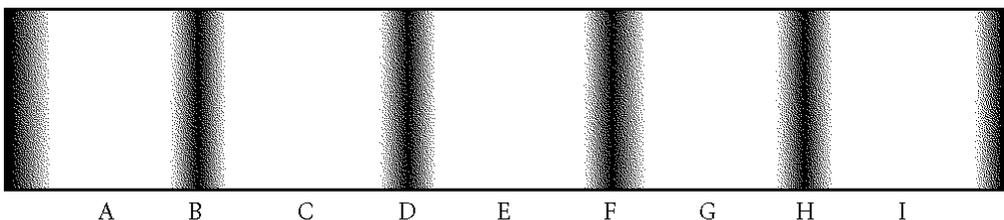# Physics G12-Q3W4-Revision on light- Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. A highly polished finish on a new car provides a ____ surface for ____ reflection.
     a. specular, diffused
     b. rough, regular
     c. rough, diffused
     d. smooth, specular

_____ 2. What type of image does a converging lens produce?
     a. virtual
     b. real or virtual
     c. real
     d. none of the above

_____ 3. What is the frequency of infrared light of 1.0×10^{-4} m wavelength?
     a. $3.0 \times 10_{12}$ Hz
     b. 3.0×10^{4} Hz
     c. $3.0 \times 10_{2}^{-13}$ Hz
     d. 3.0×10 Hz

A   B   C   D   E   F   G   H   I

The figure above shows the pattern of a double-slit interference experiment. The center of the pattern is located at E.

_____ 4. In the figure above, θ_1 is the angle between the central maximum and the first-order maximum. What is the angle between fringes D and F?
     a. $2\theta_1$
     c. $\dfrac{3\theta_1}{2}$

     b. $\dfrac{\theta_1}{2}$
     d. θ_1

_____ 5. In the figure above, which fringe represents a second-order minimum?
     a. F
     b. H
     c. G
     d. E

_____ 6. Which of the following is *not* an additive primary color?
     a. red
     b. yellow
     c. green
     d. blue

_____ 7. When a light ray passes from water ($n = 1.333$) into diamond ($n = 2.419$) at an angle of 45°, its path is
     a. parallel to the normal.
     b. bent toward the normal.
     c. bent away from the normal.
     d. not bent.

_____ 8. The focal length for a diverging lens is
     a. dependent on the location of the image.
     b. always positive.
     c. always negative.
     d. dependent on the location of the object.

____ 9. The distance between two slits in a double-slit interference experiment is 0.0050 mm. What is the angle of the third-order bright fringe ($m = 3$) produced with light of 550 nm?
   a. 12°   c. 19°
   b. 5.0°   d. 9.9°

____ 10. Which of the following is *not* a primary subtractive color?
   a. blue   c. cyan
   b. yellow   d. magenta

____ 11. Light with a wavelength of 546.1 nm passes through a 6.62×10^3 lines/cm diffraction grating. What is the first-order angle of diffraction?
   a. 34.6°   c. 21.2°
   b. 41.6°   d. 39.2°

____ 12. An object is placed 14.0 cm from a diverging lens. If a virtual image appears 10.0 cm from the lens on the same side as the object, what is the focal length of the lens?
   a. –5.8 cm   c. –1.6 cm
   b. –50 cm   d. –34 cm

____ 13. In a double-slit interference experiment, a wave from one slit arrives at a point on a screen one-half wavelength behind the wave from the other slit. What is observed at that point?
   a. bright fringe   c. dark fringe
   b. gray fringe, neither dark nor bright d. multicolored fringe

____ 14. The _____ of light can change when light is refracted because the medium changes.
   a. wavelength   c. frequency
   b. medium   d. transparency

____ 15. If you are reading a book and you move twice as far away from the light source, how does the brightness at the new distance compare with that at the old distance? It is
   a. one-half as bright.   c. one-fourth as bright.
   b. twice as bright.   d. one-eighth as bright.

____ 16. What type of mirror is used whenever a magnified image of an object is needed?
   a. flat mirror   c. two-way mirror
   b. concave mirror   d. convex mirror

____ 17. Snow reflects almost all of the light incident upon it. However, a single beam of light is not reflected in the form of parallel rays. This is an example of _____ reflection off a _____ surface.
   a. regular, rough   c. diffuse, rough
   b. regular, specular   d. diffuse, specular

____ 18. Which best describes the image of a concave mirror when the object is located somewhere between the focal point and twice the focal-point distance from the mirror?
   a. real, inverted, and magnification greater than one
   b. virtual, upright, and magnification less than one
   c. virtual, upright, and magnification greater than one
   d. real, inverted, and magnification less than one

____ 19. In what direction does a parallel ray from an object proceed after passing through a diverging lens?
   a. The ray passes through the center of the lens.
   b. The ray passes through the center of curvature, C.
   c. The ray is directed away from the focal point, F.
   d. The ray continues parallel to the principal axis.

____ 20. A beam of light in air is incident at an angle of 35° to the surface of a rectangular block of clear plastic ($n = 1.49$). What is the angle of refraction?
   a. 12°   c. 23°
   b. 42°   d. 57°

____ 21. Light is *not* refracted when it is
  a. traveling from air into a glass of water at an angle of 35° to the normal.
  b. traveling from water into air at an angle of 35° to the normal.
  c. traveling from air into a diamond at an angle of 45°.
  d. striking a wood surface at an angle of 75°.

____ 22. For a spherical mirror, the focal length is equal to ____ the radius of curvature of the mirror.
  a. one-half   c. the square of
  b. one-third   d. one-fourth

____ 23. If a light ray strikes a flat mirror at an angle of 29° from the normal, the reflected ray will be
  a. 29° from the normal.   c. 27° from the normal.
  b. 29° from the mirror's surface.   d. 61° from the normal.

____ 24. When a light ray moves from air into glass, which has a higher index of refraction, its path is
  a. parallel to the normal.   c. not bent.
  b. bent away from the normal.   d. bent toward the normal.

____ 25. The acronym *laser* stands for light amplification by ____ emission of radiation.
  a. simultaneous   c. stimulated
  b. spontaneous   d. similar

____ 26. All of the following images can be formed by a converging lens *except* which one?
  a. real, upright, and magnified   c. real and point
  b. virtual, upright, and magnified d. real, inverted, and magnified

____ 27. If a light ray strikes a flat mirror at an angle of 30° from the normal, the ray will be reflected at an angle of
  a. 60° from the normal.   c. 60° from the mirror's surface.
  b. 90° from the normal.   d. 30° from the mirror's surface.

____ 28. When red light and green light shine on the same place on a piece of white paper, the spot appears to be
  a. white.   c. yellow.
  b. brown.   d. black.
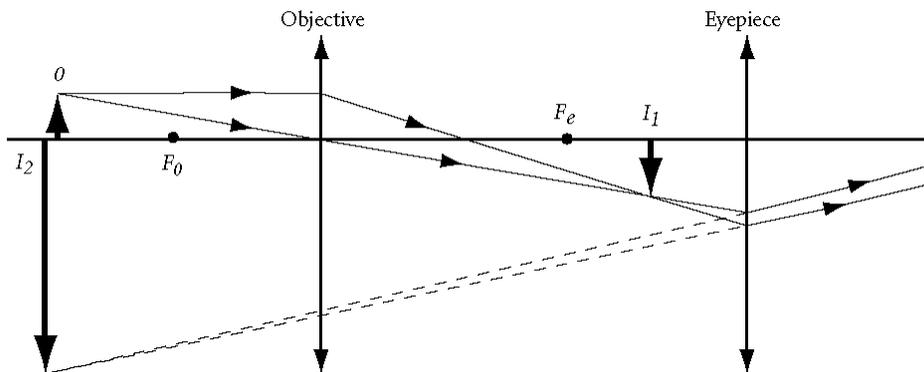
____ 29. In the diagram of a compound microscope shown above, where would you place the slide?
  a. at O c. at I_1
  b. at I_2 d. at F_0

____ 30. Which is *not* correct when describing the formation of rainbows?
  a. All wavelengths refract at the same angle.
  b. A rainbow is really spherical in nature.
  c. Sunlight is spread into a spectrum when it enters a spherical raindrop.
  d. Sunlight is internally reflected on the back side of a raindrop.

_____ 31. In a double-slit interference pattern, the path length from one slit to the first bright fringe of a double-slit interference pattern is longer than the path length from the other slit to the fringe by
    a. one full wavelength.
    b. one-half of a wavelength.
    c. one-quarter of a wavelength.
    d. three-quarters of a wavelength.

_____ 32. How many focal points and focal lengths do converging and diverging lenses have?
    a. two, two
    b. one, two
    c. one, one
    d. two, one
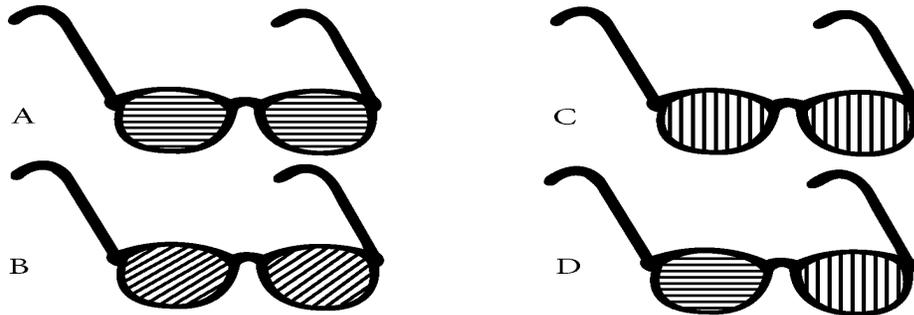
_____ 33. Which pair of glasses shown above is best suited for automobile drivers? The transmission axes are shown by straight lines on the lenses. (Hint: The light reflects off the hood of the car.)
    a. C
    b. A
    c. D
    d. B

_____ 34. In what direction does a focal ray from an object proceed after passing through a diverging lens?
    a. The ray passes through the focal point, F.
    b. The ray exits the lens parallel to the principal axis.
    c. The ray passes through the center of the lens.
    d. The ray intersects with the center of curvature, C.

_____ 35. A concave mirror forms a real image at 25.0 cm from the mirror surface along the principal axis. If the corresponding object is at a 10.0 cm distance, what is the mirror's focal length?
    a. 17.0 cm
    b. 7.14 cm
    c. 1.40 cm
    d. 12.0 cm

_____ 36. If a light ray strikes a flat mirror at an angle of 14° from the normal, the reflected ray will be
    a. 76° from the normal.
    b. 14° from the normal.
    c. 90° from the mirror's surface.
    d. 14° from the mirror's surface.

_____ 37. A parabolic mirror, instead of a spherical mirror, can be used to reduce the occurrence of which effect?
    a. chromatic aberration
    b. light scattering
    c. spherical aberration
    d. mirages

_____ 38. In a laser, energy is added to a(n)
    a. partially transparent mirror.
    b. mirror.
    c. active medium.
    d. light wave.

_____ 39. The farther light is from a source,
    a. the more bright light becomes.
    b. the more condensed light becomes.
    c. the more spread out light becomes.
    d. the more light is available per unit area.

_____ 40. An object that is 18 cm from a converging lens forms a real image 22.5 cm from the lens. What is the magnification of the image?
    a. 1.25
    b. –0.80
    c. –1.25
    d. 0.80

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