MaxRay Handheld X-ray Systems
Operator Training Exam

Employee: ________________________________    Date: _____________________________
Instructor: ________________________________    Score: ____________________________

Instructions
Read each question carefully and choose the best answer.

______ 1) ALARA is

a. a safety principle meant to keep radiation dose to a minimum
b. a suggested improvement to always do what is responsible
c. the alarming point on X-ray devices
d. the target material in X-ray devices

______ 2) Which are the two primary mechanisms of X-ray interaction in patients?

a. coherent scatter and photoelectric absorption
b. Compton scatter and coherent scatter
c. Compton scatter and photoelectric absorption
d. photoelectric scatter and coherent absorption

______ 3) Absorbed dose is defined as

a. energy dissipated through Compton scatter
b. energy absorbed per unit mass
c. energy in the X-ray beam after attenuation of X-rays in the patient
d. energy collected on the image receptor

______ 4) What safety consideration(s) should be remembered when trying to minimize radiation exposure?

a. Time
b. Distance
c. Shielding
d. all of the above
5) If the operator has no options except to violate the backscatter zone, the operator should

   a. wear a lead apron
   b. not take the image
   c. get supervisory approval
   d. proceed without concern

6) When taking an image, the operator should stand

   a. anywhere that is convenient to get the best image
   b. to the left or right of the backscatter shield
   c. directly behind the backscatter shield
   d. none of the above

7) When not in use for an extended period of time, the MaxRay should be stored

   a. on the counter with the battery installed
   b. in a cabinet with the battery installed
   c. in a drawer next to the battery
   d. in a locked cabinet with the battery removed and stored separately

8) To maximize the backscatter safety zone, the device should be held so that the

   a. backscatter shield is parallel to the operator and close to the patient
   b. X-ray emission cone is parallel to the operator
   c. backscatter shield is perpendicular to the operator
   d. none of the above

9) Prior to taking an exposure, the operator should ensure that

   a. they are behind the backscatter zone
   b. the patient is properly shielded
   c. all unnecessary persons are out of the room
   d. all of the above

10) When trying to capture a difficult image, the operator should

    a. do whatever is necessary to get the image needed
    b. move the patient before moving the device
    c. move the device before moving the patient
    d. contact the manufacturer for advice
11) When taking an image, the operator wants a higher mAs exposure factor. The operator can
   a. adjust the mA setting
   b. adjust the exposure time setting
   c. adjust the kVp setting
   d. adjust the emission cone

12) If the operator removes their finger from the exposure button prior to the passage of the exposure time, X-ray emissions will
   a. continue until the exposure time has elapsed
   b. slowly decrease until the exposure time has elapsed
   c. stop immediately
   d. none of the above

13) Generally, film will require an exposure time
   a. equal to that of digital
   b. less than that of digital
   c. greater than that of digital
   d. greater than 1 second

14) The purpose of the backscatter shield is to protect the operator from
   a. the primary beam radiation
   b. radiation scattered from the patient
   c. both a and b
   d. neither a nor b

15) If the operator doubles the exposure time
   a. the number of scattered X-rays will double
   b. the patient dose will double
   c. the operator’s exposure will double
   d. all of the above

16) X-rays are best shielded by
   a. low density material
   b. high density material
   c. human tissue
   d. scatter material
17) The majority of X-rays in a 60 kVp primary X-ray beam are produced by which mechanism?
   a. Compton scatter  
   b. characteristic X-rays  
   c. Bremsstrahlung  
   d. none of the above

18) The glass X-ray tube provides “inherent filtration” for the primary X-ray beam. How does this filtration impact the energy profile of the emitted X-rays?
   a. lower energy X-rays are removed  
   b. higher energy X-rays are removed  
   c. only characteristic X-rays are removed  
   d. no X-rays are removed

19) X-rays penetrating the housing are classified as what type of radiation?
   a. primary  
   b. scattered  
   c. Compton  
   d. leakage

20) In order to prevent unwanted exposure, what practice is best?
   a. remove the battery when not in use  
   b. never point the emission port at anyone not intended to receive X-rays  
   c. remain in the backscatter zone during a radiographic procedure  
   d. all of the above

21) A stochastic biological effect occurs
   a. if a threshold is exceeded  
   b. with all exposures of X-ray radiation  
   c. randomly  
   d. only in children
22) Generally, children require less exposure time than adults because
   a. adults generally have more dental problems
   b. children have thinner tissues and smaller teeth
   c. tissue density is lower in children
   d. the child is more prone to movement

23) Which exposure factor can be changed by the operator on the MaxRay?
   a. filament current
   b. tube current
   c. exposure time
   d. tube potential

24) Except for their energy level, X-rays are essentially the same as
   a. microwaves
   b. visible light
   c. radio waves
   d. all of the above

25) What is meant if an atom is “ionized”?
   a. it loses an electron
   b. its mass is doubled
   c. its nucleus shrinks
   d. all of the above