Chapter 13

1. *Receptor exposure* is an aspect of the:
   1. Projected image
   2. Latent image
   3. Displayed image
   4. All of the above
2. Which of the following is a *unique* aspect of the final displayed image:
   1. Spatial resolution
   2. Noise
   3. Brightness
   4. Magnification
3. The signal being carried by the remnant x-ray beam under the tabletop and under the grid, but prior to capture by the IR, is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ image:
   1. Displayed image
   2. Latent image
   3. Projected image
   4. None of the above
4. Which of the following is described as having geographical areas with different intensities of x-rays:
   1. Primary beam
   2. Projected image
   3. Latent image
   4. Displayed image
5. According to the American Association of Physicists in Medicine (AAPM), what is the relationship between the projected image and the final displayed image:
   1. They are essentially the same image
   2. The projected image directly controls the displayed image
   3. Exposure factors used to produce the projected image also control the displayed image
   4. They are independent of each other
6. Receptor exposure and subject contrast are qualities that both apply directly to the:
   1. electronic image
   2. displayed image
   3. latent image
   4. projected image
7. The terms *brightness, contrast,* and *grayscale* should be used only in conjunction with the:
   1. electronic image
   2. displayed image
   3. latent image
   4. projected image
8. The analog image captured and retained by the image receptor for a very short period of time prior to processing is best referred to as the \_\_\_\_\_\_\_\_\_\_ image.
   1. light
   2. projected
   3. latent
   4. displayed
9. During the exposure phase of radiographic image production, the radiographer is primarily concerned with controlling the \_\_\_\_\_\_\_\_\_\_\_\_ image.
   1. electronic
   2. projected
   3. latent
   4. displayed

10. Generally, an image with many different shades of gray possesses:

a. low contrast

b. short gray scale

c. low brightness

d. fog

e. a high level of noise

11. Generally, an image with only a few shades of gray possesses:

a. high contrast

b. long gray scale

c. low density

d. low brightness

e. low noise

12. Which of the following should always be optimized at an *intermediate or medium* level:

a. sharpness

b. magnification

c. contrast

d. shape distortion

e. noise

13. Diagnostic information can be lost if an image has:

a. excessive contrast

b. excessive gray scale

c. excessive blur

d. all of the above

e. none of the above

14. A radiograph of an aluminum step wedge demonstrates only very small differences from one

density (brightness) to the next. This image possesses:

a. low contrast

b. long gray scale

c. low density

d. both a & b

15. Taken together, brightness, contrast and noise make up the functions of any image:

a. recognizability

b. visibility

c. geometrical

d. resolution

e. detail enhancement

16. Extremely long gray scale in an image can lead to a loss of information because:

a. slightly different shades of gray cannot be distinguished from one another

b. very different shades of gray are exaggerated into white or black densities

c. the image begins to appear blurred

d. there is insufficient brightness to see details

17. The ideal degree of brightness for any image would be a(n) level:

a. maximum

b. minimum

c. intermediate

d. any of the above can be true, depending on the particular image

18. Electronic “snow” on a display monitor or TV monitor image is a form of:

a. scatter

b. distortion

c. image acquisition artifact

d. noise

e. fog

19. With insufficient penetration of the x-ray beam through the anatomy, a(n) image is produced:

a. silhouette

b. excessively blurred

c. excessively dark

d. long gray-scale

e. distorted

20. A densitometer would measure the:

a. attenuation coefficient of an image

b. contrast resolution of an image

c. tonal values on an electronic display monitor image

d. tonal values on a hard-copy printed image

e. signal-to-noise ratio on any image

21. Mathematically, the contrast present in any radiographic image is best thought of as the

\_\_\_\_\_\_\_ between two adjacent areas of different tonal value (density):

a. added sum

b. subtracted difference

c. divided ratio

d. multiplied product

22. Remaining within the practical range of diagnostic brightness (density) values, (that is,

without going to extremes), a radiographic image’s:

a. average brightness can be changed up or down without changing its contrast

b. average brightness cannot be changed up or down without changing its contrast

c. contrast can be changed up or down without changing its gray scale

d. contrast cannot be changed up or down without changing its average brightness

23. Generally, for an image with insufficient visibility of some details, which of the following

should be adjusted first:

a. contrast

b. brightness

c. edge enhancement

d. smoothing

24. In the broadest sense, *anything* that impedes full visibility of the details in an image may be

classified as:

a. mottle

b. distortion

c. acquisition artifacts

d. noise

e. fog

25. The mathematical measure of the overall *visibility* of information contained in an image is:

a. gray scale

b. signal-to-noise ratio

c. brightness-to-artifact aspect

d. modulation transfer function

26. Most radiographic images are viewed as \_\_\_\_\_\_\_\_\_\_\_ images:

a. positive

b. negative

c. printed

d. electromagnetic

278. Although both appear dark overall on conventional film, a truly fogged radiographic image

differs from an overexposed image in that the fogged image:

1. Is blurry
2. Displays no pitch dark areas
3. Displays no white areas at all
4. Displays short gray scale

28. For any image in general, all of the following are *essential* for visibility *except:*

a. sufficient light intensity

b. sufficient contrast

c. minimal noise

d. high sharpness

29. In the digital age, \_\_\_\_\_\_\_\_ has/have exceeded scatter radiation as the most common form of

noise appearing in the final displayed image:

1. Off-focus radiation
2. Mottle
3. Algorithmic noise
4. Grid artifacts

30. Superimposed tissues which are not of present diagnostic interest may be considered as a

form of:

1. Noise
2. Mottle
3. Off-focus radiation
4. Scatter radiation

31. Which of the following is defined as “imperfections in computer reconstruction programs

that lead to abnormalities in images produced”:

1. Electronic noise
2. Algorithmic noise
3. False images
4. Material mottle

32. All of the following would be classified as sources of *material* mottle *except:*

a. Fiber-optic bundles

b. Image intensifier phosphor crystals

c. CR plate phosphor crystals

d. Grids

33. All of the following would be classified as sources of *electronic* noise *except:*

a. Image display systems

b. Quantum mottle

c. DR detector active matrix arrays

d. Charge-coupled devices (CCDs)

34. Which type of noise becomes visible in the image when there is an insufficient amount of

signal reaching the image receptor?

1. Off-focus radiation
2. Electronic noise
3. Material mottle
4. Quantum mottle