Name: _____ Period: _____

Waves-EM Spectrum

1. Compared to the speed of a sound wave in air, the speed of a radio wave in air is
   1. less
   2. greater
   3. the same

2. An electromagnetic AM-band radio wave could have a wavelength of
   1. 0.005 m
   2. 5 m
   3. 500 m
   4. 5,000,000 m

3. Which color of light has a wavelength of 5.0×10^{-7} meter in air?
   1. blue
   2. green
   3. orange
   4. violet

4. In a vacuum, all electromagnetic waves have the same
   1. speed
   2. phase
   3. frequency
   4. wavelength

5. An electromagnetic wave traveling through a vacuum has a wavelength of 1.5×10^{-1} meter. What is the period of this electromagnetic wave?
   1. 5.0×10^{-10} s
   2. 1.5×10^{-1} s
   3. 4.5×10^{7} s
   4. 2.0×10^{9} s

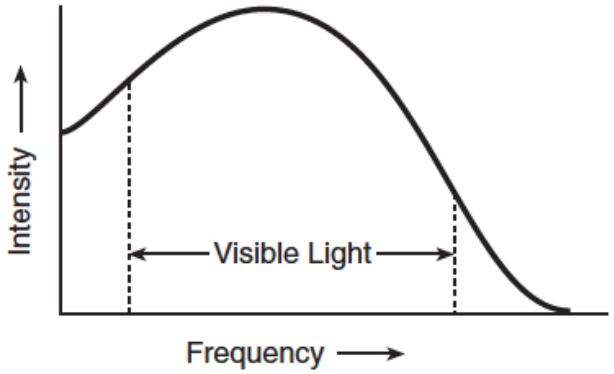
6. Which characteristic is the same for every color of light in a vacuum?
   1. energy
   2. frequency
   3. speed
   4. period

7. Explosure to ultraviolet radiation can damage skin. Exposure to visible light does not damage skin. State one possible reason for this difference.

8. An FM radio station broadcasts its signal at a frequency of 9.15×10^{7} hertz. Determine the wavelength of the signal in air.

Base your answers to questions 9 and 10 on the information and graph below.

Sunlight is composed of various intensities of all frequencies of visible light. The graph represents the relationship between light intensity and frequency.



9. Based on the graph, which color of visible light has the lowest intensity?

10. It has been suggested that fire trucks be painted yellow green instead of red. Using information from the graph, explain the advantage of using yellow-green paint.

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11. Which wave characteristics is the same for all types of electromagnetic radiation traveling in a vacuum?
    1. speed
    2. wavelength
    3. period
    4. frequency

12. Calculate the wavelength in a vacuum of a radio wave having a frequency of 2.2×10^{6} hertz. [Show all work, including the equation and substitution with units.]

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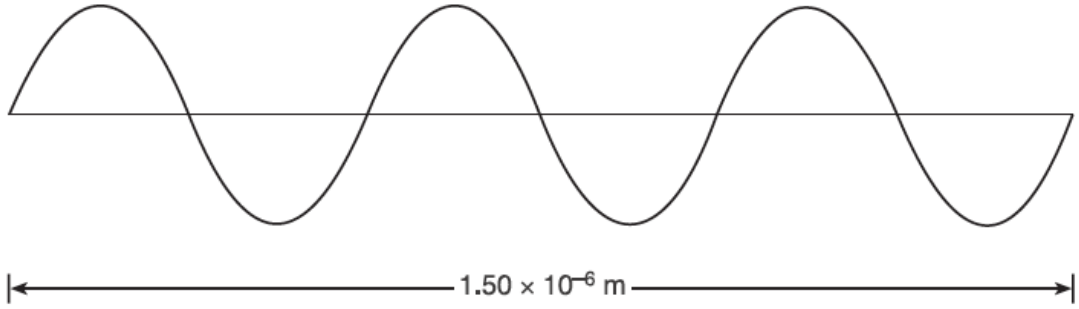
Waves-EM Spectrum

Base your answers to questions 13 and 14 on the information and diagram below.

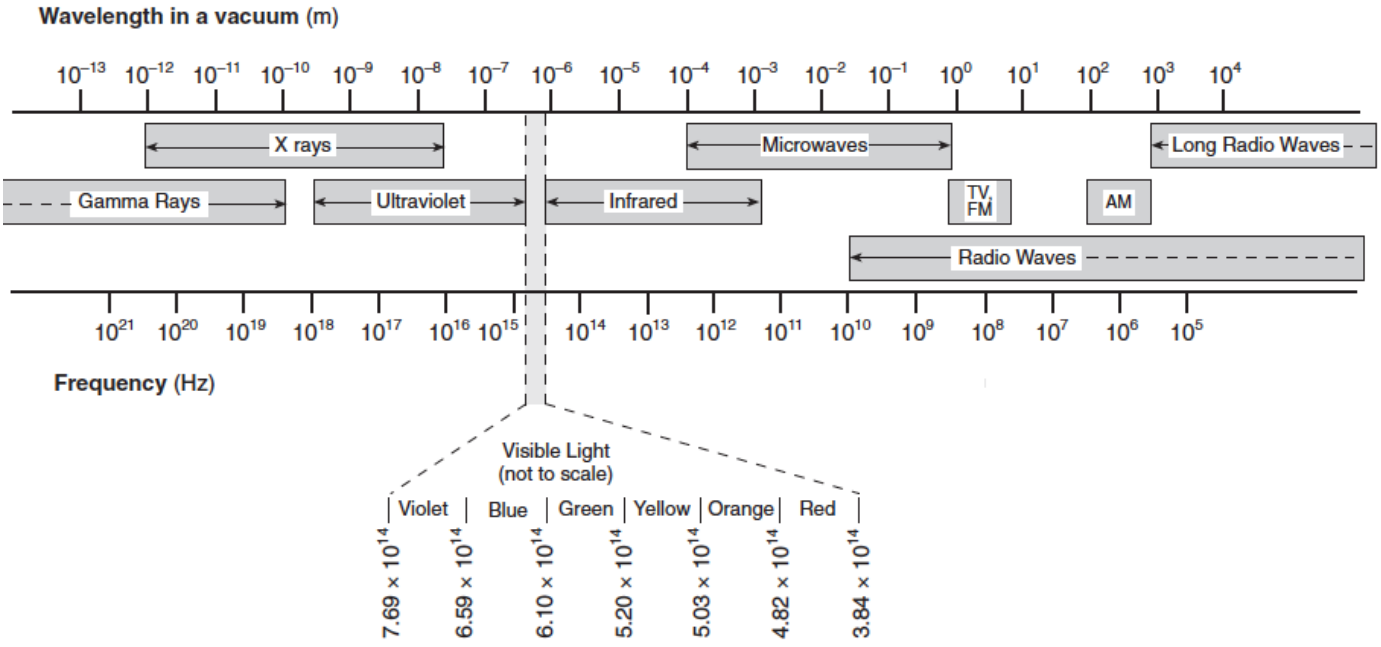
A 1.50×10^{-6}-meter-long segment of an electromagnetic wave having a frequency of 6.00×10^{14} hertz is represented below.



13. On the diagram above, mark two points on the wave that are in phase with each other. Label each point with the letter P.

14. Which type of electromagnetic wave does the segment in the diagram represent?

The Electromagnetic Spectrum



Name: _____ Period: _____

Waves-EM Spectrum

15. Radio waves and gamma rays traveling in space have the same
    1. frequency
    2. wavelength
    3. period
    4. speed

16. Radio waves are propagated through the interaction of
    1. nuclear and electric fields
    2. electric and magnetic fields
    3. gravitational and magnetic fields
    4. gravitational and electric fields

17. Which pair of terms best describes light waves traveling from the Sun to Earth?
    1. electromagnetic and transverse
    2. electromagnetic and longitudinal
    3. mechanical and transverse
    4. mechanical and longitudinal

18. Which wavelength is in the infrared range of the electromagnetic spectrum?
    1. 100 nm
    2. 100 mm
    3. 100 m
    4. 100 μm

19. Compared to the period of a wave of red light the period of a wave of green light is
    1. less
    2. greater
    3. the same

20. Orange light has a frequency of 5.0×10^{14} hertz in a vacuum. What is the wavelength of this light?
    1. 1.5×10^{23} m
    2. 1.7×10^{6} m
    3. 6.0×10^{-7} m
    4. 2.0×10^{-15} m

21. What is the speed of a radio wave in a vacuum?
    1. 0 m/s
    2. 3.31×10^{2} m/s
    3. 1.13×10^{3} m/s
    4. 3.00×10^{8} m/s

22. How much time does it take light from a flash camera to reach a subject 6.0 meters across a room?
    1. 5.0×10^{-9} s
    2. 2.0×10^{-8} s
    3. 5.0×10^{-8} s
    4. 2.0×10^{-7} s

23. Which statement best describes a proton that is being accelerated?
    1. It produces electromagnetic radiation.
    2. The magnitude of its charge increases.
    3. It absorbs a neutron to become an electron.
    4. It is attracted to other protons.