

Radiography Essentials for Limited Practice 5th ed.

Chapter 1 Role of the Limited X-ray Machine Operator

1. The oldest and largest radiologic science professional organization is the:
 - A. American Registry of Radiologic Technologists (ARRT)
 - B. American Society of Radiologic Technologists (ASRT)
 - C. Joint Review Committee on Education in Radiologic Technology (JRCERT)
 - D. American Hospital Radiology Administrators (AHRA)

2. The organization that sets standards and prepares examinations necessary to certify radiologic technologists and limited operators is the:
 - A. American Registry of Radiologic Technologists (ARRT)
 - B. American Society of Radiologic Technologists (ASRT)
 - C. Joint Review Committee on Education in Radiologic Technology (JRCERT)
 - D. American Hospital Radiology Administrators (AHRA)

Chapter 2 Introduction to Radiographic Equipment

1. The radiation that exits the opposite side of the patient to expose the image receptor (IR) is called:
 - A. attenuated radiation
 - B. scatter radiation
 - C. primary radiation
 - D. remnant radiation

2. The term used to describe radiation that is absorbed by matter is:
 - A. scatter
 - B. attenuation
 - C. remnant
 - D. latent

3. The "unseen" image that is contained in the image receptor (IR) before it is processed is called the:
 - A. latent image
 - B. remnant image
 - C. primary image
 - D. secondary image

4. The radiation that exits the body in all directions and causes unwanted exposure on the image receptor (IR) as well as anyone who is in the room is called _____ radiation.
 - A. remnant
 - B. scattered
 - C. secondary
 - D. primary

5. The radiation that exits the x-ray tube and travels in-air to the patient is called:
 - A. primary
 - B. remnant
 - C. scatter
 - D. latent

6. The boxlike device attached under the tube housing that allows the limited operator to vary the size of the radiation field is called the:
 - A. port
 - B. detent
 - C. housing
 - D. collimator

7. An invisible line in the center of the x-ray beam and perpendicular to the long axis of the x-ray tube is called the:
 - A. radiation field.
 - B. primary x-ray beam.
 - C. x-ray tube.
 - D. central ray.

Chapter 3 Basic Mathematics for Limited Operators

1. An exposure time of 0.02 seconds is equal to how many milliseconds?
 - A. 0.2 msec
 - B. 2 msec
 - C. 20 msec
 - D. 200 msec
2. The number 9^2 is equal to:
 - A. 4.5
 - B. 18
 - C. 81
 - D. 90
3. The number 4 is the square root of:
 - A. 2
 - B. 8
 - C. 12
 - D. 16
4. When 62 kVp is increased by 30%, the result is approximately:
 - A. 65 kVp
 - B. 81 kVp
 - C. 92 kVp
 - D. 105 kVp
5. When the fraction $7/8$ is converted to a decimal, the result is:
 - A. 0.875
 - B. 0.78
 - C. 1.14
 - D. 7.8
6. When 230% is expressed as a decimal, the result is:
 - A. 23
 - B. 2.3
 - C. 0.23
 - D. 0.023
7. A radiographic image is made using 500 mA, 0.1 sec., 80 kVp, and 48-inches SID. The value of the mAs for this exposure is:
 - A. 8 mAs
 - B. 50 mAs
 - C. 3,840 mAs
 - D. 4,000 mAs
8. An image made using 20 mAs and 100 kVp has satisfactory radiographic density, but is lacking in radiographic contrast. Which of the following techniques will improve the appearance of the image?
 - A. 10 mAs and 115 kVp
 - B. 40 mAs and 115 kVp
 - C. 10 mAs and 85 kVp
 - D. 40 mAs and 85 kVp
9. A satisfactory radiographic image of a shoulder is made on a patient measuring 14 cm. using 15 mAs and 75 kVp. Approximately how much mAs is needed to produce a similar image on a patient measuring 16 cm.?
 - A. 16 mAs

- B. 20 mAs
- C. 25 mAs
- D. 35 mAs

10. A satisfactory radiographic image is made using 40-inches SID and 25 mAs. Approximately how much mAs is required to produce a similar image at 48-inches SID?

- A. 12 mAs
- B. 30 mAs
- C. 36 mAs
- D. 50 mAs

Chapter 4 Basic Physics for Radiography

1. X-rays have electromagnetic energy. The velocity (or speed) of this energy travels at a speed of:
 - A. 186,000 meters per second
 - B. 200,000 meters per second
 - C. 186,000 miles per second
 - D. 200,000 miles per second

2. The smallest possible unit of electromagnetic energy is the:
 - A. proton
 - B. neutron
 - C. electron
 - D. photon

3. Which of the following would be considered a characteristic of x-rays?
 1. have no mass
 2. are electrically neutral
 3. travel in straight lines
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

4. The electrical current flowing in an x-ray tube is measured in:
 - A. milliamperes
 - B. kilovoltage
 - C. Ohms
 - D. potential difference

5. The force or strength of the electron flow in an electrical current is measured in:
 - A. milliamperes
 - B. kilovoltage
 - C. Ohms
 - D. resistance

6. The device used to produce the high voltage needed for x-ray production is called the:
 - A. diode
 - B. generator
 - C. transformer
 - D. rectifier

7. In radiology, 80,000 volts is converted to:
 - A. 0.125 volts
 - B. 125 volts
 - C. 80 kVp
 - D. 800 kVp

Chapter 5 X-ray Production

1. The target and the filament in the x-ray tube are made of:
 - A. pyrex glass
 - B. tungsten
 - C. copper
 - D. aluminum

2. Electrons are made available in the filament of the x-ray tube by a process called:
 - A. heterogeneous
 - B. characteristic production
 - C. Bremsstrahlung production
 - D. thermionic emission

3. The anode in x-ray tubes rotates at a high rpm to:
 - A. dissipate the heat
 - B. create more photons
 - C. create a heterogeneous beam
 - D. allow more Bremsstrahlung to be emitted

4. The target in the x-ray tube is angled to affect the:
 1. heat capacity
 2. number of photons
 3. sharpness of the image
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

5. Which of the following would be a common small focal spot size in an x-ray tube?
 - A. 0.1 mm
 - B. 0.3 mm
 - C. 0.6 mm
 - D. 1.2 mm

6. What size of target angle is required for the radiation to cover a 14-in x 17-in IR at a distance of 40 inches?
 - A. 6 degrees
 - B. 10 degrees
 - C. 12 degrees
 - D. 15 degrees

7. The intensity of the x-ray beam is greatest at the:
 - A. center of the x-ray beam
 - B. anode end of the beam
 - C. cathode end of the beam
 - D. either side of the beam

8. The penetrating power of the x-ray beam is controlled by varying the:
 - A. mA
 - B. mAs
 - C. kVp
 - D. exposure time

9. If the mA is doubled, the x-ray photons emitted from the tube:
- A. double
 - B. triple
 - C. increase by a factor of 4
 - D. remain the same
10. What material is used as the added filter material in x-ray tubes?
- A. oil
 - B. glass
 - C. copper
 - D. aluminum
11. X-ray equipment that operates at 70 kVp and above must have how much aluminum equivalency permanently installed?
- A. 2.0 mm/Al
 - B. 2.5 mm/Al
 - C. 3.0 mm/Al
 - D. 3.2 mm/Al
12. The x-ray tube inside the protective housing is made of:
- A. lead
 - B. steel
 - C. aluminum
 - D. Pyrex glass
13. What percentage of the total energy applied to an x-ray tube target is converted into x-rays?
- A. 1%
 - B. 50%
 - C. 75%
 - D. 99%
14. The density in the radiographic image is primarily controlled by the:
- A. mA
 - B. mAs
 - C. kVp
 - D. SID

Chapter 6 X-ray Circuit and Tube Heat Management

1. Which of the following supplies and controls the heat required by the x-ray tube filament for thermionic emission of electrons?
 - A. rectifier
 - B. autotransformer
 - C. filament circuit
 - D. high-voltage circuit

2. Which of the following is controlled directly on the x-ray control panel?
 1. mA
 2. rectification
 3. automatic exposure control
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

3. How many detectors are contained in an automatic exposure control (AEC) device in an x-ray table?
 - A. 1
 - B. 2
 - C. 3
 - D. 4

4. Which of the following is varied automatically when using automatic exposure control (AEC)?
 - A. exposure time
 - B. kilovoltage
 - C. milliamperage
 - D. back-up time

5. Which of the following can cause too much heat on the anode and cause it to crack and fail?
 1. excessive exposure on a cold tube
 2. a rapid series of large exposures
 3. mA settings greater than 400 mA
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

6. X-ray tubes should undergo the warm-up procedure again after they have been idle for more than:
 - A. 30 minutes
 - B. 1 hour
 - C. 1.5 hours
 - D. 2 hours

7. What is the heat unit (HU) of the anode if 200 mA, 0.10 sec., and 80 kVp is used on a single-phase generator?
 - A. 400
 - B. 1000
 - C. 1200
 - D. 1600

8. How many heat units (HU) are generated on a high frequency (HF) generator if an exposure time of 300 mA, 0.12 sec., and 95 kVp is used?

- A. 36
- B. 2,800
- C. 3,420
- D. 28,500

9. Which of the following will help prolong the life of an x-ray tube?

- 1. warm up the anode each morning
- 2. use low ma setting whenever possible
- 3. use the low-speed rotor whenever possible

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

10. In a high-frequency generator, the incoming 60 Hz electrical frequency is brought up to how high of a level?

- A. 2,500 Hz
- B. 5,000 Hz
- C. 6,000 Hz
- D. 8,000 Hz

11. Which of the following x-ray generators produces the greatest amount of x-rays for the same exposure technique?

- A. 1-phase
- B. 3-phase, 6 pulse
- C. 3-phase, 12 pulse
- D. High-frequency

Chapter 7 Principles of Exposure and Image Quality

1. Radiographic contrast is controlled by the:

- A. mA
- B. mAs
- C. kVp
- D. SID

2. If the intensity of the x-ray beam is 100 mR at an SID of 40 inches, what is the intensity if the SID is changed to 48 inches?

- A. 40 mR
- B. 69 mR
- C. 83 mR
- D. 120 mR

3. The quantity, or number of photons produced per second during an exposure is controlled by the:

- A. mA
- B. mAs
- C. kVp
- D. SID

4. The variation in tissue densities within the patient is referred to as the:

- A. radiographic contrast
- B. subject contrast
- C. long scale contrast
- D. short scale contrast

5. The overall contrast seen in the radiographic image is referred to as:

- A. radiographic contrast
- B. subject contrast
- C. long scale contrast
- D. short scale contrast

6. Which of the following are considered a part of shape distortion?

- 1. magnification
- 2. foreshortening
- 3. elongation

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

7. The unsharp edges of a body part are referred to as the:

- A. umbra
- B. elongation
- C. recorded detail
- D. penumbra

8. Which of the following would be considered involuntary motion?

- 1. tremors
- 2. peristalsis
- 3. heartbeats

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

9. Quantum mottle is typically seen on the radiographic image when using:

- A. high mA, high kVp techniques
- B. low mA, high kVp techniques
- C. an SID greater than 48 inches
- D. a very slow screen speed

10. The primary controlling factor of penetration of x-rays is:

- A. mA
- B. kVp
- C. SID
- D. exposure time

11. The term used in the new digital imaging environment to replace density is:

- A. brightness.
- B. matrix
- C. dynamic range
- D. exposure latitude

12. The geometric factors that affect the formation of the image are:

- 1. SID
- 2. OID
- 3. Focal spot

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

Chapter 8 Digital Image Receptor Systems

1. When using computed radiography (CR), where is the latent image stored until it is processed?
 - A. On a hard drive
 - B. In a film/screen cassette
 - C. In a flat panel detector unit
 - D. In a photostimulable phosphor plate
2. Digital imaging requires that the exposure technique is accurately set. Which of the following is the most critical of the exposure factors?
 - A. SID
 - B. kVp
 - C. mA
 - D. Exposure time
3. One of the major advantages of using CR or DR systems is the:
 - A. reduced total cost for the institution
 - B. reduction in patient dose
 - C. the ability to see images with greater detail
 - D. the ability to see images very fast
4. All of the digital images made in an x-ray department are stored in a system called the:
 - A. DR
 - B. ALARA
 - C. PACS
 - D. DICOM
5. When a CR plate is inserted into the reader for processing, the phosphor is scanned with a:
 - A. green/blue light.
 - B. fluorescent light.
 - C. white light.
 - D. laser beam.
6. What is the size of the flat-panel detector inside the table of a DR system?
 - A. 10 x 12 in.
 - B. 14 x 14 in.
 - C. 14 x 17 in.
 - D. 17 x 17 in.
7. The viewing monitor's active viewing area is called a:
 - A. voxel
 - B. pixel
 - C. matrix
 - D. window width
8. The amount of detail or sharpness in the digital image is termed:
 - A. contrast resolution
 - B. dynamic range
 - C. recorded detail
 - D. spatial resolution
9. Which control on the viewing station control the density, or brightness, in the radiographic image?
 - A. Window width
 - B. Window level
 - C. Shuttering

D. Dynamic range

10. Which of the following tells the operator that the correct exposure has been received by the phosphors in the imaging plate?

- A. Exposure indicator number
- B. Signal-to-noise ratio (SNR)
- C. Health level-7
- D. DICOM gray-scale function

Chapter 9 Scatter Radiation and Its Control

1. The negative effect of scatter radiation reaching the image receptor (IR) is:
 - A. fog
 - B. lower density
 - C. higher contrast
 - D. higher dose

2. Which of the following will affect the amount of scatter radiation reaching the image receptor (IR)?
 1. higher kVp
 2. dense body part
 3. volume of tissue irradiated
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

3. Scatter radiation can be controlled by:
 1. grids
 2. reducing field size
 3. reducing mAs
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

4. The effectiveness of a radiographic grid is determined by the:
 - A. grid radius
 - B. grid ratio
 - C. grid lines
 - D. grid frequency

5. A grid must be used when the body part becomes larger than:
 - A. 4 cm
 - B. 8 cm
 - C. 4-8 cm
 - D. 10-12 cm

6. Grid cut-off will occur when:
 1. the grid is tilted
 2. the kVp is too high
 3. when the SID is out of focal range
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

7. A scattered photon has _____ energy than the incoming primary beam photon.
 - A. less
 - B. more
 - C. less, if the kVp is over 80

D. more, if the kVp is over 80

8. What is the principal source of scatter radiation in radiography?

A. Tube housing

B. Patient

C. Table

D. Collimator

Chapter 10 Formulating X-ray Techniques

- Which of the following factors would you see on an exposure technique chart?
 - kVp
 - generator phase
 - part thickness in cm

A. 1 and 2
B. 1 and 3
C. 2 and 3
D. 1, 2, and 3
- In determining the best level of kVp to use for a given body part, which of the following is used?
 - lowest kVp
 - average kVp
 - optimum kVp
 - variable kVp
- The use of 200 mA and 0.12 sec would result in _____ mAs.
 - 24
 - 32
 - 240
 - 320
- Practically, which mA station can be used for most small to average size patients who can cooperate during the examination?
 - 100 mA
 - 200 mA
 - 300 mA
 - 400 mA
- Which of the following pathological conditions would require an increase in exposure technique?
 - necrosis
 - arthritis
 - pneumothorax
 - pleural effusion
- Which of the following pathological conditions would require a decrease in exposure technique?
 - pneumothorax
 - pneumonia
 - edema
 - cardiomegaly
- Which of the following grids would have a higher grid factor and therefore a high mAs?
 - 5:1 ratio
 - 8:1 ratio
 - 12:1 ratio
 - 16:1 ratio
- How much of a change in mAs is needed if there is a 2-cm increase in the part size?
 - 20%

- B. 25%
- C. 30%
- D. 40%

Chapter 11 Radiobiology and Radiation Safety

1. What is the SI unit of exposure which measures radiation in air?
 - A. Gray (Gy_a)
 - B. Sievert (Sv)
 - C. Rad (rad)
 - D. Air kerma (Gy_a)
2. The SI unit for measuring absorbed dose is the:
 - A. air kerma (Gy_a).
 - B. Sievert (Sv).
 - C. Gray (Gy_a).
 - D. Roentgen (R).
3. Which of the following x-ray examinations would give the patient the highest bone marrow dose?
 - A. chest
 - B. limb
 - C. abdomen
 - D. skull
4. Patient doses in radiography as usually calculated as the:
 - A. air kerma (Gy_a)
 - B. cumulative dose (Gy_t)
 - C. absorbed dose (Gy_t)
 - D. entrance skin exposure (ESE)
5. Which of the following would be used to reduce the likelihood of genetic radiation effects?
 - A. SID greater than 40-in
 - B. Low mAs
 - C. Low kVp
 - D. Gonad shields
6. Radiation dosimeters should be worn:
 - A. at the collar
 - B. at the waist
 - C. at the waist and anterior portion of the body
 - D. at the collar and anterior portion of the body
7. According to the NCRP, there is cause for concern if a pregnant woman receives a dose in excess of _____ to the uterus.
 - A. 15 Gy_t
 - B. 25 Gy_t
 - C. 150 mGy_t
 - D. 250 mGy_t
8. According to the Law of Bergonie and Tribondeau, which of the following groups would NOT be as sensitive to radiation?
 - A. Fetuses
 - B. Infants
 - C. Children
 - D. Adults
9. The annual effective dose limit for an occupational radiation worker is:
 - A. 25 mSv
 - B. 50 mSv

- C. 1 Sv
- D. 5 Sv

10. 38. A gonad shield should be used whenever the edge of the radiation field is within _____ cm of the gonads.

- A. 3
- B. 5
- C. 6
- D. 8

11. The greatest cause of unnecessary radiation to patients is from:

- A. repeat exposures
- B. CT scans
- C. radon gas
- D. chest x-rays

Chapter 12 Introduction to Anatomy, Positioning, and Pathology

1. The definition of an organ is:

- A. the smallest units of living things
- B. a group of similar cells that work together to perform functions
- C. a group of tissues that work together to perform specialized and complex functions
- D. complex proteins that provide the “blueprint” for the body’s structure and function

2. The definition of pathology is:

- A. study of aging
- B. study of abnormal conditions of the body
- C. study of function of the body
- D. study of structure of the body

3. Which of the following are respiratory system structures?

- 1. thymus
 - 2. trachea
 - 3. bronchi
- A. 1 and 2 only
 - B. 1 and 3 only
 - C. 2 and 3 only
 - D. 1, 2, and 3

4. The human skeletal system consists of _____ bones?

- A. 206
- B. 412
- C. 103
- D. 260

5. What is a condyle?

- A. a hole in bone that provides a passage for nerves and blood vessels
- B. a long, sharp bony process
- C. a bony ridge
- D. a rounded process that forms part of a joint

6. What term describes movement of a part away from the central axis of the body?

- A. flexion
- B. extension
- C. adduction
- D. abduction

7. What term describes straightening of a joint?

- A. flexion
- B. extension
- C. adduction
- D. abduction

8. What does supination mean?

- A. to turn the wrist so that the palm of the hand is up
- B. to turn the wrist so that the palm of the hand is down
- C. to turn the wrist so that the palm of the hand faces laterally
- D. to turn the wrist so that the palm of the hand faces medially

9. Anatomic position is described by which of the following statements?

- A. lying on one’s back with arms and legs extended, palms turned outward, and toes facing anteriorly

- B. lying on one's back with arms and legs extended, palms turned backward, and toes facing anteriorly
- C. standing facing the observer with palms of hands turned forward and toes facing anteriorly
- D. standing facing the observer with palms of hand turned backward and toes facing anteriorly

10. What is the meaning of the term cephalic?

- A. toward the head
- B. away from the head
- C. the front part of the body
- D. the back part of the body

11. What term refers to the back portion of the body or of a body part?

- A. anterior
- B. posterior
- C. cephalic
- D. caudal

12. Which plane divides the body into equal right and left halves?

- A. transverse
- B. axial
- C. midcoronal
- D. midsagittal

13. Which plane divides the body into equal anterior and posterior halves?

- A. transverse
- B. axial
- C. midcoronal
- D. midsagittal

14. Which term describes the body position when the patient is lying on his or her back?

- A. supine
- B. lateral
- C. prone
- D. erect

15. To achieve a prone position, the patient must be placed ____?

- A. upright
- B. in a recumbent position on his or her stomach
- C. in a recumbent position on his or her back
- D. in a recumbent position on his or her side

16. What term is used to describe the path of the CR from the radiographic tube, through the patient and to the IR?

- A. position
- B. projection
- C. tangential
- D. lateral

17. What three items must be precisely aligned to obtain a quality radiograph?

- A. the x-ray tube, the IR, and the CR
- B. the x-ray tube, the IR, and the collimator field light
- C. the CR, the body part, and the collimator field light
- D. the CR, the body part, and the IR

18. What is indicated by a radiographic side marker?

- A. the side of the patient
- B. the side of the collimator field light
- C. the side of the x-ray tube
- D. the side of the IR

19. What term refers to the condition in which the tissue of a bone is broken or disrupted?

- A. dislocation
- B. sprain
- C. fracture
- D. infection

20. Which of the following is the medical term for swelling?

- A. degeneration
- B. regeneration
- C. atrophy
- D. edema

21. What is the term that means the IR is oriented so its long dimension is aligned with the long axis of the body?

- A. upright
- B. crosswise
- C. diagonal
- D. lengthwise

22. What is the term that means the IR is oriented so its long dimension is perpendicular to the long axis of the body?

- A. upright
- B. crosswise
- C. diagonal
- D. lengthwise

23. What is the term that describes the central ray entering the anterior surface of the body and exiting the posterior surface?

- A. posteroanterior projection
- B. anteroposterior projection
- C. oblique projection
- D. lateral projection

24. What is the term that describes a projection produced when the sagittal plane of the body or part is parallel to the IR?

- A. axial projection
- B. anteroposterior projection
- C. oblique projection
- D. lateral projection

25. What is the term that describes a projection produced by angling the central ray 10 degrees or more along the long axis of the body or part?

- A. axial projection
- B. anteroposterior projection
- C. oblique projection
- D. lateral projection

Chapter 13 Upper Limb and Shoulder Girdle

1. The digits of the hand are composed of which bones?
 - A. carpals
 - B. metacarpals
 - C. phalanges
 - D. tarsals
2. Which bones are located in the palm area of the hand?
 - A. carpals
 - B. metacarpals
 - C. phalanges
 - D. tarsals
3. Which surface of the hand should be in contact with the IR when performing a PA projection?
 - A. anterior (palmar)
 - B. posterior (dorsal)
 - C. medial
 - D. lateral
4. Which surface of the hand should be in contact with the IR when performing a routine lateral projection?
 - A. lateral
 - B. medial
 - C. anterior (palmar)
 - D. posterior (dorsal)
5. What is the position of the wrist when performing the PA oblique projection?
 - A. hand and wrist flat with anterior surface in contact with IR
 - B. fingers flexed with anterior surface of wrist in contact with IR
 - C. coronal plane of wrist at 45° angle to IR with anteromedial surface on IR
 - D. medial surface of wrist on IR with coronal plane perpendicular to IR
6. Which of the following are bones of the forearm?
 - A. radius and ulna
 - B. tibia and fibula
 - C. humerus and radius
 - D. clavicle and scapula
7. What is the position of the arm when performing the AP projection of the forearm?
 - A. elbow flexed, wrist and elbow perpendicular to IR, hand in lateral position
 - B. elbow flexed, wrist and elbow perpendicular to IR, hand pronated
 - C. elbow extended, wrist and elbow parallel to IR, hand pronated
 - D. elbow extended, wrist and elbow parallel to IR, hand supinated
8. What is the relationship between the humeral epicondyles and the IR to achieve a proper lateral projection of the humerus?
 - A. parallel
 - B. perpendicular
 - C. from anatomic position, 45° medial rotation
 - D. from anatomic position, 45° lateral rotation
9. What are the proper patient instructions, just prior to the exposure, for the AP projection of the shoulder?

- A. stop breathing and do not move
- B. breathe quietly and do not move
- C. slow deep breaths and do not move
- D. pant quickly and do not move

10. Which projection of the shoulder will demonstrate an open glenohumeral joint space and the glenoid process in profile?

- A. AP projection with internal rotation
- B. AP projection with external rotation
- C. AP oblique projection (Grashey method)
- D. PA oblique projection (Scapular Y)

11. What is the relationship between the coronal plane through the humeral epicondyles and the IR to achieve a proper AP projection of the elbow?

- A. parallel
- B. perpendicular
- C. from anatomic position, 45° medial rotation
- D. from anatomic position, 45° lateral rotation

12. Why is the AP projection of the thumb preferred over the PA projection?

- A. the AP projection is easier for the patient to perform
- B. the PA projection results in a less detailed image because of magnification
- C. the AP projection results in a less detailed image because of magnification
- D. the positioning for the PA projection is not possible for the patient to perform

13. What is the projection name for the Gaynor-Hart method performed to evaluate the carpal canal?

- A. PA projection
- B. oblique projection
- C. tangential projection
- D. axial projection

14. What is the CR centering point for the AP projections of the shoulder?

- A. at the coracoid process
- B. to a point 1 inch inferior to the coracoid process
- C. to a point 1 inch superior to the coracoid process
- D. to a point 2 inches lateral to the coracoid process

15. What is the degree and direction of CR angulation required to perform an AP axial projection of the clavicle?

- A. 5-10 degrees cephalad
- B. 5-10 degrees caudad
- C. 15-30 degrees cephalad
- D. 15-30 degrees caudad

Chapter 14 Lower Limb and Pelvis

1. The forefoot is composed of which bones?
 - A. phalanges and tarsals
 - B. tarsals and metatarsals
 - C. phalanges and metatarsals
 - D. cuneiforms and cuboid
2. What tarsal bone is commonly referred to as the “heel bone”?
 - A. talus
 - B. cuneiforms
 - C. navicular
 - D. calcaneus
3. What is the anatomical name for the bone commonly known as the kneecap?
 - A. fibula
 - B. tibia
 - C. patella
 - D. flabella
4. What anatomic structures articulate to form the knee joint?
 - A. the condyles of the femur and the tibial plateaus
 - B. the condyles of the femur and the tibial tuberosities
 - C. the head of the femur and the acetabulum
 - D. the head of the femur and the tibial plateaus
5. When performing an AP axial projection of the foot, the central ray is directed _____.
 - A. 10° toward the toes
 - B. 10° toward the heel
 - C. 25° toward the heel
 - D. Perpendicular to the IR
6. Where is the CR directed when performing an AP projection of the ankle joint?
 - A. Perpendicular to a point midway between the malleoli
 - B. Perpendicular to the base of the 3rd metatarsal
 - C. Angled 10° cephalic to a point midway between the malleoli
 - D. Angled 10° cephalic to the base of the 3rd metatarsal
7. Where is the CR directed when performing the AP projection of the knee?
 - A. ½ inch below the apex of the patella
 - B. ½ inch below the base of the patella
 - C. 1 inch distal to the medial epicondyle of the femur
 - D. 1 inch proximal to the medial epicondyle of the femur
8. If a knee x-ray is made while the patient is wearing denim jeans, which of the following is likely to appear on the image?
 - A. Nothing. Denim jeans are radiolucent.
 - B. The jeans will leave an artifact on the image.
 - C. Nothing. Leaving the patient’s jeans on helps to protect the patient’s modesty.
 - D. The jeans will totally block out the knee anatomy because x-rays cannot penetrate denim.
9. What is the proper rotation of the lower limbs for an AP projection of the pelvis?
 - A. 15° medial
 - B. 5° medial
 - C. 5° lateral

D. 15° lateral

10. What is the name of the fracture that occurs from repeated injuries that are insufficient to cause a fracture from a single occurrence?

- A. bimalleolar
- B. Colles'
- C. spiral
- D. stress

11. For an AP oblique projection of the foot, the foot is rotated medially so that the plantar surface forms what angle with the IR?

- A. 10 degrees
- B. 20 degrees
- C. 30 degrees
- D. 45 degrees

12. An AP or PA projection of the calcaneus is not possible because of its location in the foot. What projection is performed, along with the lateral projection, to accomplish a complete radiographic examination?

- A. AP oblique projection
- B. PA oblique projection
- C. tangential projection
- D. axial projection

13. For an AP oblique projection of the ankle mortise joint, how much is the ankle rotated medially?

- A. 5-10 degrees
- B. 15-20 degrees
- C. 25-30 degrees
- D. 35-45 degrees

14. How much and in which direction is the CR angled for an AP projection of the knee on a patient with an ASIS to table top measurement of 22 cm?

- A. 0 degrees
- B. 3-5 degrees caudad
- C. 3-5 degrees cephalad
- D. 10 degrees cephalad

15. How much and in which direction is the CR angled for an AP projection of the knee on a patient with an ASIS to table top measurement of 26 cm?

- A. 0 degrees
- B. 3-5 degrees caudad
- C. 3-5 degrees cephalad
- D. 10 degrees cephalad

Chapter 15 Spine

1. The cervical spine is composed of what number of vertebrae?
 - A. 5
 - B. 7
 - C. 9
 - D. 12
2. What is the term for the cylinder block-like, anterior portion of a typical vertebra?
 - A. body
 - B. lamina
 - C. pedicle
 - D. articular process
3. Why is a 72-inch SID used for the lateral projection of the cervical spine?
 - A. This SID enables the limited operator to use a lower kVp technique
 - B. This SID reduces patient dose
 - C. This SID helps to overcome the magnification caused by the increased OID of the position
 - D. This SID provides more room for the limited operator to assist the patient into the proper position
4. What angle and direction is the CR directed when performing an AP axial projection of the cervical spine?
 - A. 15° caudad
 - B. 15° cephalad
 - C. 25° caudad
 - D. 25° cephalad
5. A “breathing technique” is used to advantage when performing a lateral projection of which of the following portion of the spine?
 - A. cervical
 - B. thoracic
 - C. lumbar
 - D. sacrum
6. Which of the following devices will improve visualization of the spinous processes on the lateral projection of the thoracic spine?
 - A. a piece of lead behind the shadow of the patient’s back
 - B. a wedge filter placed with the thicker end on the upper thoracic spine
 - C. a sandbag near the patient’s shoulders and another near the patient’s hips
 - D. a positioning sponge to elevate the patient’s waist
7. Which projection of the lumbar spine demonstrates the “Scottie dog” configuration of the zygapophyseal joint?
 - A. AP
 - B. AP axial
 - C. oblique
 - D. lateral
8. What positioning technique is used to improve patient comfort and reduce the lordotic curve of the lumbar spine when performing a recumbent AP projection of the lumbar spine?
 - A. raising the patient’s arms above the head
 - B. crossing the patient’s arms across the chest
 - C. flexing the patient’s knees and placing a support under them

D. having the patient distribute weight equally on both feet

9. Which region of the spine is the most common site of pathologic compression fracture of vertebral bodies resulting from osteoporosis?

- A. cervical
- B. thoracic
- C. lumbar
- D. coccyx

10. What term is used to describe an abnormal lateral curvature of the spine?

- A. lordosis
- B. kyphosis
- C. scoliosis
- D. laminosis

11. How much and in which direction is the CR angled for an AP axial oblique projection of the cervical spine?

- A. perpendicular (0 degrees)
- B. 15 degrees cephalad
- C. 15 degrees caudad
- D. 30 degree cephalad

12. Which intervertebral foramina are demonstrated on the AP axial oblique projection of the cervical spine?

- A. none; they are not demonstrated on this projection
- B. those closest to the IR
- C. those farthest from the IR
- D. both sides are equally well demonstrated

13. What is the common name for the lateral projection of the cervicothoracic region of the spine?

- A. whiplash technique
- B. runner's technique
- C. swimmer's technique
- D. jumper's technique

14. How much is the patient rotated for an AP oblique projection of the lumbar spine?

- A. 10 degrees
- B. 25 degrees
- C. 45 degrees
- D. 60 degrees

15. Which zygapophyseal (facet) joints are demonstrated on the AP oblique projection of the lumbar spine?

- A. none; they are not demonstrated on this projection
- B. those closest to the IR
- C. those farthest from the IR
- D. both sides are equally well demonstrated

Chapter 16 Bony Thorax, Chest, and Abdomen

1. What anatomic term is used to describe the inferior, lateral “corners” of the lungs?
 - A. hila
 - B. apices
 - C. cardiophrenic angles
 - D. costophrenic angles

2. The right lung has lobes and the left lung has lobes.
 - A. 2, 2
 - B. 2, 3
 - C. 3, 2
 - D. 3, 3

3. What body habitus term is applied to the person of “average” size?
 - A. asthenic
 - B. sthenic
 - C. hypersthenic
 - D. hyposthenic

4. What is the name of the structure that separates the thoracic cavity from the abdominal cavity?
 - A. aortic arch
 - B. parietal peritoneum
 - C. visceral peritoneum
 - D. diaphragm

5. Which of the following are ways that chest radiography differs from radiography of the ribs?
 - 1 72-inch SID is used
 - 2 higher kV is used
 - 3 exposure is made on expiration
 - A. 1 and 2 only
 - B. 1 and 3 only
 - C. 2 and 3 only
 - D. 1, 2, and 3

6. Which of the following techniques is recommended for optimum chest radiography?
 - A. high kVp, high mA, and short exposure time
 - B. low kVp and 40-inch SID
 - C. low kVp, long exposure time, and “breathing technique”
 - D. high mAs and low kVp

7. What is the purpose of rolling the patient’s shoulders anteriorly when performing the PA projection of the chest?
 - A. This motion makes the position more comfortable for the patient
 - B. This motion reduces magnification of the heart shadow
 - C. This motion rotates the scapulae out of the lungs
 - D. This motion places the coronal plane parallel to the upright grid cabinet

8. Where is CR directed for the upright, PA projection of the chest?
 - A. midsagittal plane at the level of t7
 - B. midcoronal plane at the level of t7
 - C. midsagittal plane at the level of the iliac crests

D. midcoronal plane at the level of the iliac crests

9. Which of the following is proper placement of the patient's arms for the upright, lateral projection of the chest?

- A. backs of the hands on the hips with the shoulders rolled anteriorly
- B. raised over the head, hands grasping opposite elbows
- C. abducted from thorax
- D. adducted from thorax

10. What patient breathing instructions maximize the amount of air in the lungs on the PA projection of the chest?

- A. stop breathing after second deep inspiration
- B. stop breathing after deep inspiration
- C. stop breathing after expiration
- D. continue slow, even breathing

11. To perform an AP projection of the chest in the lateral decubitus position, which of the following orientations of CR and IR is necessary?

- A. CR is vertical and IR is vertical
- B. CR is horizontal and IR is horizontal
- C. CR is vertical and IR is horizontal
- D. CR is horizontal and IR is vertical

12. To perform an AP projection of the chest in the lateral decubitus position, which of the following patient positions is necessary?

- A. patient lying on back with side against the IR
- B. patient lying on side with back against the IR
- C. patient lying on back with back against the IR
- D. patient lying on side with side against the IR

13. What patient breathing instructions are necessary for radiography of the ribs above the diaphragm?

- A. stop breathing (it doesn't matter when during the breathing cycle)
- B. stop breathing at the end of inspiration
- C. stop breathing at the end of expiration
- D. continue slow, even breathing

14. What patient breathing instructions are necessary for radiography of the ribs below the diaphragm?

- A. stop breathing (it doesn't matter when during the breathing cycle)
- B. stop breathing at the end of inspiration
- C. stop breathing at the end of expiration
- D. continue slow, even breathing

15. What patient breathing instructions are necessary for an AP projection of the abdomen?

- A. stop breathing (it doesn't matter when during the breathing cycle)
- B. stop breathing at the end of inspiration
- C. stop breathing at the end of expiration
- D. continue slow, even breathing

Chapter 17 Skull, Facial Bones, and Paranasal Sinuses

1. Which of the following positioning landmark is located at the junction of the nose and the upper lip?
 - A. EAM
 - B. glabella
 - C. foramen magnum
 - D. acanthion
2. What does the abbreviation "EAM" represent?
 - A. external auditory meatus
 - B. external anterior mastoid
 - C. external anterior meatus
 - D. external acoustic magnum
3. What anatomic term refers to the air-filled cavities located in some bones of the face and cranium?
 - A. sella turcica
 - B. zygomatic prominences
 - C. paranasal sinuses
 - D. paranasal foramina
4. Which positioning baseline, used for radiography of the skull and facial bones, extends from the outer corner of the eye to the EAM?
 - A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
5. How is the CR directed for a PA axial projection (Caldwell method) of the skull?
 - A. 15° cephalic
 - B. 15° caudad
 - C. 30° cephalic
 - D. 30° caudad
6. Why is sinus radiography performed with the patient in the upright position?
 - A. to demonstrate air/fluid levels
 - B. for ease of patient positioning
 - C. for patient comfort
 - D. to prevent superimposition of the cranial structures on the paranasal sinuses
7. Which radiographic projection of the cranium best demonstrates the maxillary sinuses?
 - A. AP axial (Towne method)
 - B. SMV
 - C. PA axial (Caldwell method)
 - D. parietoacanthial (Waters method)
8. A lateral projection of the face, with no grid, is used to image which of these bones?
 - A. mandible
 - B. nasal bones
 - C. orbits
 - D. zygoma

9. A "blow-out fracture" involves which of the following structures?
- A. occipital bone
 - B. mandible
 - C. nasal bones
 - D. floor of the orbit
10. Which facial bones are most commonly fractured?
- A. nasal bones
 - B. zygomatic arches
 - C. orbits
 - D. mandible
11. Which positioning baseline, used for radiography of the skull and facial bones, extends from the inferior orbital margin to the EAM?
- A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
12. Which positioning baseline, used for radiography of the skull and facial bones, extends from a point at the junction of the nose and upper lip to the EAM?
- A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
13. For the PA axial (Caldwell method) projection of the skull, which positioning baseline is placed perpendicular to the IR?
- A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
14. For the parietoacanthial (Waters method) projection of the facial bones and sinuses, which positioning baseline forms a 37 degree angle to the IR?
- A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
15. For the lateral projection of the skull, which positioning baseline is placed parallel to the long axis of the IR?
- A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line

Chapter 18 Radiography of Pediatric and Geriatric Patients

1. A common condition among geriatric patients is diverticulitis, which affects the:
 - A. lungs
 - B. colon
 - C. eyes
 - D. brain

2. Nonaccidental trauma is a term that may be used to describe:
 - A. aspiration of a foreign object
 - B. ingestion of a foreign object
 - C. slipped capital femoral epiphysis
 - D. physical manifestations of child abuse

3. When the degree of skeletal maturation, also called “bone age,” is not consistent with a child’s chronological age, the cause is usually pathology involving the:
 - A. skeletal system
 - B. endocrine system
 - C. respiratory system
 - D. reproductive system

4. Greenstick fractures are commonly seen in:
 1. pediatric patients
 2. geriatric patients
 - A. 1
 - B. 2
 - C. 1 and 2
 - D. Neither 1 nor 2

5. Which of the following radiographic studies is usually performed bilaterally on pediatric patients, but unilaterally on adults?
 - A. clavicle
 - B. ankle
 - C. elbow
 - D. lung

6. A radiographic study to determine the bone age of a child may involve any of a number of different joints, but the most common joint for this purpose is the:
 - A. hip
 - B. elbow
 - C. knee
 - D. wrist

7. A neurologic condition that affects the elderly, causing tremors and eventual debilitation, is:
 - A. Alzheimer disease
 - B. osteopenia
 - C. Parkinson disease
 - D. decubitus ulcer

8. Which of the following strategies is/are likely to prove helpful in communicating with patients who are hard of hearing?
 1. Put your lips close to the patient’s ear and shout.
 2. Speak clearly at a moderate pace.
 3. Avoid noisy background situations.
 - A. 1 only
 - B. 2 only
 - C. 2 and 3 only
 - D. 1, 2 and 3

9. Patients with Alzheimer disease commonly experience:

- A. no memory loss.
- B. short term memory loss
- C. long term memory loss
- D. total memory loss

10. Slipped capital femoral epiphysis is a condition most often seen in:

- A. overweight boys
- B. elderly women with osteoporosis
- C. premature infants
- D. cases of physical abuse

Chapter 19 Image Evaluation

1. What light level is best for viewing radiographic images?
 - A. no light in room
 - B. low light in room
 - C. bright light in room
 - D. bright light shining directly on viewing monitor

2. True or false: Radiographs taken in both AP and PA projections should be viewed as though the patient were in anatomic position.
 - A. true
 - B. false

3. How are hands and feet oriented for viewing?
 - A. fingers and toes pointing down toward the floor
 - B. fingers and toes pointing left
 - C. fingers and toes pointing right
 - D. fingers and toes pointing up toward the ceiling

4. True or false: It is recommended that all radiographic markers be placed so they are recorded on the image during the exposure.
 - A. true
 - B. false

5. Exclusion of significant anatomy would be considered what type of error?
 - A. anatomy and positioning error
 - B. exposure factor error
 - C. esthetic error
 - D. radiation safety error

6. Lack of spatial resolution (detail) would be considered what type of error?
 - A. anatomy and positioning error
 - B. exposure factor error
 - C. esthetic error
 - D. radiation safety error

7. Leaving a metallic object in a patients clothing in the area to be radiographed would be considered what type of error?
 - A. anatomy and positioning error
 - B. exposure factor error
 - C. esthetic error
 - D. radiation safety error

8. Failure to properly collimate would be considered what type of error?
 - A. anatomy and positioning error
 - B. exposure factor error
 - C. esthetic error
 - D. radiation safety error

9. Incorrect positioning of anatomy for a radiograph would be considered what type of error?
 - A. anatomy and positioning error
 - B. exposure factor error
 - C. esthetic error
 - D. radiation safety error

10. Failure to properly align the long axis of the anatomy of interest with the long axis of the IR or radiation field would be considered what type of error?

- A. anatomy and positioning error
- B. exposure factor error
- C. esthetic error
- D. radiation safety error

Chapter 20 Ethics, Legal Considerations, and Professionalism

1. The threat of being touched in an injurious way defines:
 - A. libel
 - B. negligence
 - C. false imprisonment
 - D. assault

2. The standard of reasonable care is based upon:
 - A. the doctrine of the reasonably prudent person
 - B. the doctrine of *respondeat superior*
 - C. the doctrine of *res ipsa loquitur*
 - D. the rule of personal responsibility

3. Which of the following human needs is more basic than the others?
 - A. activity
 - B. esteem
 - C. sleep
 - D. love

4. A profession is best defined as:
 - A. a job that requires a college education.
 - B. an organization of workers that do the same job.
 - C. a position in a hospital.
 - D. the application of specialized knowledge in a way that benefits others.

5. Title II of the Health Insurance Portability and Accountability Act (HIPAA) requires that health care providers protect patients':
 - A. right to know.
 - B. confidentiality.
 - C. modesty.
 - D. right to refuse treatment.

6. Medical images belong to:
 - A. the patient.
 - B. the attending physician.
 - C. the hospital or clinic where they are made.
 - D. the insurance company that pays for them.

7. Communication strategies most likely to alleviate stress include:
 1. lowering your voice and speaking slowly and clearly.
 2. nonjudgmental communication, both verbal and nonverbal.
 3. responding calmly to inappropriate language or actions.
 - A. 1 only
 - B. 1 and 2 only
 - C. 2 and 3 only
 - D. 1, 2 and 3

8. Eye contact, touch, facial expression, and body posture are all examples of:
 - A. nonverbal communication.
 - B. improper communication.
 - C. transcultural communication.
 - D. tactless communication.

9. Assertive statements are characterized by:
 - A. anger or hostility
 - B. a calm, firm expression of feelings or opinions

- C. confirmation and validation
- D. an offer of a valid choice

10. The most appropriate form of address for Mrs. Genevieve Nesmith, age 81, is:
- A. Mrs. Nesmith
 - B. Genevieve
 - C. Jenny
 - D. Honey

Chapter 21 Safety and Infection Control

1. Which of the following describes the Trendelenburg position?
 - A. The patient is lying face down.
 - B. The patient's head is elevated.
 - C. The patient is lying on the left side.
 - D. The patient's head is lower than the feet.

2. A lightheaded or faint sensation upon first sitting up is termed:
 - A. dyspnea
 - B. orthopnea
 - C. orthostatic hypotension
 - D. debilitation

3. The single best protection against disease in the health care setting is:
 - A. vaccination
 - B. wearing a mask
 - C. frequent hand hygiene
 - D. sterile technique

4. An autoclave provides sterilization by means of:
 - A. heat produced by steam under pressure
 - B. gas plasma technology
 - C. a heated mixture of Freon and ethylene oxide
 - D. soaking items in a bath of germicidal solution

5. Which of the following infectious diseases are caused by bloodborne pathogens?
 1. hepatitis A
 2. hepatitis B
 3. HIV/AIDS
 4. tuberculosis
 - A. 1 and 2
 - B. 2 and 3
 - C. 1, 2 and 3
 - D. 1, 2, 3, and 4

6. Which of the following organisms is/are commonly responsible for healthcare associated infections (HAI)?
 1. MRSA
 2. VRE
 3. *C. difficile*
 - A. 1 only
 - B. 1 and 2 only
 - C. 1 and 3 only
 - D. 1, 2, and 3

7. An intradermal injection or "skin test" is used to detect antibodies for the pathogen that causes:
 - A. HIV/AIDS
 - B. hepatitis B
 - C. tuberculosis
 - D. influenza

8. Standard Precautions involve the use of barriers whenever contact is anticipated with:
 1. Blood or wound drainage
 2. nonintact skin
 3. mucous membranes

- 4. sweat
- A. 1 only
- B. 1 and 2 only
- C. 1, 2 and 3 only
- D. 1, 2, 3, and 4

9. Alcohol-based hand rubs provide effective hand hygiene in most circumstances, but should not be used when:

- 1. the hands are contaminated with visible soil.
- 2. the hands are contaminated with blood or body secretions.
- 3. the hands may be contaminated with endospores.
- 4. removing protective gloves.

- A. 1 only
- B. 1 and 2 only
- C. 1, 2 and 3 only
- D. 1, 2, 3, and 4

10. The term for the complete removal of all organisms and their spores from equipment used to perform specific procedures is:

- A. sterilization
- B. medical asepsis
- C. microbial dilution
- D. environmental protection

Chapter 22 Assessing Patients and Managing Acute Situations

1. The medical term for loss of bladder control is:
 - A. incontinence
 - B. hypotension
 - C. diuresis
 - D. bradycardia

2. Which of the following measurements are considered vital signs?
 1. pulse
 2. blood pressure
 3. temperature
 4. respirations
 - A. 1 and 2 only
 - B. 3 and 4 only
 - C. 1, 2 and 3 only
 - D. 1, 2, 3, and 4

3. A sphygmomanometer is an instrument used to measure:
 - A. pulse
 - B. respirations
 - C. blood pressure
 - D. oxygen saturation

4. When stress causes an attack of bronchial constriction and difficult breathing, the condition is called:
 - A. aspiration
 - B. asthma
 - C. incontinence
 - D. hypertension

5. A rapid, weak, and ineffective heartbeat defines a state called:
 - A. hypertension
 - B. angina
 - C. stridor
 - D. fibrillation

6. A transient ischemic attack (TIA) is a mild form of:
 - A. urticaria
 - B. vertigo
 - C. stroke
 - D. heart attack

7. A patient who is *diaphoretic* is:
 - A. sweating
 - B. short of breath
 - C. dizzy
 - D. incontinent

8. A bluish coloration of the skin, mucous membranes, and nail beds indicates that the patient is suffering from:
 - A. pain
 - B. lack of oxygen
 - C. lack of water
 - D. lack of sleep

9. Which of the following vital signs is often measured at the tympanic membrane?
 - A. pulse

- B. temperature
- C. respiration
- D. blood pressure

10. A diabetic patient who has taken insulin but no food may develop:

- A. hypoglycemia
- B. diabetic coma
- C. urticaria
- D. erythema

11. A patient who exhibits an increased pulse rate, pallor, weakness and a fall in systolic blood pressure of 30 mm Hg is suffering from:

- A. epistaxis
- B. angina
- C. shock
- D. vertigo

12. When a patient has a sudden onset of pain in the chest, shoulder or jaw, develops an irregular pulse, appears diaphoretic and pale, and is feeling short of breath, weak, or nauseated, or you should:

1. assist the patient to lie down
 2. call an emergency team or dial 911
 3. prepare to administer oxygen
- A. 1 only
 - B. 2 only
 - C. 1 and 2 only
 - D. 1, 2 and 3

Chapter 23 Medications and Their Administration

1. The effectiveness of a drug is referred to as its:
 - A. toxicity
 - B. potency
 - C. efficacy
 - D. hydration
2. The government agency responsible for, among other things, setting standards for control of drugs is the:
 - A. PDR
 - B. ASRT
 - C. FDA
 - D. DEQ
3. A natural or synthetic drug whose actions are similar to the actions of morphine is called a/an:
 - A. opiate
 - B. opioid
 - C. antihistamine
 - D. steroid
4. An instrument used to monitor the oxygen saturation of sedated patients is called a/an:
 - A. pulse oximeter
 - B. respiratory depressant
 - C. anticoagulant
 - D. antagonist
5. A drug that counteracts the effects of other drugs is called an:
 - A. agonist
 - B. antagonist
 - C. allergen
 - D. antihistamine
6. An antidote is a drug used to:
 - A. treat an infection
 - B. treats an allergic reaction
 - C. provide relief from pain
 - D. counteract a toxic effect
7. A medication dose administered subcutaneously should be limited to no more than:
 - A. 10 ml
 - B. 5 ml
 - C. 2 ml
 - D. 0.5 ml
8. When administering a medication intramuscularly to a child under 5 years of age, the best site to use is the:
 - A. gluteus maximus muscle
 - B. vastus lateralis muscle
 - C. deltoid muscle
 - D. anterior thigh
9. When it is your duty to monitor an intravenous infusion, you should be especially alert for signs of:
 - A. infiltration
 - B. dehydration
 - C. shock
 - D. excretion

10. The process by which the body transforms drugs into an inactive form that can be eliminated from the body is called:

- A. absorption
- B. distribution
- C. metabolism
- D. excretion

Chapter 24 Medical Laboratory Skills

1. A needle holder, sometimes called a barrel, is a plastic tube designed to:
 - A. receive contaminated sharps
 - B. contain the blood specimen obtained by venipuncture
 - C. support a vacuum tube during blood specimen collection
 - D. prevent needlestick injuries

2. Test results such as negative, trace, 1+, 2+, 3, and 4+ are typical of which of the following laboratory tests?
 - A. white blood cell count
 - B. red blood cell count
 - C. microscopic evaluation of urine sediment
 - D. chemical evaluation of urine using a reagent strip

3. When performing venipuncture or urine collection, the safety of the health care worker requires the practice of:
 - A. surgical asepsis
 - B. Standard Precautions
 - C. sterile technique
 - D. phlebotomy

4. The veins commonly used for venipuncture are found in the:
 - A. antecubital fossa
 - B. thigh muscle
 - C. fingertip
 - D. deltoid region

5. The CCMS method is used to obtain:
 - A. blood samples for blood alcohol testing
 - B. blood samples for tests requiring blood plasma
 - C. blood samples from patients subject to fainting
 - D. urine samples for routine urinalysis

6. Which of the following sites should NOT be used for phlebotomy?
 1. the arm on the side of a previous mastectomy
 2. areas where scarring is evident
 3. the antecubital fossa
 - A. 1 only
 - B. 2 only
 - C. 1 and 2 only
 - D. 1, 2 and 3.

7. When a patient who is seated feels faint during the process of venipuncture, you should:
 - A. proceed with specimen collection, then help the patient to lie down.
 - B. reschedule the test for another day.
 - C. delay specimen collection and tell the patient to breathe deeply.
 - D. stop the procedure, assist the patient to lie down, and try again using the other arm.

8. When a urinalysis reagent strip indicates a positive result for glucose, protein, blood, nitrite, or leukocyte esterase, you should:
 - A. notify the physician that a microscopic examination of sediment is needed
 - B. repeat the test with a new specimen
 - C. repeat the test with a new reagent strip
 - D. discard the specimen immediately into a biohazard container

9. Which of the following are included in the macroscopic examination of urine specimens?

1. color assessment
2. clarity assessment
3. chemical analysis
4. sediment analysis.

- A. 1 and 2 only
- B. 2 and 3 only
- C. 3 and 4 only
- D. 2 and 4 only

10. Which of the following statements is/are true with regard to blood collection tubes?

1. Tubes are evacuated so that the vacuum draws the blood into the tube.
2. Tube stoppers are color coded according to the presence or absence of specific additives.
3. Tubes without additives should be filled before tubes that contain additives.

- A. 1 only
- B. 1 and 2 only
- C. 2 and 3 only
- D. 1, 2, and 3.

Chapter 25 Additional Procedures for Assessment and Diagnosis

1. When the standard test for distance vision cannot be performed because the patient is unfamiliar with the English alphabet, which of the following can be used instead?
 - A. near vision acuity chart
 - B. Ishihara test
 - C. Snellen E chart
 - D. calibration rod
2. When a patient's distance vision measurement is reported as OS 20/40 sc, this means that:
 - A. with the right eye and wearing glasses, the patient can read at 40 feet what a person with normal vision can read at 20 feet
 - B. with the left eye and without glasses, the patient can read at 20 feet what a person with normal vision can read at 40 feet
 - C. with the left eye and wearing glasses, the patient can read at 40 feet what a person with normal vision can read at 20 feet
 - D. with the right eye and wearing glasses, the patient can read at 20 feet what a person with normal vision can read at 40 feet
3. A flow-volume graph is a means of plotting the results of a/an:
 - A. electrocardiogram
 - B. Ishihara test
 - C. forced expiration spirometry test
 - D. exercise tolerance test
4. One contradiction for spirometry testing is the presence of *hemoptysis*, which means:
 - A. coughing up blood
 - B. collapsed lung
 - C. bronchodilation
 - D. a type of eye surgery
5. The amplitude and morphology of the QRS complex is diagnostic information obtained from a/an:
 - A. Ishihara test
 - B. pulmonary function test
 - C. electrocardiogram
 - D. spirogram
6. When weighing a patient on a balance scale, the scale is balanced when the weight is set at 150 on the upper calibration bar and at 21.5 on the lower bar. This patient weighs:
 - A. 150 pounds
 - B. 171.5 pounds
 - C. 128.5 pounds
 - D. 21.5 kilograms
7. Presbyopia is a lack of far vision acuity that is related to:
 - A. myopia
 - B. defective color perception
 - C. defective depth perception
 - D. age
8. The number of separate ECG recordings from various electrode combinations (leads) in a standard diagnostic electrocardiogram is:
 - A. three
 - B. four
 - C. twelve
 - D. twenty

9. While making an ECG recording you note that the amplitude of the QRS complex so great that it causes the stylus to move off the paper. In this case you should set the machine to run at:

- A. $\frac{1}{2}$ STD
- B. 2 STD
- C. half speed
- D. double speed

10. Enthusiastic coaching is an essential part of which of the following tests?

- A. Snellen test
- B. forced expiration spirometry
- C. electrocardiography
- D. exercise tolerance test