Photonics Concepts Learning Unit 8 Test

1. Please give an example of a Virtual Image.
    a. A good example of a virtual image is the one in your bathroom mirror.

2. The radius of curvature of a spherical mirror is 1.5m. Find the focal length.
    a. F=c/2, f=1.5m/2 = 0.75m = 75cm

3. At what distance from a concave mirror should a candle be placed in order for its image to be the same size?
    a. At the center of curvature.

4. In the problem above, is the image inverted or erect?
    a. Inverted

5. Lenses _____ light to create images?
    a. a. Transmit b. Reflect
    b. c. Absorb d. Diffract

6. Convex lenses are _____ lenses, and _____ light rays.
    a. a. negative, diverge b. positive, converge
    b. c. positive, diverge d. negative, converge

7. Concave lenses are _____ lenses, and _____ light rays.
    a. a. negative, diverge b. positive, converge
    b. c. positive, diverge d. negative, converge

8. A negative lens on its own generates only a _____ image.
    a. a. negative b. virtual
    b. c. positive d. real

9. A positive lens alone can generate a real image or a virtual image.
    a. a. false b. true

10. The closer an object is placed to the focal length of a positive lens, the _____ is the image.
    a. a. smaller b. larger
    b. closer

11. An image where rays do NOT cross, they just appear to come from that point is a _____.
    a. a. real image b. virtual image
    b. c. positive image d. diverging image

12. If the image distance is positive, the image is _____.
    a. a. virtual b. real
    b. c. diverging d. negative

13. A lens that is thicker in the middle than on the edges is a _____ lens:
    a. a. converging b. negative
    b. c. concave d. diverging

14. All negative lenses _____ light rays.
    a. a. diverge b. converge
    b. c. split all d. focus

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15. A lenses ability to gather light or the ratio of its focal length to its diameter is know as _____.
    a. a. f/number b. f/aperture
    b. c. f/diameter d. f/drop

16. By stopping down an aperture in front of a lens, you are _____ the bundle of rays exiting.
    a. decreasing
    b. stopping
    c. changing the direction of
    d. increasing

17. If the focal length of a lens remains the same but the diameter decreases, the numerical aperture _____.
    a. a. decreases b. is 1.0
    b. c. remains the same d. increases

18. A positive lens generates a real image as long as the object is _____.
    a. a. beyond the focal point b. virtual
    b. c. inside the focal point d. beyond 2f

19. When does a negative lens alone generate a real image?
    a. never
    b. when the object is real
    c. when the object is inside f
    d. when the object is outside of f

20. The image distance is _____ for real images.
    a. a. positive b. exponential
    b. c. negative d. unpredictable

21. The focal length for a converging lens is _____.
    a. a. positive b. exponential
    b. c. negative d. unpredictable

22. Find the image distance if an object is placed 24 cm in front of a 12cm focal length plano convex lens.
    a. a. 24cm b. -12cm
    b. c. 100cm d. 12 cm

23. Which type of lens is used in a pinhole camera?
    a. a. meniscus b. None
    b. c. positive d. negative

24. When looking at an object through a concave lens alone, the image always appears _____.
    a. a. smaller b. blurry
    b. c. inverted d. larger

25. A _____ image can be projected onto a screen.
    a. a. real b. positive
    b. c. inverted d. virtual

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26. How do we see ordinary opaque objects, like baseballs?
    a. light reflecting off the object
    b. light emitted from the object
    c. light transmitted through the object
    d. light absorbed by the object

27. The reflection of light that bounces off of a smooth or shiny surface is what type of reflection?
    a. a. Smooth b. Specular
    b. c. Diffuse d. Shiny

28. The reflection of light that bounces off of a rough surface is what type of reflection?
    a. a. Diverging b. Specular
    b. c. Diffuse d. Shiny

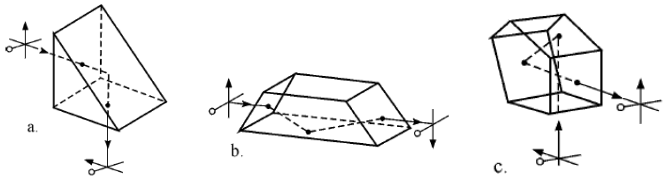
29. The law of reflection states that the _____ equals the _____.
    a. reflected angle, incident angle
    b. power, energy
    c. input power, output power
    d. input energy, output energy

30. TIR occurs in many optics, like fiber, when what is exceeded?
    a. a. input angle b. critical angle
    b. c. Brewster's angle d. reflected angle

31. What is the point in a spherical mirror that is half of the radius of curvature?
    a. a. vertex b. center of curvature
    b. c. focal point d. optical axis

32. An incident ray makes an angle of 60° with the plane of a mirror. Find: (3 pts)
    a. The angle of incidence 60°
    b. The angle of reflection 60°
    c. The angle the reflected beam makes with the mirror surface. 30°

33. Identify each of the following prisms. (4 pts)
    a. right-angle
    b. dove
    c. penta
    d. porro

34. 

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