Chapter 02: Digital Image Characteristics
Test Bank

MULTIPLE CHOICE

1. Multiple numeric values divided into an array of small elements capable of being processed is the definition of _____ images.
   a. analog
   b. digital
   c. medical
   d. radiographic

   ANS: B REF: 24 OBJ: Differentiate between analog and digital images.

2. The continuous and varying levels of brightness and colors describes _____ images.
   a. analog
   b. digital
   c. medical
   d. radiographic

   ANS: B REF: 24 OBJ: Differentiate between analog and digital images.

3. Critical characteristics of a digital image include all of the following except:
   a. contrast resolution.
   b. noise efficiency.
   c. sample resolution.
   d. dose efficiency of the receptor.

   ANS: C REF: 25 OBJ: Differentiate between analog and digital images.

4. Which of the following statements is not true?
   a. Matrix size can change without affecting the FOV.
   b. FOV can change without affecting the matrix.
   c. Changing the matrix or the FOV will change the size of the pixel.
   d. Changing the matrix and the FOV will not change the size of the pixel.

   ANS: D REF: 25
   OBJ: Relate pixel size, matrix size, and FOV to each other.

5. Each square in a matrix is called a:
   a. matrix element.
   b. picture element.
   c. bit.
   d. byte.

   ANS: B REF: 25
   OBJ: Define pixel and image matrix and characteristics of each.

6. The number of bits per pixel is known as bit:
   a. pitch.
   b. depth.

c. height.
d. width.

ANS: B REF: 25
OBJ: Define pixel and image matrix and characteristics of each.

7. If a pixel has a bit depth of 29, the number of gray tones that pixel can produce is:
a. 256.
b. 512.
c. 1024.
d. 2500.

ANS: B REF: 26
OBJ: Define pixel and image matrix and characteristics of each.

8. The size of the pixel is determined by the:
a. bit.
b. bit depth.
c. matrix.
d. byte.

ANS: C REF: 25
OBJ: Define pixel and image matrix and characteristics of each.

9. Which of the following statements is not true?
a. *Exposure index* refers to the amount of exposure to the patient.
b. *Exposure index* refers to the amount of exposure to the image receptor.
c. Exposure is not uniformly represented across manufacturers.
d. Exposure index standardization is beneficial to the technologist.

ANS: A REF: 26
OBJ: Discriminate between standard units of measure for exposure indicators.

10. The measurement for radiation that was incident on the image receptor for a particular exposure is known as:
a. Gy.
b. KSTD.
c. KIND.
d. KTGT.

ANS: C REF: 28
OBJ: Discriminate between standard units of measure for exposure indicators.

11. Deviation index is the difference between _____ and _____ expressed in logarithmic fashion.
a. actual exposure (KIND); target exposure (KTGT)
b. standard exposure (KSTD); actual exposure (KIND)
c. standard exposure (KSTD); target exposure (KTGT)

ANS: A REF: 28
OBJ: Discriminate between standard units of measure for exposure indicators.

12. Factors that can adversely affect the pixel values expressed in the deviation index include all of the following except:

a. gonadal shielding within the image.
b. a prosthesis within the image.
c. failure of the system to recognize the exposure indicator.
d. failure of the system to recognize the collimated border.

ANS: C REF: 29
OBJ: Discriminate between standard units of measure for exposure indicators.

13. How dark or light a digital image appears on a display monitor is known as:
a. density.
b. contrast resolution.
c. brightness.
d. spatial resolution.

ANS: C REF: 29 OBJ: Define image brightness.

14. The ability of a digital system to display subtle changes in shades of gray is called:
a. image quality.
b. contrast resolution.
c. spatial resolution.
d. dynamic range.

ANS: B REF: 29
OBJ: Discuss the differences between spatial and contrast resolution.

15. The ability of an imaging system to demonstrate small details of an object is known as:
a. image quality.
b. contrast resolution.
c. spatial resolution.
d. dynamic range.

ANS: C REF: 30
OBJ: Discuss the differences between spatial and contrast resolution.

16. A system's ability to respond to varying levels of exposure, resulting in more detail, is referred to as:
a. spatial resolution.
b. dynamic range.
c. contrast resolution.
d. dynamic resolution.

ANS: B REF: 30
OBJ: Discuss the differences between spatial and contrast resolution.

17. "The sum of the components in a recording system cannot be greater than the system as a whole" is a definition of:
a. modulation transfer function (MTF).
b. enhanced visualization image processing.
c. digital image contrast and density latitude.
d. principles of contrast enhancement.

ANS: A REF: 30
OBJ: Discuss the implications of image noise, MTF, and detective quantum efficiency.

18. A perfect image processing system would have an MTF of:
    a. 1%.
    b. 10%.
    c. 100%.
    d. 1000%.

    ANS: C REF: 30
    OBJ: Discuss the implications of image noise, MTF, and detective quantum efficiency.

19. The more light spread, the _____ the MTF.
    a. higher
    b. lower
    c. more equal
    d. none of these

    ANS: B REF: 30
    OBJ: Discuss the implications of image noise, MTF, and detective quantum efficiency.

20. The range of exposure values the image detector is able to produce is known as:
    a. dynamic range.
    b. modulation transfer.
    c. latitude.
    d. detective quantum efficiency.

    ANS: C REF: 32 OBJ: Define exposure latitude.

21. The efficiency of a system to convert x-ray input signal into a useful output image is known as:
    a. dynamic range.
    b. spatial resolution.
    c. latitude.
    d. detective quantum efficiency.

    ANS: D REF: 33 OBJ: Define exposure latitude.

TRUE/FALSE

1. Air kerma is the measurement of radiation energy absorbed in a unit of air.

    ANS: T REF: 28
    OBJ: Discriminate between standard units of measure for exposure indicators.

2. The reflection of ambient light can be problematic with monochromatic monitors.

    ANS: T REF: 29 OBJ: Define image brightness.

3. MTF is a way to quantify the contribution of each system component and the component's overall efficiency.

    ANS: F REF: 30
    OBJ: Discuss the implications of image noise, MTF, and detective quantum efficiency.

4. It is possible to achieve an MTF of 100%.

ANS: F REF: 31
OBJ: Discuss the implications of image noise, MTF, and detective quantum efficiency.