

Exam #5 ---- (light, optics, electric charge, electric current, etc.)

96. A capacitor is a device used to

- A. convert electricity into light.
- B. convert electricity into heat.
- C. force current through a wire.
- D. store separated electrical charges.
- E. measure the volume of a glass container.

97. A positively charged object

- A. has a deficiency of protons.
- B. has a deficiency of neutrons.
- C. has a deficiency of electrons.
- D. has an excess of electrons.
- E. has an excess of neutrons.

98. Good electrical insulators are usually

- A. good thermal conductors.
- B. poor thermal conductors.
- C. good electrical conductors.
- D. poor thermal insulators.
- E. opaque to light.

99. The lines of force for a point charge

- A. form concentric circles about it.
- B. extend radially outward from it.
- C. connect points of equal electric potential.
- D. connect points of equal charge.
- E. indicate the direction of motion of the point charge.

100. According to Coulomb's law, if the distance between two charges is doubled, the force each charge exerts on the other will be ___ its previous value.

- A. the same as
- B. double
- C. one half of
- D. four times
- E. one fourth of

101. If the charges in an electrical circuit always flow in the same direction, the current is called

- A. an alternating current.
- B. a constant current.

- C. a direct current.
- D. an oscillating current.
- E. a basic current.

102. If the current in a wire is 6 amperes, how much charge will flow through it in 2 seconds?

- A. 12 coulombs
- B. 2 coulombs
- C. 8 coulombs
- D. 6 coulombs
- E. 3 coulombs

103. If a voltage of 110 volts produces a current of 2 amps in an electrical device, the resistance must be

- A. 110 ohms.
- B. 2 ohms.
- C. 108 ohms.
- D. 55 ohms.
- E. 220 ohms.

104. If 120 volts are used to light a 30-watt light bulb, the current in the bulb will be

- A. 120 amps.
- B. 30 amps.
- C. 150 amps.
- D. 0.25 amps.
- E. 4 amps.

105. Wires that are _____ have lower resistance.

- A. longer and thicker
- B. longer and thinner
- C. shorter and thicker
- D. shorter and thinner
- E. straight

106. If light bulb A has four times the resistance of light bulb B and the same current passes through each bulb, the voltage across bulb A will be ___ the voltage across bulb B.

- A. two times
- B. equal to
- C. one half of
- D. one fourth of
- E. four times

107. If three light bulbs of different wattage are connected in series to a battery,

- A. the voltage drop across each bulb will be the same.
- B. the current in each light bulb will be the same.
- C. the resistance in each light bulb will be the same.
- D. the power consumed by each light bulb will be the same.
- E. the light output of each bulb will be the same.

108. The speed of light in a vacuum

- A. is found by averaging the different speeds of all the different colors of light.
- B. is higher for blue light than for red light.
- C. is higher for green light than for violet light.
- D. is the same for all the different colors of light.
- E. is chosen to be equal to the speed of yellow light, which moves faster than any other color.

109. A material is said to be transparent if

- A. light can pass freely through it in a straight line.
- B. it absorbs light and redistributes the energy as thermal energy.
- C. it reflects light.
- D. it can vibrate at a resonant frequency to match the frequency of the light.
- E. it cannot emit any light.

110. Of all the electromagnetic waves, those with highest energy are _____ and those with lowest energy are _____ .

- A. gamma rays; radio waves
- B. radio waves; x-rays
- C. x-rays; microwaves
- D. microwaves; ultraviolet
- E. visible light; infrared

111. Which of the following is true?

- A. Only virtual images can be projected on a screen.
- B. A light ray passing through the center of a converging lens will be bent to pass through the focus.
- C. A virtual image is formed where the rays from an object meet after passing through a lens.
- D. The image seen in a plane mirror is a virtual image.
- E. A virtual image is always upside down.

112. When a converging lens is used as a magnifying glass, the image produced is

- A. real and inverted.
- B. real and upright.

- C. virtual and inverted.
- D. virtual and upright.
- E. none of the above -- a converging lens cannot be used as a magnifying glass.

113. Which of the following is true? When used alone,

- A. converging lenses can form only real images.
- B. converging lenses can form only virtual images.
- C. converging lenses can form only inverted images.
- D. diverging lenses can form only real images.
- E. diverging lenses can form only virtual images.

114. The colors seen in a rainbow

- A. are produced by raindrops of different colors.
- B. are produced by raindrops of different shapes.
- C. are the colors of the different atoms that make up water.
- D. are the colors of the different molecules that make up water.
- E. are produced when sunlight is refracted by raindrops.

115. The law of reflection says

- A. all reflected rays are perpendicular to the incident ray.
- B. all reflected rays are parallel to the incident ray.
- C. all reflected rays are parallel to each other.
- D. the angle of reflection equals the angle of incidence.
- E. the angle of reflection equals the angle of refraction.

116. A light ray passing from air into water at an angle of 30° from the normal in air

- A. would make an angle of 30° from the normal in water.
- B. would make an angle greater than 30° from the normal in water.
- C. would make an angle less than 30° from the normal in water.
- D. would be completely reflected by the water surface.
- E. would be completely absorbed by the water surface.

117. The critical angle is

- A. the angle of incidence for which the angle of the refracted beam is 0° .
- B. the angle of incidence for which the angle of the refracted beam is 90° .
- C. the angle of incidence for which the angle of the refracted beam is the same.
- D. the angle of incidence for which the angle of the reflected beam is the same.
- E. the angular radius of the arc of a rainbow.

Lab Questions (for the Final Exam)

118. How long is a meter stick?

- A. 36 inches
- B. 100 mm
- C. 10 cm
- D. 100 cm
- E. 1000 cm

119. If T is directly proportional to L , then a plot of T vs L should be

- A. a parabola.
- B. a circle.
- C. a curve that is concave upward.
- D. a curve that is concave downward.
- E. a straight line passing through the origin.

120. In the laboratory, the speed of sound is measured to be 344 meters per second, different from the actual value of 343 meters per second. What is the percent error in the measurement?

- A. 1%
- B. 0.1%
- C. 10%
- D. 3%
- E. 0.3%