Chapter 18

1. If the second set of shutters in a collimator is 40 cm from the focal spot, and the shutters are

opened to 10 cm apart, what will the field size be at 100 cm SID?

a. 25 cm

b. 4 cm

c. 40 cm

d. 160 cm

e. 400 cm

2. When the field is collimated to a smaller size, the overall exposure reaching the image receptor plate decreases. This is primarily due to a reduction in:

a. primary radiation

b. scatter radiation

d. backscatter radiation

e. x-ray quality

3. Which of the following devices is most recommended for both protecting the patient *and*

improving subject contrast in the remnant beam as it reaches the image receptor:

a. collimator

b. extension cylinder

c. aperture diaphragm

d. cone

e. added filtration beyond 3.0 mm Al

4. The field size is changed from 35 X 43 cm to 20 X 24 cm. Which of the following

adjustments in radiographic technique would maintain the overall exposure at the image receptor?

a. 10-20% increase

b. 10-20% decrease

c. 30-50% increase

d. 30-50% decrease

e. 100% increase (double)

5. As field size is increased, which aspect of the remnant beam signal reaching the image

receptor actually *decreases*:

a. overall exposure

b. subject contrast

c. sharpness of detail

d. magnification

e. noise

6. Modern x-ray collimators have two sets of shutters. The second (lower) set is actually a patient

protection device which reduces:

a. off-focus radiation

b. air-scattered radiation

c. low-energy characteristic radiation missed by the filters

d. low-energy bremsstrahlung missed by the filters

7. A leaded rubber sheet placed behind the patient’s back during a lateral projection of the

lumbar spine prevents:

a. scatter radiation from inside the patient from reaching the spine image

b. scatter radiation produced in the air from reaching the spine image

c. backscatter from being produced in the bucky tray

d. scatter radiation from being produced in the tabletop

8. The end of an extension cylinder is 25 cm from the focal spot, and an SID of 75 cm is used. If

the projected field size at the film is 30 cm, what was the diameter of the cylinder used?

a. 12.5 cm

b. 5.25 cm

c. 8.5 cm

d. 20 cm

e. 10 cm

9. With all other factors unchanged, if the field size is increased, spatial resolution (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

10. With all other factors unchanged, if the field size 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

11. Positive beam limitation (PBL) should be manually over-ridden when:

a. the desired field size is larger than the receptor plate size

b. the PBL is inaccurate by ½ inch (or 1 cm)

c. the field light is burned out

d. the desired field size is smaller than the receptor plate size

12. Off-focus radiation is:

a. primary radiation

b. secondary radiation

c. scatter radiation

d. remnant radiation

13. The end of an extension cylinder is 40 cm from the focal spot, and an SID of 100 cm is

used. If the cylinder is 8 cm in diameter, what will be the diameter of the projected

field at the image receptor plate?

a. 3.2 cm

b. 16.4 cm

c. 20 cm

d. 24 cm

14. When the body part being radiographed is much smaller than the image receptor plate, the

edges of the field should be collimated:

a. as close as possible to the edges of the anatomy

b. to allow ½ inch of field beyond each edge of the anatomy

c. to match the edges of the image receptor plate

d. as wide open as possible

15. The second set of shutters in a collimator is 18 cm from the focal spot and an SID of 45 cm is

used. If the field size at image receptor plate measures 25 cm, how far were the shutters

opened?

a. 10 cm

b. 12 cm

c. 25 cm

d. 32.4 cm

16. The end of an extension cylinder is 40 cm from the focal spot. The cylinder has a

diameter of 8 cm, and the diameter of the projected field at the image receptor plate is

24 cm. What SID was used?

a. 4.8 cm

b. 9.6 cm

c. 96 cm

d. 120 cm

17. An SID of 180 cm is used. The second set of shutters in a collimator is opened 6 cm,

and the field size at image receptor plate measures 24 cm. What is the distance from

the focal spot to the second set of shutters in the collimator?

a. 1.25 cm

b. 30 cm

c. 45 cm

d. 60 cm

18. The effects of field size limitation (collimation) upon the subject contrast carried within the

remnant beam signal are best attributed to their impact on:

a. the relative proportions of scatter and primary radiation in the remnant beam

b. the raw amount of scatter radiation produced

c. the raw amount of primary radiation penetrating through the body

d. the cumulative amount of radiation remaining in the remnant beam

19. The proportion of scatter radiation present in the remnant x-ray beam is most directly and

most dramatically determined by the:

a. kVp set

b. use of grids

c. amount of off-focus radiation produced

d. volume of tissue exposed to the primary beam

20. When the field size is opened to a much larger area, the total amount of radiation striking

*each square inch (or square cm)* of the receptor plate within the field is:

a. increased

b. decreased

c. unchanged

d. unrelated

21. In the x-ray tube, off-focus radiation can be produced from:

a. the anode disc

b. the glass envelope

c. the anode stem

d. any of the above