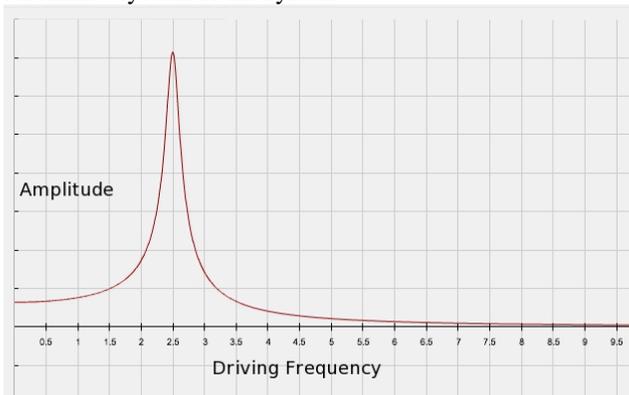


Questions on Resonance *

1. What is meant by damped harmonic motion? Give an example.
2. What is meant by driven, damped harmonic motion? Give an example.
3. What is the difference between natural frequency and driving frequency?
4. Define resonance.
5. List as many examples of resonance as you can think of.
6. In the YouTube of the singer who broke a wine glass using his voice, why did the wine glass break?
7. What is a Helmholtz resonator? Give an example.
8. In the simulation you downloaded with several different masses, why did different masses resonate at different driving frequencies?
9. The natural frequency of an oscillating object is 10 Hz. At what frequency would you want push it in order to make the oscillations bigger?
10. For the previous question, how often in seconds should you push the object to make the oscillations bigger?
11. State two ways to change the resonance frequency of a mass-spring system.
12. Suppose you recorded the amplitude of a driven spring system for many different driving frequencies and got the following graph of amplitude versus driving frequency. According to the graph, what is the resonance system of the system?



13. What is the resonance frequency of a kid on a swing if the period of oscillation is 2.4 s?
14. If the period of oscillation of a kid on a swing is 3.0 seconds you could push it with a period of 3.0 s and the oscillations would get larger. What would happen if instead you pushed every 6.0 s?
15. For the 3.0 s oscillation in the previous question, what period other than 6.0 s could you push the swing so as to make the oscillation larger?
16. For a 20 Hz oscillator you will have resonance if you drive it at 20 Hz. What happens if you drive it at 40 Hz?

* Many of these ideas came from *Conceptual Physics* 11th Ed. by Paul Hewitt (Addison Wesley, 2011).