A-Day Due Mon., Feb 23
B-Day: Due Tues., Feb 24

2009 PreAP Light and Optics 1

1. Photon	A. The fastest speed in the universe: the speed of light.
2. 3×10^8 m/sec	B. An orbit of electrons. To move from low to high requires energy.
3. Prism	C. All light: visible and invisible.
4. Light	D. Used to separate white light into its colors.
5. EM Spectrum	E. A single particle or packet of light.
6. Energy Level	F. A wave that can travel through a vacuum.

7. Radio waves	A. Electromagnetic waves we feel as heat.
8. Infrared	B. Dangerous EM waves that have very high energy and come from nuclear reactions.
9. Ultraviolet	C. EM waves that have very low energy and long wavelengths.
10. X-rays	D. EM waves that can pass through skin and have short wavelengths.
11. Gamma rays	E. EM waves with more energy than visible light and can cause sunburns.
12. Microwaves	F. Long wavelengths; used in cell phones.

13. Is light a wave or a particle? Prove your answer

14. Where does light come from?

15. Why do we see lightening and hear the thunder a few seconds later?

16. Put these three in order from slowest to fastest:
Light waves; sound waves; water waves.

17. Radio waves; Ultraviolet; X-rays; Visible; Microwaves
   A. Which has the longest wavelength?
   B. Which has the least energy?
   C. Which is the fastest?
   D. Which is used by cell phones?

18. What do scientists call all light, both visible and invisible?

19. Pigment	A. A color model that uses pigments on a white background.
20. Magenta	B. A color made from red and green.
21. Cyan	C. Dyes and paints are a type of this.
22. Yellow	D. A color made from blue and red.
23. RGB	E. A color model that uses lights on a black background.
24. CMYK	F. A color made from green and blue.

25. Make the following additive colors using RGB.

Cyan _____ White _____ Yellow _____

Red _____ Magenta _____ Black _____

26. Make the following subtractive colors using CMYK.

Blue _____ White _____ Green _____

Red _____ Magenta _____ Black _____

27. White or Black?
   A. What is the background for RGB?
   B. What is the background for CMYK?

28. A. Which is made by turning on lights: CMYK or RGB?
   B. Which is made by using paint: CMYK or RGB?

29. Decide if the following use RGB or CMYK and why.

Television: _____ Why? _____

Paint on a wall: _____ Why? _____

Movie Theater: _____ Why? _____

Color Printer: _____ Why? _____

30. A. What color lights must be reflected to make Magenta?

   B. So, what color does Magenta absorb?

31. Using the same logic, what color does Cyan absorb?

32. What color is a stop sign?

33. Does a stop sign use additive or subtractive color?

34. What two colors would a printer use to make this color?

35. Express the following in standard units (m, etc) and in scientific notation:
    A. 8 nm B. 500 nm (Visible light) C. 105 MHz (FM radio)

36. What is 750 nm: period, frequency, amplitude, speed, or wavelength?

37. What is the speed of light?

38. What is the speed of microwaves?

39. What is the speed of x-rays?

40. Calculate the frequency of 750 nm light.

From your book (p.520)

41. Define electromagnetic waves.

42. In Figure 14-1, which bends more red or blue light?

43. This bending is called:

44. A. How many times per second does a 25 cm long light wave vibrate?

    B. What part of the electromagnetic spectrum is it?

45. Remembering from sound:
    A. When a string vibrates at 440 Hz, the sound wave in the air around it has what frequency?

    B. Does the string and the sound wave in the air have the same wavelength?

46. So, when a light wave passes from air into glass, what is the same in both mediums: speed, frequency, wavelength?

47. P.525—If you move twice the distance away from a light source, by how much does the brightness change?

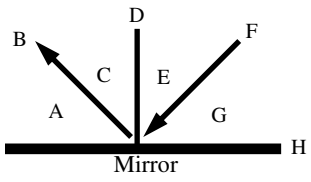
48. A light source is 15 meters away from you. If you move 10 meters closer to the light source, how does the intensity of the light change?

49. P.526—Why do the reflections of the golf ball get darker as the get farther back?

50. Define specular and diffuse reflection.

51. Answer Q 1 on p.529

52. For optics what is the "normal"?



53. Use the diagram at the left to answer the following:
    A. _____ The angle of incidence is:
    B. _____ The angle of reflection is:
    C. _____ The normal is:
    D. _____ The incident ray is:
    E. _____ The reflected ray is:

TAKS QUESTIONS:

54. In DNA: A pairs with ____; C pairs with ____; In RNA: A pairs with ____; C pairs with ____.

55. Which classification group contains organisms that are most closely related?
    A. Genus B. Family C. Class D. Phylum

56. You are using a scalpel to do a dissection. You should
    A. Wear heat-resistant gloves
    B. Cut toward your body
    C. Curt away from your body
    D. Hold the specimen with tongs

57. Which of the following is most likely to increase the confidence of the scientific community in the results of an experiment?
    A. The experiment is repeated many times and the same results are obtained.
    B. The company who paid for the experiment publishes its results
    C. Scientist who repeated the experiment obtained different experimental results.
    D. The scientists who performed the experiment admits to removing some data from the published results.

58. In the human body, most bacteria
    A. Produce vitamins
    B. Reproduce and cause disease
    C. Have no effect or are beneficial
    D. Aid in digestion