Chapter 16

1. The ratio of the remnant beam intensity to the primary beam intensity is the:

a. exposure

b. subject contrast

c. scatter

d. penetration

e. secondary radiation

2. . When the 15% increase in kVp is applied along with a halving of the mAs, experiments

confirm that the *net* patient exposure is reduced to about:

1. 33%
2. 50%
3. 67%
4. 80%
5. 90%

3. The effect of kVp on the intensity of the remnant x-ray beam is:

a. exponential

b. proportional

c. inversely proportional

d. inverse

e. none

4. Most essential to producing a radiographic image is adequate:

a. penetration

b. intensity

c. collimation

d. exposure length

e. distance

5. To be accurate, applying the 15% rule for kVp in order to cut the mAs in half does *not* cut

patient exposure all the way to ½, primarily because the increase in kVp results in:

1. Less penetration
2. Less original intensity
3. More photoelectric interactions
4. More characteristic radiation being produced in the anode
5. More bremsstrahlung radiation being produced in the anode

6. From an original technique of 40 mAs at 98 kVp, which of the following techniques would

increase subject contrast in the remnant x-ray beam while at the same time maintaining

overall exposure intensity to the image receptor plate?

a. 40 mAs at 98 kVp

b. 80 mAs at 88 kVp

c. 80 mAs at 83 kVp

d. 20 mAs at 108 kVp

e. 20 mAs at 114 kVp

7. In terms of overall exposure to the imaging receptor, which of the following techniques is *not*

roughly equivalent to the other four:

a. 500 mA, 0.1 sec., 92 kVp

b.100 mA, .25 sec., 106 kVp

c. 300 mA, .25 sec., 86 kVp

d. 400 mA, 0.l7 sec., 80 kVp

e. 50 mA, .25 sec., 120 kVp

8. An x-ray beam with the ability to penetrate more different types of tissue will result in what

change in the quality of the signal carried by the remnant x-ray beam?

a. higher subject contrast

b. longer gray scale

c. increased brightness

d. increased mottle

e. improved sharpness of detail

9. High-kVp techniques allow more margin for error in estimating mAs values. This margin of

error is called:

a. half-value layer

b. exposure quality

c. exposure margin

d. exposure latitude

e. image latitude

10. An original technique of 30 mAs at 80 kVp was used. Which of the following new kVp

levels would be the *minimum* to significantly increase the exposure intensity at the image

receptor plate?

a. 82

b. 84

c. 87

d. 90

11. For an AP lumbar spine projection, an original technique of 40 mAs at 80 kVp, which

produced a proper exposure, is adjusted using the 15% rule in a series of steps to 160

mAs at 58 kVp. For an average patient, which of the following would result:

a. underexposure at the receptor plate

b. overexposure at the receptor plate

c. excessive scatter radiation

d. over-penetration through the patient

e. excessive blurring of image details

12. For a single-phase x-ray machine, about what fraction of the peak kV is the *average* kV:

a. 1/5

b. 1/4

c. 1/3

d. ½

e. 3/4

13. Starting at 80 kVp, in order to obtain a significantly lighter exposure at the image receptor

plate, the kVp must be reduced by *at least*:

a. 1 kVp

b. 2 kVp

c. 4 kVp

d. 8 kVp

e. 12 kVp

14. Starting at 40 kVp, in order to double the overall exposure at the image receptor plate, change:

kVp by a(n):

a. 4 kVp increase

b. 6 kVp increase

c. 8 kVp increase

d. 10 kVp increase

e. 4 kVp decrease

15. When the kVp is increased, overall exposure at the image receptor plate increases *because*:

a. more x-rays are emitted form the x-ray tube

b. the x-ray beam has higher average energy

c. the x-ray beam penetrates more through tissues

d. all of the above

e. none of the above

16. Which of the following is *not* a reason why higher kVp levels reduce subject contrast in the

remnant x-ray beam?

a. there is penetration through more different types of tissues

b. photoelectric interactions are lost

c. the scatter radiation which is produced is more likely to reach the image receptor plate

d. more scatter radiation is produced within the patient

17. With all other factors unchanged, if kVp is decreased, spatial resolution (sharpness) 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

18. Starting at 70 kVp, to *quadruple* the overall exposure reaching the image receptor plate, the

kVp should be changed to:

a. 89

b. 92

c. 95

d. 80

e. 100

19. With all other factors unchanged, if kVp is substantially decreased, subject contrast in the

remnant x-ray beam 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

20. In the x-ray tube anode, increasing the kVp increases the:

a. number of bremsstrahlung interactions

b. overall output (quantity) of x-rays

c. average energy of x-rays produced

d. none of these

e. all of these

21. Even if scatter radiation were completely eliminated, higher kVp levels would still result in

reduced subject contrast and lengthened gray scale within the remnant x-ray beam signal due to:

a. increased fog

b. increased exposure

c. increased penetration

d. increased numbers of interactions

22. Generally, anything that lengthens the gray scale within the remnant x-ray beam signal also

increases:

a. exposure latitude

b. subject contrast

c. patient dose

d. overall exposure

23. Adequate penetration of all tissues without excessive production of scatter radiation would be

the measure for:

a. maximum kVp

b. minimum kVp

c. optimum kVp

d. optimum mAs

e. maximum mAs

24. The kVp major and kVp minor controls at the console actually set which electronic device in

the x-ray machine circuit?

a. The rheostat

b. The autotransformer

c. the step-up transformer

d. the series of resistors

e. the step-down transformer

25. The *minimum* kVp is defined as the lowest kVp that provides some degree of x-ray

penetration through in the body part being radiographed:

a. bone

b. soft tissues

c. any tissue

d. all tissues of interest

26. In order to double the remnant x-ray beam signal reaching the image receptor, rather than

using mAs, if the kVp is increased by 15% instead, patient exposure will:

a. decrease to about ½

b. decrease by about 15%

c. increase by 15%

d. increase by 25-40%

e. increase by double (100%)

27. When radiographing the *lungs or small body parts*, which of the following best describes the

effect of using high kVp techniques on scatter radiation:

a. They increase scatter substantially

b. They increase scatter, but *not* substantially

c. They decrease scatter substantially

d. They decrease scatter, but *not* substantially

28. What is the effect of increasing kVp upon spatial resolution (sharpness) in the image:

a. It increases spatial resolution (sharpness)

b. It reduces spatial resolution (sharpness)

c. It affects spatial resolution (sharpness) indirectly

d. It is not related to spatial resolution (sharpness)

29. Within a given procedural series, from view to view, the:

a. kVp and mAs should both always be adjusted

b. kVp should be kept fairly stable while the mAs is adjusted

c. mAs should be kept fairly stable while the kVp is adjusted

d. kVp and mAs should both be kept the same

30. What has been the impact of digital imaging technology upon the use of high-kVp

techniques:

a. It has made them more relevant, and more practical to apply

b. It has made them more relevant, but more problematic to apply

c. It has made them less relevant

d. It has made them less relevant, and more problematic to apply