Ch. 26 Properties of Light; 11th edition
Review questions pg. 469

7. What is the principal difference between a radio wave and light? Between light and an x-ray?
Ans. Radio waves and x-rays are types of light having different frequencies. The higher the frequency, the more energy its photons have.

9. a) What is the color of visible light of the lowest frequency?
Ans. Red.
b) Highest frequency?
Ans. Violet.

11. How is the wavelength of light related to its frequency?
Ans. The higher the frequency, the shorter the wavelength.

Extra: What is the same about radio waves and visible light?
Ans. The both are electromagnetic radiation and travel as bundles of energy called photons, at the speed of light.
b) What is different about them?
Ans. They have different frequencies and wavelengths.

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19. Do radio waves travel at the speed of sound, or at the speed of light, or somewhere in between?
Ans. Radio waves are light and therefore travel at the speed of light.

21. What are the similarities between radio waves and light?
Ans. Radio waves are light. The different types of light have different frequencies. Radio waves have low frequencies and long wave lengths.

28. What determines whether a material is transparent or opaque?
Ans. The resonant frequency of the electrons in the material. If the frequency of the light is the same as the resonant frequency of the electrons, the material is opaque.

29. You can get a sunburn on a cloudy day, but you can't get a sunburn even on a sunny day if you are behind glass. Explain.
Ans. The ultraviolet photons that give you a sunburn, pass right through the water vapor in the clouds but they are absorbed by glass.

48. When you are looking at a distant galaxy through a telescope, how is it that you are looking back in time?
Ans. It takes many years for the light from the galaxy to reach Earth. We see the galaxy as it was when the light left it.