**Using your TEXT** answer the following questions; **this is graded for correctness.**

**1. In materials like glass or water the speed of light is \_\_\_\_\_\_\_\_\_.**

A. reduced B. increased C. the same as in a vacuum D. sometimes reduced sometimes increased

**2. A \_\_\_\_ is a particle of light.**

A. proton B. photon C. electron D. neutron

**3. If a photon's frequency increases its wavelength**

A. will decrease. B. will increase. C. will not change.

**4. The lower the frequency of the electromagnetic wave, the shorter its wavelength.**

1. **FALSE B. TRUE C. Both TRUE and FALSE**

**5. What is light?**

A. Light is radiant energy in the form of a stream of energy particles, called photons.

B. Light is radiant energy in the form of a wave of electromagnetic energy.

C. Light is radiant energy that can be mathematically treated as a wave or particle of energy.

D. None of these choices are correct.

**6. Which of the following colors travels most quickly through glass or plastic?**

A. blue B. orange C. yellow D. red

**7. How is light different from sound?**

A. Light can be reflected from a surface; sound cannot.

B. Sound requires a medium to move through; light does not.

C. Light can be treated as a wave; sound cannot.

D. Sound of any frequency can be heard; only visible light can be seen.

**8. Assuming that light could curve around the Earth, about how long would it take for one trip?**

A. 1/7th second B. 1 second C. 7 seconds D. 7 minutes

**9. Is light a wave or a particle?**

A. a wave B. a particle

C. both a wave and a particle at the same time D. neither a wave nor a particle

**10. In the wave model, light is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

A. a mix of electric and magnetic energy B. a compression wave moving through the air

C. a packet of energy moving through space D a ripple in space-time

**11. In the particle model, light is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

A. a mix of electric and magnetic energy B. a compression wave moving through the air

C. a packet of energy moving through space D. the absence of dark

**12. For which of these scenarios is the particle model of light more convenient to use?**

A. reflection of light from a mirror B. refraction of light through a lens

C. diffraction of light through a slit D. None of these choices are correct.

**13. For which of these scenarios is the wave model of light more convenient to use?**

A. diffraction of light through a slit B. refraction of light through a lens

C. the Doppler shift of light D. All of these choices are correct.

**14. The wavelength of a wave describes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

A. the distance between two successive peaks in a wave B. the distance between a peak and the nearest trough

C. the distance a wave can travel before being absorbed D. the distance a wave will travel after being emitted

**15. Which of the following colors has the shortest wavelength?**

A. red B. yellow C. green D. violet

**16. Visible light coming from the Sun is a combination of all colors called \_\_\_\_ light.**

A. white B. yellow C. ultraviolet D. spectral E. visible

**17. The mixing of light of all visible colors results in \_\_\_\_ light.**

A. white B. brown C. Sun D. spectral E. visible

**18. What is the relationship between wavelength (*λ*) and frequency (*f*)? ("*c*" is the speed of light.)**

A. *λf = c* B. *λ/f = c* C. *f/λ = c* D. *λc = f*

**19. What is the approximate wavelength of red light?**

A. 5 m B. 7 cm C. 400 nm D. 700 nm

**20. \_\_\_\_\_\_\_\_ range in wavelength from millimeters to hundreds of meters.**

A. X-rays B. gamma rays C. ultraviolet waves D. radio waves

**21. Which of the following statements is true?**

A. X-rays have higher energy, hence they move faster than visible light.

B. X-rays have higher energy, but still they move slower than visible light.

C. Even though X-rays have higher energy, they move with the same speed as that of visible light.

D. None of these choices are correct.

**22. A night vision camera**

A. is just much more sensitive to visible light than your eyes.

B. uses a detector sensitive to infrared light, so you can see objects that are warmer than their surroundings.

C. can only detect green photons, which reflect well in the dark, but which our eyes have trouble seeing.

D. uses a detector sensitive to X-ray light, so you can see through the dark.

**23. Ultraviolet light has wavelengths that are \_\_\_\_ visible wavelengths.**

A. longer than B. shorter than C. faster than D. slower than E. the same energy as

**24. Radio waves have wavelengths that are \_\_\_\_ visible wavelengths.**

A. longer than B. shorter than C. faster than D. slower than E. the same energy as**41.**

**25. List these electromagnetic radiations from lowest to highest energy.**

A. gamma rays, X-rays, ultraviolet, visible light, infrared, radio waves

B**.** radio waves, infrared, visible light, ultraviolet, X-rays, gamma rays

C. gamma rays, X-rays, infrared, visible light, ultraviolet, radio waves

**26. Wien's law allows astronomers to measure what property of a star?**

A. the surface temperature of the star B. the chemical composition of the star

C. the distance to the star D. All of these choices are correct

**27. As a solid is heated (from low to high temperature) the radiated light will move through what sequence of colors?**

A**.** red, yellow, blue B. blue, yellow, red C. yellow, red, blue D. blue, red, yellow

**28. \_\_\_\_\_\_ attraction holds the electron in orbit around the nucleus of the hydrogen atom.**

A. Gravitational B. Electrical C. Centrifugal D. Nuclear

**29. On the Kelvin temperature scale, a body’s temperature is directly related to its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

A. internal energy content B. kinetic energy due to its motion through space

C. mass D. kinetic energy due to rotation E. None of these choices are correct.

**31. Zero Kelvin is also known as \_\_\_\_.**

A. absolute zero B. the freezing point of water C. thermal equilibrium D. an ideal blackbody

**32. According to Wien's law, a hotter object will \_\_\_\_\_\_\_\_\_ a cooler object.**

A. appear darker than B. radiate the same intensity of wavelengths as

C. radiate more strongly at shorter wavelengths than D. appear the same color as

**33. The maximum temperature on the Kelvin scale is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

A. absolute zero B. absolute energy C. no maximum temperature on the Kelvin scale.

**34.** **Object A emits most strongly at 400 nm, while object B emits most strongly at 800 nm. What can we say about their relative temperatures?**

A. A’s temperature is twice as high as B’s. B. B’s temperature is twice as high as A’s.

C. A’s temperature is the same as B’s. D. Nothing. Temperature is related to brightness, not emitted wavelength.