

Questions on String instruments.

1. What are the three parameters that determine the fundamental frequency of a vibrating string?
2. What is the relationship between the speed of a wave on a string and the fundamental frequency?
3. What are harmonic frequencies?
4. If you have a fundamental frequency of 102 Hz, what are the next three harmonic frequencies above this?
5. What is the distinction between a node and an anti-node?
6. How many nodes and antinodes are there in the 3rd harmonic? The 6th?
7. Explain the difference between harmonics and overtones.
8. What is the relationship between the fundamental frequency of a vibrating string on a stringed instrument and pitch?
9. What effect does plucking a string at different locations have on the harmonics that are formed?
10. What is the difference in vibrational modes between a string that is plucked and one that is bowed?
11. Why is it that a vibrating string in air doesn't produce as much sound as a vibrating string attached to a surface?
12. A string attached to a surface is louder than if it is not. How does this fit with conservation of energy?
13. Strings have harmonic overtones but surfaces typically do not. How does this effect the sound produced by a stringed instrument?
14. What is holographic interferometry and how does it show the vibrational modes of a surface?
15. What does the bridge of a stringed instrument do?
16. Why is the bridge of a violin shaped differently than the bridge of a guitar?
17. What is the purpose of the sound post in a stringed instrument?
18. What is the purpose of bracing in a guitar?
19. What is the purpose of the bass bar in a violin?
20. Why is uniformity in wood grain for a stringed instrument such as a guitar important with respect to resonance?
21. What is the Wolf tone, and what causes it?
22. Which can play a note longer, a harpsichord or a piano and why?
23. Why is the piano louder than the harpsichord?
24. Using a reliable source, find out how much tension is inside a piano, why were other stringed instruments what type of technology did it take to overcome this?
25. Are Chladni plate resonance frequencies harmonic?
26. Explain Q-factor.
27. Why do you want the body of a stringed instrument to have low Q resonance frequencies?
28. What is a Helmholtz resonance?
29. Why do acoustic stringed instrument have hollow bodies with holes?
30. Find a reliable source and discuss the history of the f-hole.
31. Violins and guitars are both stringed instruments with hollow bodies and can play some of the same notes. Why is the timbre different between these two instruments?
32. On the Indian instrument, the sitar, why are there strings that are not plucked? Explain how this works.