# Chapter 22

1. At 100 cm SID, 200 mGy of radiation reaches the image receptor plate. By changing the

distance to 180 cm, the new intensity of radiation at the receptor plate will be:

a. 0.016 mGy

b. 61.73 mGy

c. 111.1 mGy

d. 152 mGy

e. 250 mGy

2. As a rule of thumb, changing from a 100 cm (40”) SID to a 180 cm (72”) SID will require the radiographic technique to maintain overall exposure at the image receptor plate:

a. 2X

b. 3X

c. 4X

d. ½

e. 1/3

3. If overall exposure at the image receptor plate was maintained by cutting the mAs from 60 to

15, the SID must have been:

a. doubled

b. tripled

c. quadrupled

d. cut to ½

e. cut to 1/4

4. When changing from a 100 cm (40”) SID to a 75 cm (30”) SID, (or *half-way to one-half* the

original distance), if the original radiographic technique is *not* adjusted to maintain

overall exposure, the resulting exposure at the image receptor plate will be approximately what proportion of the original?

a. 1/4

b. ½

c. double

d. triple

e. quadruple

5. The adjustment in radiographic *technique* to compensate for changes in the SID follows which

law:

a. the square law

b. the inverse square law

c. Ceiszynkski’s law

d. the law of Bergonie and Tribondeau

6. Which of the following benefits result from using an increased SID:

a. A larger field-of-view results for a particular image receptor

b. More anatomy can be included within the view

c. Patient dose is reduced

d. All of the above

e. None of the above

7. The *concentration* of x-rays is \_\_\_\_\_\_\_\_\_\_ proportional to the \_\_\_\_\_\_\_\_\_ of the distance:

a. directly, square

b. inversely, square

c. directly, change

d. inversely, change

8. In order to eliminate any statistically significant magnification of the heart size during chest

radiography, *dedicated* chest units frequently have the x-ray tube locked into a precisely

centered position at \_ cm SID:

a. 75 (30”)

b. 100 (40”)

c. 200 (80”)

d. 244 (96”)

e. 300 (120”)

9. If the exposure time required to produce an optimum exposure for a particular procedure is 1

second at 100 cm. SID, what exposure time would be required to produce the same

exposure at 50 cm SID:

a. 1.5 sec.

b. .75 sec.

c. 5 sec.

d. .25 sec.

10. If an optimum exposure for a particular procedure was obtained with 100 mA at 100 cm SID,

what new mA station would maintain the same exposure if the SID is increased to 300

cm:

a. 400 mA

b. 600 mA

c. 900 mA

d. 1200 mA

11. An optimum exposure was obtained with 60 mAs at 100 cm SID. Which of the following

will maintain the exposure at 150 cm SID:

a. 300 mA at .07 sec.

b. 500 mA at .27 sec.

c. 600 mA at .52 sec.

d. 800 mA at .125 sec.

12. With all other factors unchanged, if SID is decreased, shape distortion in the image 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

13. With all other factors unchanged, if SID is reduced, image penumbra 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

14. For a 180 cm (6 ft) tall person, the distance from fingertip to fingertip with both arms

outstretched is about:

a. 100 cm (40”)

b. 150 cm (60”)

c. 180 cm (72”)

d. 200 cm (80”)

15. Any change of or greater will require a technique adjustment in order to maintain the

level of radiation exposure:

a. 5%

b. 8%

c. 15%

d. 25%

16. As a rule of thumb, a 60-inch (152 cm) projection requires more technique than a 40-

inch (100 cm) projection for the same anatomy:

a. 1/3

b. 1/2

c. 2X

d. 3X

17. As a rule of thumb, a 75 cm (30”) projection requires technique than a 100 cm (40”)

projection for the same anatomy:

a. 1/3

b. 1/2

c. 3/4

d. 2X

18. Which of the following would produce the greatest exposure at the image receptor plate:

a. 100 mA, 3/4 sec., 100 cm (40") SID

b. 200 mA, 2 sec., 180 cm (72") SID

c. 200 mA, ½ sec., 91 cm (36") SID

d. 150 mA, 1 sec. 91 cm (36") SID

19. Which of the following combinations will produce a radiographic exposure equivalent to 10

mAs, 92 kVp and 180 cm SID:

a. 10 mAs, 80 kVp, 135 cm SID

b. 5 mAs, 100 kVp, 180 cm SID

c. 3 mAs, 80 kVp, 180 cm SID

d. 2.5 mAs, 80 kVp, 120 cm SID

20. From 300 mA, 1/4 sec., and 100 cm SID, what new mAs is needed to maintain radiographic

exposure at 60 cm SID:

a. 280 mAs

b. 27 mAs

c. 3 mAs

d. 30 mAs

e. 47 mAs

21. From 700 mA, 0.2 sec., and 160 cm SID, what new exposure time is needed to maintain

radiographic exposure at 700 mA and 80 cm SID:

a. 0.025 sec.

b. 0.05 sec.

c. 0.1 sec.

d. 0.2 sec.

e. 0.4 sec.

22. With all other factors unchanged, if SID is decreased, magnification in the image 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

23. With all other factors unchanged, if SID is increased, subject contrast in the remnant beam

signal 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

24. When the SID is changed, to solve for which new mAs setting will maintain exposure to the

image receptor, use the:

a. 15% rule

b. square law

c. inverse square law

d. magnification formula

25. If a 20-cm patient is placed in an x-ray beam with an SID of 100 cm, the *SSD (source-to-skin*

*distance)* will be 100 – 20 = 80 cm. If we then increase the SID by 10 cm, the *SSD* will:

1. Increase by a greater ratio (percentage)
2. Increase by a greater raw amount
3. Remain unchanged
4. Decrease by a greater ratio (percentage)
5. Decrease by a greater raw amount

26. A 10-cm increase in SID also increases the SSD (source-skin distance) by 10

cm. Using the square law, *the mAs is then compensated* for the increased SID. For the

patient, entrance skin dose is still reduced *because*:

1. The increased amount of air molecules is substantial
2. The mAs increase is less than would have been required to compensate for the change

in SSD by the square law

1. The mAs increase is more than would have been required to compensate for the

change in SSD by the square law

1. The mAs increase is the same as the change in SSD requires by the square law

27. The extraordinary exposure latitude of digital equipment allows the SID to be increased by

10-15% …

1. Only if the mAs is compensated
2. Only if the kVp is compensated
3. Only if exposure time is compensated
4. Without compensating radiographic technique

28. For tabletop procedures, radiographers should use:

a. The average SID for the equipment default

b. The longest SID allowed by the equipment

c. The shortest SID allowed by the equipment

d. 100 cm in all cases