Chapter 17

1. When changing from a 3-phase x-ray machine to a (fully-rectified) single-phase machine,

overall technique should be changed to  the original exposure intensity:

a. 2 times

b. 4 times

c. ½

d. 1/4

e. no change should be made

2. When changing from a fully-rectified single-phase x-ray machine to a half-rectified machine,

what change in technique would be required to maintain overall exposure at the image

receptor?

a. 2 times

b. 4 times

c. ½

d. 1/4

e. no change should be made

3. When changing from a single-phase x-ray machine to a 3-phase machine, which of the

following would increase *even though the same radiographic technique is used*:

a. average beam energy

b. x-ray tube output

c. exposure intensity at the receptor plate

d. none of these

e. all of these

4. Of the following, which is the best example of a projection that used to require compensating

filters with film/screen technology but no longer requires such filters with digital

processing:

1. Groin lateral hip
2. Swimmer’s cervicothoracic lateral
3. AP thoracic spine
4. None of the above

5. With all other factors unchanged, if the phase or rectification of the x-ray machine is

increased, image sharpness of detail will:

a. increase as a direct result

b. decrease as a direct result

c. not change at all

d. may be affected indirectly, but is not directly controlled by it

6. High-frequency x-ray machines require about the same technique (very slightly less) as:

a. single-phase units

b. 3-phase units

c. half-rectified units

d. capacitor-discharge units

7. Battery-powered constant-potential mobile x-ray machines require about when compared

to 3-phase stationary units:

a. the same technique

b. double the mAs and 7 kVp more

c. 8 kVp less

d. 10 kVp more

8. Compared to a 3-phase 6-pulse x-ray machine, a 3-phase 12-pulse unit is:

a. twice as efficient

b. half as efficient

c. slightly more efficient

d. slightly less efficient

9. Three-phase and high-frequency generators can produce a much more *continuous* output of x-

rays over time, due to:

a. raising the kVp

b. decreasing the average kV

c. overlapping pulses of electricity

d. increasing the percentage of ripple

10. For a particular *set* kVp, which type of x-ray equipment produces the very highest *average*

kV for the x-ray beam:

a. single-phase

b. 3-phase 6-pulse

c. 3-phase 12-pulse

d. battery-powered mobile units

11. Three-phase x-ray machines produce greater overall exposure at the image receptor plate than single-phase units operated at the same technique, because 3-phase machines create

an increased:

a. quality of radiation

b. quantity of radiation

c. penetration of radiation

d. all of these

e. none of these

12. For all x-ray machines that can operate above 70 kVp, the required minimum amount of total

filtration for the x-ray tube is:

a. 0.25 mm Pb

b. 2.5 mm Al

c. 0.25 cm Ag equivalent

d. 2.5 cm Pb equivalent

e. 2.5 mm Al equivalent

13. A wedge-shaped compensating filter would always be placed with the thickest end:

a. toward the anode

b. toward the patient’s feet

c. toward the patient’s head

d. toward the thinnest anatomy

e. toward the thickest anatomy

14. The purpose of *protective* filtration in the x-ray tube and collimator is to:

a. provide uniform exposure across the field

b. enhance subject contrast

c. reduce off-focus radiation

d. all of these

e. none of these

15. With all other factors unchanged, if 0.5 mm of general filtration is added to the collimator,

image sharpness of detail will:

a. increase as a direct result

b. decrease as a direct result

c. not change at all

d. may be affected indirectly, but is not directly controlled by it

16. The glass of the x-ray tube, the beryllium window, and the oil through which the x-rays must

pass, all constitute part of the:

a. compensating filtration

b. inherent filtration

c. added filtration

d. anode heel effect

e. off-focus radiation

17. Protective filtration in the x-ray tube and collimator do all of the following to the x-ray beam

*except*:

a. make the beam more homogeneous

b. increase its average energy

c. increase its minimum energy

d. increase its peak energy

e. decrease patient exposure

18. The practical effect of removing 0.5 mm of aluminum from the original filtration would be to:

a. make the final image darker

b. decrease contrast in the final image

c. increase contrast in the final image

d. increase patient exposure

e. decrease patient exposure

19. Added filters are usually made of what material for diagnostic x-ray machines:

a. tungsten

b. molybdenum

c. rhenium

d. copper

e. aluminum

20. Which of the following adjectives best describes the desired amount of protective filtration?

a. maximum

b. minimum

c. optimum

d. none

21. The half-value layer (HVL) is used to measure:

a. the amount of filtration in the x-ray beam

b. the kVp set

c. the amount of x-rays in the beam

d. the degree of penetration of the x-ray beam

22. Which type of x-ray machine generator produces an average kV at about 91% of the set kVp?

a. Single-phase fully rectified

b. 3-phase 6-pulse

c. 3-phase 12-pulse

d. High-frequency generators

23. A particular x-ray machine has 2.5 mm aluminum equivalent of total filtration, but upon

testing, the measured HVL at the 80-kVp setting is lower than required by regulatory

agencies. What action, if any, must be taken:

a. None - the machine is within guidelines

b. Some filtration must be removed

c. Some filtration must be added

d. The effective kVp must be re-calibrated

24. Default digital processing can balance the brightness across the image so well that it has

reduced the need for using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ except in the most extreme cases.

1. AEC
2. Compensating filtration
3. Protective filtration
4. High-frequency generators
5. High kVp