Digital Image Manipulation

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

____ 1. The range of densities visible on the digital image is determined by:
a. window level
b. window width
c. windowing
d. all of the above

____ 2. Increasing visibility of darker anatomic regions is accomplished by:
a. raising the window level
b. lowering the window level
c. increasing the window width
d. decreasing the window width

____ 3. Increasing the overall brightness of the digital image is accomplished by:
a. raising the window level
b. lowering the window level
c. increasing the window width
d. decreasing the window width

____ 4. Making the digital image appear with low contrast, with many shades of gray, is done by:
a. raising the window level
b. lowering the window level
c. increasing the window width
d. decreasing the window width

____ 5. Making the digital image appear with high contrast, more black and white, is done by:
a. raising the window level
b. lowering the window level
c. increasing the window width
d. decreasing the window width

____ 6. The number of shades of gray that can be stored and displayed by a computer system is:
a. grayscale
b. pixel pitch
c. pixel density
d. contrast resolution

____ 7. Which control on the viewing station controls the density, or brightness, in the radiographic image?
a. Window width
b. Window level
c. Shuttering
d. Dynamic range

____ 8. “Window width” controls which aspect of the radiographic image?

a. Shuttering
b. Noise
c. Density
d. Contrast

____ 9. What is the name of the computer software function that allows adjustment of the radiographic image after it has been processed?
a. Image annotation
b. Postprocessing
c. Edge enhancement
d. DICOM gray-scale function

____ 10. Which of the following determines the maximum number of gray shades to be displayed on the television monitor?
a. Window level (WL)
b. Window width (WW)
c. Contrast controls on the television monitor
d. Filtered back-projection (FBP) algorithm

____ 11. A large WW indicates that there is a relatively _____ gray scale.
a. long
b. short
c. narrow
d. curved

____ 12. If all of the shades were left in an image after processing, the contrast would be:
a. too low.
b. too high.
c. sufficient.
d. unaffected.

____ 13. Image level parameters control image:
a. brightness.
b. darkness.
c. contrast.
d. density.

____ 14. Window width controls the ratio of black and white, also known as:
a. window.
b. level.
c. contrast.
d. matrix.

____ 15. Which of the following factors has the greatest effect on the brightness of the digital image?
a. kV
b. mAs
c. Processing software
d. Matrix size

____ 16. Contrast in the digital image is primarily affected by:
   a. kV.
   b. mAs.
   c. matrix size.
   d. processing algorithms.

____ 17. Changing or enhancing the electronic image in order to view it from a different perspective or improve its diagnostic quality is the general definition for:
   a. smoothing.
   b. edge enhancement.
   c. post-processing.
   d. algorithmic conversion.

____ 18. Contrast is adjusted by windowing, changing window width and window level. Window level determines the:
   a. number of gray levels displayed.
   b. midpoint of the gray range.
   c. size of the field of view.
   d. slice thickness.

True/False
Indicate whether the statement is true or false.

____ 1. A narrow WW implies that the transition from black to white will take place over a wide range of CT numbers.

____ 2. A large WW means a long gray scale.

Digital Image Manipulation
Answer Section

MULTIPLE CHOICE

1. ANS: D
   Windowing, including setting the window width and level, allows adjustment of the range of densities visible on the digital image.

   PTS: 1 OBJ: 17
2. ANS: A
   Raising the window level brightens the overall image, making darker anatomy more visible.

   PTS: 1 OBJ: 17
3. ANS: A
   Raising the window level brightens the overall image.

   PTS: 1 OBJ: 17
4. ANS: C
   Increasing window width includes more shades of gray in the image, creating a low-contrast appearance.

   PTS: 1 OBJ: 17
5. ANS: D
   Decreasing window width includes fewer shades of gray in the image, making it more black and white.

   PTS: 1 OBJ: 17
6. ANS: A
   Grayscale is the number of shades of gray that can be stored and displayed by a computer system.

   PTS: 1 OBJ: 16
7. ANS: B PTS: 1 REF: Page 96
8. ANS: D PTS: 1 REF: Page 96
9. ANS: B PTS: 1 REF: Page 101
10. ANS: B
    WW determines the maximum number of shades of gray that can be displayed on the CT monitor.

    PTS: 1 REF: p. 158
11. ANS: A
    A large WW indicates that there is a relatively long gray scale or a large block of CT numbers that will be assigned some value of gray.

    PTS: 1 REF: p. 158
12. ANS: A PTS: 1 REF: 43
    OBJ: List the functions of contrast enhancement parameters.

13. ANS: A PTS: 1 REF: 46
    OBJ: Discuss the purpose and function of image manipulation factors.
14. ANS: C PTS: 1 REF: 46
    OBJ: Discuss the purpose and function of image manipulation factors.
15. ANS: C PTS: 1
16. ANS: D PTS: 1
17. ANS: C PTS: 1
18. ANS: B PTS: 1 DIF: Level: Medium
    REF: Volume 3, Page 308 OBJ: Category: None
    TOP: Exam: None

TRUE/FALSE

1. ANS: F
   A narrow WW implies that the transition from black to white will take place over relatively few CT numbers.

   PTS: 1 REF: p. 158
2. ANS: T
   A large WW indicates that there is a relatively long gray scale or a large block of CT numbers that will be assigned some value of gray.

   PTS: 1 REF: p. 158