Chapter 20

1. Which of the following is *not* a cause of scatter radiation?

a. increased mAs

b. increased kVp

c. increased field size

d. increased patient thickness

2. In the remnant x-ray beam signal, which of the following is *not* affected by scatter radiation?

a. subject contrast

b. gray scale

c. overall resolution

d. sharpness of detail

3. Scatter radiation is a form of:

a. signal

b. information

c. noise

d. blur

e. distortion

4. The production of scatter radiation is *most* dramatically affected by the:

a. x-ray beam energy

b. x-ray beam intensity

c. amount of tissue exposed

d. size of receptor plate used

5. As x-ray beam energy (kVp) increases, the absolute *amount* of scattered radiation produced

within the patient:

a. increases

b. decreases

c. remains about the same

6. Additional scatter radiation increases:

a. penumbra

b. umbra

c. desirable gray scale

d. overall exposure at the receptor plate

7. Desirable gray scale within the remnant beam signal is lengthened by increasing:

a. scatter radiation

b. tissue atomic number

c. mAs

d. penetration

8. *All* scatter radiation:

a. can be eliminated with grids

b. reaches the image receptor plate

c. is produced within the patient

d. is secondary radiation

9. At the edges of an image, scatter radiation:

a. reduces penumbra

b. spreads penumbra

c. has no effect on penumbra

d. increases visibility

10. Even though scatter radiation from the patient is random in its direction, it still follows the:

a. general direction of the primary x-ray beam

b. inverse square law

c. shortest path to the receptor plate

d. law of isometry

11. Within the signal of the remnant radiation beam, scattered radiation can destroy:

a. subject contrast

b. gray scale

c. visibility

d. none of these

e. all of these

12. Scatter radiation affects:

a. primary beam geometry

b. spatial resolution

c. image distortion

d. occupational exposure

13. Which of the following is *decreased* by scatter radiation:

a. overall exposure at the receptor plate

b. noise in the remnant beam

c. spatial resolution (sharpness)

d. gray scale in the remnant beam

14. A radiograph demonstrates a loss of exposure toward only one side of the image. The most

likely cause was a(n):

a. tilted receptor plate with a grid

b. grid placed crosswise

c. x-ray tube too far from the grid

d. x-ray tube angled parallel to the grid strips

e. x-ray tube too close to the grid

15. Grids should generally be used:

a. for mobile chest radiography

b. for anatomy thicker than 13 cm

c. when kVp is greater than 60

d. when mAs is greater than 50

e. when single-phase equipment is used

16. When maintaining proper distances may be difficult, such as in mobile radiography, you

should use a(n) grid.

a. linear

b. cross-hatch

c. rhombic

d. low-ratio

17. The lead strips of a parallel grid are 1.6 mm high, and the distance between them is 0.2 mm.

What is the grid ratio?

a. 2:1

b. 4:1

c. 8:1

d. 16:1

e. 32:1

18. Which of the following is used only with focused grids?

a. canting

b. plastic interspacers

c. long distances

d. 85-line frequencies

19. The general rule for adjusting radiographic technique when changing from a non-grid

tabletop approach to the bucky tray is to:

a. 2 times the mAs

b. 3 times the mAs

c. 4 times the mAs

d. 6 times the mAs

e. cut the mAs to 1/3

20. Which of the following would cause the worst case of grid cut-off on a radiograph:

a. improper centering

b. improper angle of the beam

c. improper distance

d. turning a focused grid upside down

e. Potter-Bucky mechanism not turned on

21. The purpose of a grid is to restore in the remnant x-ray beam signal:

a. spatial resolution (sharpness)

b. the exposure rate

c. overall exposure

d. subject contrast

22. The Potter-Bucky diaphragm was developed to eliminate:

a. grid cut-off

b. grid lines

c. secondary radiation

d. motion unsharpness

e. the Moire effect

23. When changing from non-grid approach to an 8:1 ratio grid, if the mAs is adjusted to

maintain the overall exposure at the image receptor plate, the patient’s skin dose will be:

a. reduced to ½

b. reduced to 1/3

c. increased by 3 times

d. increased by 5 times

e. about the same as the original

24. Why is a 16:1 ratio grid never used in a general procedures x-ray table?

a. Its selectivity demands perfect centering and perpendicularity of the beam

b. Its selectivity reduces exposure so much that excessive techniques must be used

c. its selectivity produces excessive contrast levels with loss of information

d. focused grids of any ratio will absorb all of the radiation when used in a bucky

25. With all other factors unchanged, if grid ratio is increased, magnification of the image would:

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

26. With all other factors unchanged, if grid ratio is increased, penetration of the x-ray beam

would:

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

27. Which of the following grid changes would result in exchanging one type of noise in the

remnant x-ray beam for another type of noise?

a. non-grid to stationary grid

b. parallel grid to focused grid

c. stationary grid to grid in Potter-Bucky diaphragm

d. non-grid to grid in Potter-Bucky diaphragm

28. The grid frequency is the:

a. total amount of lead content

b. ratio of the height of the lead strips to the spaces between them

c. range of distances from the grid within which the x-ray tube must be placed

d. percentage of procedures upon which the grid could be used to advantage

e. number of lead strips concentrated into a given distance

29. Which of the following best describes a mechanism which moves the grid back and forth in a

linear movement during exposure:

a. wafer Potter-Bucky mechanism

b. oscillating Potter-Bucky mechanism

c. reciprocating Potter-Bucky mechanism

d. linear Potter-Bucky mechanism

30. Who invented the first radiographic grid?

a. Potter

b. Bucky

c. Edison

d. Pupin

e. Morris

31. Which of the following is most likely to result in visible grid lines:

a. focused grid

b. parallel grid

c. reciprocating grid

d. oscillating grid

e. stationary grid

32. Which of the following is most reliable in determining the effectiveness (selectivity) of a

grid?

a. grid radius

b. grid frequency

c. lead content

d. grid ratio

e. interspacer width

33. Which of the following is best used to actually measure grid effectiveness?

a. bucky factor

b. contrast improvement factor

c. lead content

d. modulation transfer function

34. The Bucky factor is *best* used to:

a. measure grid effectiveness

b. convert radiographic techniques for grid changes

c. determine appropriate distances to use with grids

d. indicate the selectivity of grids

35. Read carefully: The lead strips of a *parallel* grid are 3.2 mm high, and the distance between

them is 0.2 mm. What is the grid radius?

a. 4:1

b. 100 cm

c. 8:1

d. infinity

e. 32:2

36. The formula *measured contrast with a grid / measured contrast without a grid* defines the

for a radiographic grid:

a. contrast improvement factor

b. bucky factor

c. selectivity

d. grid frequency

e. grid ratio

37. Modern digital processing includes \_\_\_\_\_\_\_\_\_algorithms that can largely compensate

for fogged areas in the image:

1. Darkening
2. Noise-reduction
3. Dynamic range compression
4. Smoothing

38. *Virtual grid* software allows:

a. Most procedures to be done without a conventional grid at all

b. Lower grid ratios to be used when a conventional grid is employed

c. Much greater flexibility in positioning, centering, and angling

d. All of the above

39. By leveraging the advantages of digital processing to reduce grid use, \_\_\_\_\_\_\_\_\_\_ can be

lowered significantly:

1. Patient dose
2. Scatter radiation
3. Image contrast
4. Positioning efficiency