Test 1: Example #4

Note: A * marks the correct answer.

1. Three numbers are needed to completely specify a color.
   *(1) True   (2) False

2. The type of light one uses for viewing does not affect the appearance of a colored surface.
   (1) True   *(2) False

3. The Munsell color system includes more colors than does the CIE color system.
   (1) True   *(2) False

4. If blue light is subtracted from dispersed white light, the remaining colors will combine to form yellow light.
   *(1) True   (2) False

5. DUPLICATE

6. DUPLICATE

7. The subtractive primaries (“primary pigments”) are yellow, blue, and green.
   (1) True   *(2) False

8. A blue photon has more energy than a red photon.
   *(1) True   (2) False

9. It is possible by additive color mixing to produce a yellow color that is indistinguishable (by the eye) from a spectral yellow.
   *(1) True   (2) False

10. Two colors are called metamers if they produce the same perceived color, although their spectral compositions may be quite different.
    *(1) True   (2) False
11. Purples are not spectral colors, but their hues can be specified in terms of their (green) complementary colors.
   *(1) True   (2) False

12. A pigment that subtracts red light from white light appears to be
   (1) magenta  (2) yellow  (3) blue  *(4) cyan  (5) violet

13. Complementary colors are:
   (1) two colors which "go" together
   * (2) two colors which added together give white light
      (3) the same as primary colors
      (4) two colors which enhance each other
      (5) none of these

14. When the three (subtractive) primary pigments are mixed in proper proportions, all the colors are subtracted, resulting in
   *(1) black  (2) white  (3) purple  (4) magenta  (5) violet

15. Color TV is an example of color mixing by
   *(1) addition  (2) subtraction  (3) none of these

16. The CIE specifies three standard sources or "illuminants," A, B, and C. Which of these differs most from the (theoretical) "equal energy" illuminant E?
   * (1) Source A  (2) Source B  (3) Source C

17. The painting technique called “pointillism” is an example of color mixing by
   (1) addition  *(2) subtraction  (3) none of these

18. The “greenhouse effect” occurs because window glass transmits visible light much better than infrared.
   *(1) True  (2) False

19. Accuracy in specifying colors is important in art but not in commerce.
   (1) True  *(2) False

20. A beam of magenta light strikes a cyan filter. The color transmitted by the filter is
   (1) magenta  (2) cyan  (3) red  *(4) blue  (5) green
21. Which one of these is correct, for subtractive color mixing as in paints or dyes?
   (1) Magenta plus cyan produces yellow
   (2) Red plus cyan produces magenta
   * (3) Red plus cyan produces black
   (4) Yellow plus cyan produces magenta
   (5) Red plus green produces yellow

22. The term chroma, as used in the Munsell System, is roughly equivalent to the CIE term
   (1) hue *(2) saturation (3) brightness

23. The term brightness refers to:
   (1) the hue (2) the saturation *(3) the quantity of light perceived
   (4) the relative amount of white light (5) the spectral composition of the color

24. The term saturation refers to:
   (1) the actual color (2) the luminance (3) the intensity of the light
   *(4) the relative amount of pure color and white light in the sample
   (5) none of the above

25. If a red filter is placed in one slide projector and a cyan filter is placed in another, and both
    are focused onto the same screen such that they overlap, in the overlapping region the screen will
    appear to be illuminated by:
   (1) yellow light (2) no light *(3) white light (4) magenta light

26. An unknown light source shines through two known filters, placed side by side. Through a
    magenta filter the light appears red, and through a yellow filter the light appears yellow. The
    light itself is probably
   *(1) yellow (2) green (3) blue (4) magenta (5) cyan

27. A red filter and a blue filter on top of one another are placed in the white-light beam from a
    slide projector.
   * (1) Very little light will strike the screen.
   (2) The screen will be illuminated with green light.
   (3) The screen will be illuminated with yellow light.
   (4) The screen will be illuminated with purple light.
   (5) The screen will be illuminated with white light.
28. Light of intensity I is incident on a fairly thick glass plate. The reflected intensity is $I_R$; the intensity of light absorbed in the glass is $I_A$. The intensity $I_T$ of the light transmitted through the glass plate is

1. $I_R + I_A$
2. $I - I_R$
*3. $I - I_R - I_A$
4. $I + I_R - I_A$
5. $I - I_R + I_A$

29. The dark-adapted (scotopic) eye cannot see colors, but only shades of gray.
*(1) True   (2) False

30. Photographic light meters and foot-candle meters (as demonstrated) depend on the action of
(1) photoemissive cells *(2) photovoltaic cells  (3) photoconductive cells

31. One of the most surprising results of photoelectric-effect experiments, totally unpredicted by classical theory, is that
(1) there is a time delay between shining the light on the metal surface and observing the photoelectrons emitted.
(2) if the light is more intense, the emitted electrons have greater speed.
* 3. no electrons are emitted for light longer than a certain wavelength, regardless of its intensity.
4. blue light produces more photoelectrons than does red light of the same intensity
5. none of the above.

32. Which of the following sentences describes the photoemissive effect?
(1) When radiation strikes a metal surface, it is absorbed and immediately reradiated at a lower frequency.
(2) When radiation strikes a metal surface, electrons are ejected from the surface.
(3) When electrons of a certain speed strike a metal surface, radiation is emitted.
* (4) When radiation strikes a metal surface, it is absorbed and reradiated after a time delay.

33. When the voltage applied to a tungsten-filament lamp is increased, there is a shift in the peak of the spectrum of the lamp toward a
(1) longer wavelength *(2) shorter wavelength

34. In the case directly above (problem 33), the total energy emitted is
*(1) increased (2) decreased
36. Which one of the following statements about photons is correct?
   (1) The brightness of a beam is determined by the energy of the individual photons of which
   the beam is composed.
   * (2) The color of a beam of light is determined by the energy of the individual photons of
       which the beam is composed.
   (3) The color of a beam is determined by the number of photons present in the beam.
   (4) The wavelength of each photon determines the brightness of the beam.

37. Because sodium-vapor lamps are more efficient than tungsten-filament lamps (that is, they
give more light per watt of electricity consumed), they are favored for lighting interiors such as
homes and offices.
   (1) True  *(2) False

38. An advantage of the human eye over photographic film as a detector of light is that it
“operates in real time” – gives the output signal practically instantly.
   *(1) True  (2) False

39. The measurement of light intensity in terms of the wavelength-sensitivity of the human eye is
called
   (1) radiometry   *(2) photometry

40. Our belief in the rectilinear propagation of light is of great practical day-to-day importance to
us.
   *(1) True   (2) False

41. Experiments in the following field prove that light behaves like a wave motion:
   (1) Reflection  (2) Refraction  (3) Absorption  *(4) Interference  (5) None of these

42. Light is shown to be a transverse wave motion by experiments involving
   (1) reflection  (2) refraction  (3) interference  *(4) diffraction  (5) polarization
43. The phenomenon of dispersion is most closely related to
   (1) reflection *(2) refraction (3) diffraction (4) polarization

44. The term “light” is commonly considered to include not only the visible region but also the
   neighboring ultraviolet and infrared regions of the electromagnetic spectrum.
   *(1) True (2) False

45. Which of the following is not an additive primary color?
   (1) red *(2) yellow (3) green (4) blue (5) none of these

46. The speed of sound in air is about 1,000 feet per second. The wavelength of a sound of
   frequency 250 hertz will be
   (1) 0.25 ft. *(2) 4 ft. (3) 8 ft. (4) 250 ft. (5) none of these

47. The tristimulus values of a certain spectrum are found experimentally to be: X = 30, Y = 60,
   Z = 10. The chromaticity coordinates (x,y) of this spectrum are:
   *(1) (0.10, 0.60)
   (2) (0.30, 0.10)
   (3) (0.30, 0.60)
   (4) (0.60, 0.10)
   (5) none of these