

Review Sheet for EM Waves, Light, and Mirrors

Topics to know:

- Particle-wave theory (Newton, Huygens, Einstein)
- Galileo and his speed of light calculation (why it failed)
- Light as an EM (electromagnetic) wave (be familiar with the EM spectrum)
- $c = 3.00 \times 10^8$ m/s
- Notes on Reflection
- Shadows
- Ray Diagrams, pinhole cameras, locating images in mirrors, etc.
- All of the worksheets completed and discussed in class

1. Which of the following electromagnetic waves travels fastest in a vacuum?
 - a. green light
 - b. infrared light
 - c. gamma rays
 - d. they all have the same speed
2. Find the frequencies of electromagnetic waves with wavelengths of
 - a. 3.0 cm
 - b. 650 nm
 - c. 1.2 mm
3. A meteorologist in a TV station is using radar to determine the distance to a cloud. He notices that a time of 0.24 ms elapses between the sending and the return of a radar pulse. How far away is the cloud?

11. A typical compact disc stores information in tiny pits on the disc's surface. A typical pit size is $1.2 \mu\text{m}$. What is the frequency of electromagnetic waves that have a wavelength equal to the typical CD pit size?

12. A new antiterrorist technique detects the differences in electromagnetic waves emitted by humans and by weapons made of metal, plastic, or ceramic. One possible range of wavelengths used with this technique is from 2.0mm to 5.0 mm . Calculate the associated range of frequencies.

13. The U.S. Army's loudest loudspeaker is almost 17m across and is transported on a special trailer. The sound is produced by an electromagnetic coil that can generate a minimum frequency of 10.0 Hz . What is the wavelength of these electromagnetic waves?

14. Radio waves can have a wavelength as large as a football field. A football field is 100 yards long. What is the frequency of a wave that has this wavelength?

15. An object and mirror are viewed from above as seen in the diagram below. Use a *protractor* to locate the three points and then sketch the image using a dashed line.

