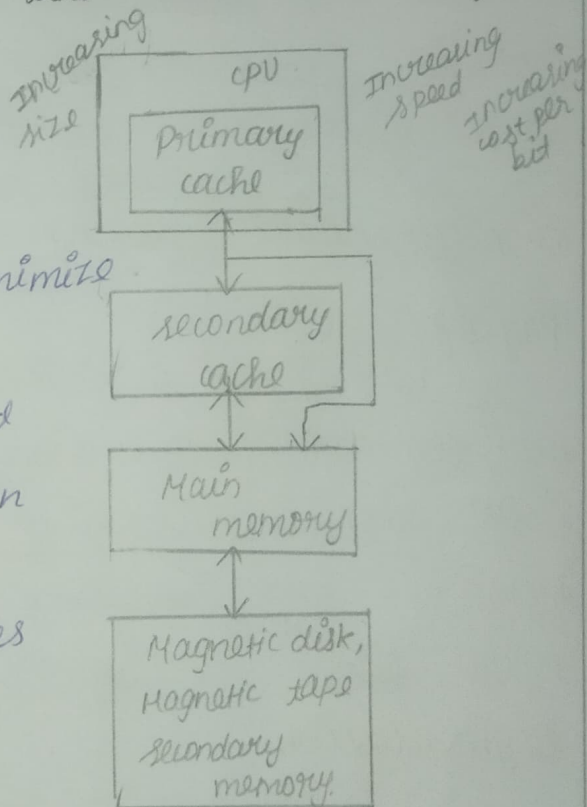
3 What is miss penalty?

Multilevel caches is one of the techniques to improve cache performance by reducing the "MISS PENALTY". Miss penalty refers to the extra time required to bring the data into cache from the main memory whenever there is a "miss" in the cache.

4. State hit rate and miss rate.

The percentage of access where the processor finds the code or data word it needs in the cache memory is called the hit rate or hit ratio.

The percentage of accesses where the processor does not find the code or data word it needs in the cache memory is called the miss rate.

5. Differentiate paging and segmentation.

Paging:

Paging is a method or technique which is used for non-contiguous memory allocation. It is a fixed-size partitioning theme. In paging, both main memory and secondary memory are divided into equal fixed size partitions.

Segmentation.

Segmentation is another non-contiguous memory allocation scheme like paging. Like paging, in segmentation, the process isn't divided indiscriminately into mounted size pages. It is a variable-size partitioning theme.

1.) Evaluate the features of Bus Architecture - Master and slaves.

In parallel interface number of lines required to transfer data depend on the number of bits to be transferred.

Parallel interface is also not Practical for devices such as cassette tapes or a CRT terminal. In such situations, Serial interface is used.

RS - 232 :

RS232 is a standard protocol is used for serial communication, it is used for connecting computer and its peripheral devices to allow serial data exchange between them.
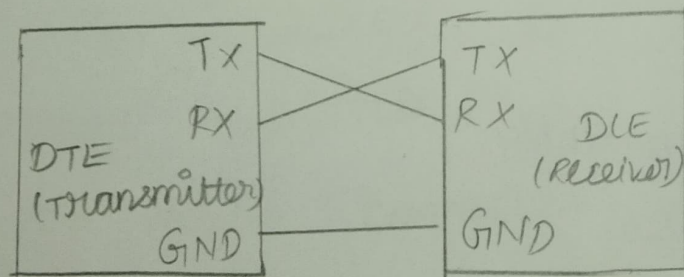
RS232 protocol.

Universal Serial Bus (USB):

USB gives fast and flexible interface for connecting all kinds of pheripherals.

USB is playing a key role in fast growing consumer areas like digital imaging, pc telephony and multimedia games etc.,

USB has advantage that specifically benefit developers, including the hardware designers who select components and design the circuits, the pc programmers who write the software that communicates with USB peripherals and peripherals programmers who write that code that resides inside USB pheripherals.

Features:

→ simple connectivity
→ simple cables.
→ one interface for many devices.
→ Automatic configuration.
→ No user setting.

→ free hardware resources for other devices.

→ Hot pluggable.

→ Data transfer rates.

→ co existence with IEEE 1394

→ Reliability

→ Low cost.

→ Low power consumption.

→ flexibility

→ operating system support.

Front View
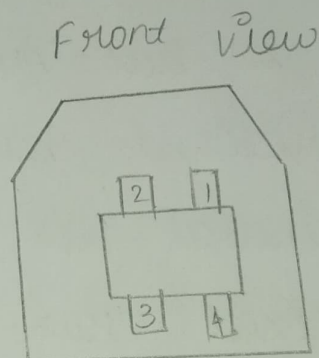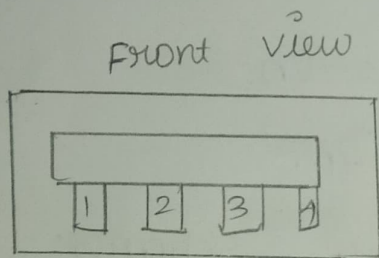
USB connector.

In either case, there are four signals as indicated in table. The 5.0 V and ground signals can be used to power the device connected on the PCI bus as long as the amount of current does not exceed 100 mA per device.

2) Bus Arbitration:

The device that is allowed to initiate data transfer on the bus at any given time is called the bus master.

Bus arbitration is the process by which the next device to become the bus master is selected and bus mastership is transferred to it. The selection of bus master is usually done on the priority basis.

Approaches to bus Arbitration:

→ Centralized bus Arbitration.

→ distributed bus Arbitration.

→ **centralized Bus Arbitration Schemes:**

There are three different arbitration schemes that use the centralized bus arbitration approach.

There schemes are.

→ daisy chaining.

→ polling method.

→ Independent request.

→ Distributed Arbitation:

When one or more devices request for the control of bus, they assert the start - Arbitration signal and place thier 4 - bit identification number.

Devices reads the status of all lines through inverter buffers so device reads bus status 0 as logic 1.

3) Input and devices.

→ peripheral input devices.

* keyboard

Alphanumeric keys.
Function keys.
Modifier keys.

⇒ Mouse.

A mouse is a palm-sized box used to position the screen cursor. It consists of all ball on the bottom connected to wheels or rollers to provide the amount and direction of movement.

=> Trackball:

A trackball works like an upside down mouse.

The trackball are mostly used on small work surfaces where sufficient space for mouse is not available.

=> Touch screens:

Automated teller machine.
Public information kiosks.
fast food restaurants.
Department stores.
Drugstores.
Supermarkets.
Lottery centers.

=> pheripheral output Devices.

The computer processes input data to produce useful information. There are two types.

→ Hard copy.
→ Soft copy.

→ Monitor

The computer send processed data to the monitor when the user needs to observe the output.

→ printer

when the user needs hard-copy of an output, the computer sends output to the printer.

⇒ Monitors:

→ Monochrome monitors
→ Grayscale monitors
→ color monitors.
→ CRT monitors
→ color CRT monitors.
→ flat panel monitors.