

Answers for the questions below can be found in the *Universal Serial Bus Specification* Revision 2.0 (also known as the “USB Standard”). The standard is available in hard-copy via the reserve collection at the Dordt Library. It is also available for free downloading from the Web. (A link is given on the Canvas homework page for this course.)

For each question below, provide an answer that is as complete as possible subject to the constraint that it is **less than 100 words**.

What is an **Isochronous Transfer**? (Section 5.6)

4/4 Isochronous Transfer is a time related transfer that will begin with a start packet. It will then have a certain amount of bandwidth to delivery. Another important note because this transfer is continuous it does not correct errors and depends on buffering or latency. An example of this type of transfer that everyone in the class has used is zoom. The video and audio feed are great examples because one can see what happens when there is an error and it does not fix it(Charlie sounding like a robot);-)

What is a **Bulk Transfer**? (Section 5.8)

4/4 A bulk transfer is used to move very large amounts of data and uses what's called bulk pipe to move the data. A bulk pip always can have communication flow in or out of the host. Lastly, the data transfer is always reliable because the hardware will detect if there is an error and fix it. An example of this would be a printer or scanner.

How many **microframes** are there in a **frame**? (Section 8.4.3.1)

4/4 1ms frame is divided into 8 microframes of 125µs each.

What is **Bus Enumeration**? (Section 9.1.2)

4/4 This is the process that will recognize and get an unique address to a device and then find out the changes happening within that device. The configuration will also let the device know when it removed and it will disable the port and then update the information it has received.

What is **Dynamic Attachment and Removal**? (Section 9.2.1)

4/4 This means that the USB can be attached and removed at any time. There is hub port that is responsible for reporting this change. When the hub port recognizes that it has been attached the USB will reset and have some conditions. When the device is removed the hub port will disable where it was attached and notifies the host of that removal.