1. **What are the two basic features of sound? Which feature determines the volume? Which one determines pitch?**

* Decibel (dB) and Hertz (Hz) are the measures of the features of sound. Volume determined by Db and Pitch determined by Hz.

1. **What is measured by decibels (dB)?**

* The intensity of sound is measured in dB, which determined the volume.

1. **What is measured by Hertz (Hz)?**

* The frequency of sound is measured in Hz, which determined the pitch.

1. **What is a sound frequency?**

* Speed of sound required to complete a cycle (includes at least 1 peak and 1 trough). The faster the sound, the higher the pitch.

1. **What is the sound wavelength?**

* Distance between 2 identical parts in the wavelength (usually measure between the current peak and the next peak or current trough to next trough).

1. **What are the rough frequency range and volume range that people to hear?**

* The human’s ear is the most sensitive at 1kHz - 4kHz**.**

1. **What is ultrasonic?**

* Sound waves produced with a frequency above the upper limit of human hearing.

1. **What is infrasonic?**

* Sound waves produced with a frequency below the lower limit of human hearing.

1. **In the range that people can hear, which sound is easier for a human to hear, lower or higher frequency?**

* In terms of frequency, a human ear can hear any sound in between the range of 20Hz to 20kHz, in general case, a human ear can hear the best at 1kHz to 4 kHz. In terms of decibel, a human’s ear can hear sound up to 80dB, and anywhere above it will cause damage to the ear, to as much as 150dB++.

1. **Which sound is less directional and hard to tell where it comes from, lower or higher frequency?**

* Lower as the wavelength is travelling too fast (too short).

1. **What are the two features determining the quality of digital audio?**

* Sample Rate and Sample Format (Bit Depth)**.**

1. **What is the term in digital audio that is the number of samples taken per second and measured in kilohertz (kHz), thousands of samples per second?**

* Sample Rate.

1. **What is the term in digital audio for how many bits are used to represent the value of each sample?**

* Sample Format or Bit Depth.

1. **(Fill in blanks)** For digital audio, the more often you take a sample (high sampling rate) and the more data you store about that sample (high bit depth), the **Higher** the resolution and **Higher** quality of the captured sound when it is played back, and the **Higher** file size.
2. **What is the file size for a 10-second stereo recording at 44.1kHz, 16-bit resolution (CD- quality)? SHOW your work (formula).**

* 44.1kHz equal for 44100Hz. With the formula we have, as SampleRate \* SampleFormat \* Time \* Channel, we have 44100\*16\*10\*2 = **14112000** bits, or in Bytes is 1764000 or in KB is 1722kb or in MB is 1.68mb.

1. **Provide at least 3 features that you would like to edit on digital audio.**

* Edit the frequency to increase/decrease the pitch, edit the Bit Depth to enhance the quality and split audio into smaller parts.

1. **Briefly explains at least 3 MIDI audio advantages, and 2 disadvantages.**

* **Advantages**: can be played much faster compared to other types, easy to edit or modify and sometimes have better quality than others.
* **Disadvantages**: required identical devices when produced vs. when playing to have the best result**,** limited effects.

1. **Discuss the following file formats. Are they lossy or lossless compressed or uncompressed file formats?** 
   * **.wav**: uncompressed, lossless
   * **.aiff**: uncompressed, lossless
   * **.mp3**: compressed, lossy
   * **.ogg**: compressed, lossy
   * **.flac**: compressed, lossy
   * **.aac**: compressed, lossless
2. **Briefly talk about 5+ guidelines regarding using audio/speech online, such as when/where/how to use it, what kind of audio, file format to use, etc. examples would be good.**

* Use acceptable quality audio, not to bad since users can’t listen to it well or too high quality where users won’t notice the differences and just waste the data.
* Only enable sound where applicable and users are expecting it.
* Notice the file type of audio, some file types are picky in an audio player.
* Use an adequate length of audio, not too short that the user can’t feel it or not too long where users will get bored.
* If audio requires manual play, place it where user can easily see and the button has to be big enough so that user won’t misclick that with other content (if any)**.**