1001 QUESTIONS ABOUT RADIOLOGIC TECHNOLOGY

Volume 2

Roy Bell, B.A., B.S. in Ed., R.T.-R.

1001 QUESTIONS ABOUT RADIOLOGIC TECHNOLOGY

Volume 2

Roy Bell, B.A., B.S. in Ed., R.T.-R.
Director
Community Hospital School of Radiologic Technology
Salem, Ohio

University Park Press
Baltimore

UNIVERSITY PARK PRESS
International Publishers in Science, Medicine, and Education
300 North Charles Street
Baltimore, Maryland 21201

Manufactured in the United States of America by
the Maple Press Company.

Library of Congress Cataloging in Publication Data (Revised)

Bell, Roy, 1930-
1001 questions about radiologic technology.

Includes bibliographical references.
1. Radiography, Medical—Examinations, questions, etc. 2. Medical technology—Examinations, etc. I. Title. [DNLM: 1. Technology, Radiologic—Examination questions. WN 18 058]
RC78.B393 616.07'57'076 80-137150
ISBN 0-8391-1607-1 (pbk.) (v. 1)

Contents

Section 1
Principles of Radiographic Exposure and Processing

Section 1
Principles of Radiographic Exposure and Processing

1. A distinct advantage of direct exposure technic is that it
   A. Provides a short scale of contrast.
   B. Decreases patient exposure.
   C. Offers a wide range of exposure latitude.
   D. Requires less exposure time.
   E. Requires less film processing time. 4:58

2. Which of the following does not control radiographic sharpness?
   A. Screen-film contact
   B. Motion
   C. Focal-film distance
   D. Object-film distance
   E. Processing 8:30

3. Radiographic density may be defined as the
   I - Amount of silver deposit on a film.
   II - Densities perceptible to the eye.
   III - Amount of blackness seen.
   A. I
   B. I, II
   C. I, II, III
   D. II
   E. II, III 8:12

4. The percentage of film exposure from the light given off by intensifying screens is _____ percent.
   A. Less than 5
   B. 15
   C. 50
   D. 75
   E. More than 95 8:56

5. If a radiographic unit produces 15 R at a distance of 60 cm, the distance would have to be _____cm to produce 45 R.
   A. 24.3
   B. 27.3
   C. 34.3
   D. 38.3
   E. 43.1 22:343

6. The zebra grid artifact may also be called the _____ grid artifact.
   A. Striated
   B. Laminated
   C. Moire
   D. Moving
   E. Misalignment 4:46

7. The use of a grid is important when
   I - Using a high kV.
   II - The primary beam passes through thick body parts.
   III - The production of secondary radiation is high.
   A. I, II, III
   B. I, II
   C. I, III
   D. II, III
   E. I

5:113

8. A visible increase in radiographic density requires an exposure increase of at least _____ percent.
   A. 10
   B. 15
   C. 20
   D. 25
   E. 30

5:61

9. Change in Field Size — Increase mAs

From	To	
14 x 17	10 x 12	Add 25%
14 x 17	8 x 10	Add 40%
14 x 17	5 x 7	Add 60%

   Using the illustrated table, calculate the mAs necessary when changing from a 14 x 17 abdominal radiograph to an 8 x 10 collimated field for the gall bladder. If the original mAs was 20, the new mAs must be
   A. 25.
   B. 28.
   C. 30.
   D. 60.
   E. None of these.

17:80

10. Properties of colloids include
   I - They will not settle out in solution.
   II - They will not dissolve at normal processing temperatures.
   III - They exhibit some degree of porosity.
   A. I
   B. I, II
   C. I, II, III
   D. I, III
   E. II, III

24:19

11. Procedures in which a short scale of radiographic contrast is acceptable include
   I - Mammography.
   II - Determination of fractures.
   III - Iodinated contrast studies.
   A. I
   B. I, II
   C. I, II, III
   D. I, III
   E. II, III

24:114

12. Factors involved in the judicious use of radiographic technique include
    I - A scientific basis for exposure technique.
    II - Measurement of each anatomic part to be examined.
    III - Use of a technique chart as a reference.
    IV - Calibration of equipment.
    A. I, II
    B. I, III, IV
    C. I, II, III
    D. II, III, IV
    E. I, II, III, IV 8:4

13. Grid ratio is defined as the ratio of the
    A. Breadth of the lead strips to the space between them.
    B. Depth of the lead strips to the depth of the interspace material.
    C. Depth of the lead strips to the breadth of the lead strips.
    D. Number of lead strips to the number of interspaces.
    E. None of these. 8:41

14. For correct calibration and operation, equipment manufacturers recommend that radiographic units be rechecked
    A. Once a month.
    B. Every three months.
    C. Every six months.
    D. Annually.
    E. As often as possible. 8:75

15. The ratio of exposure at a specific kilovoltage without screens to the exposure at the same kilovoltage with screens in order to obtain the same density on a film, is the
    A. Reciprocity factor.
    B. Amplification factor.
    C. Intensification factor.
    D. Kilovoltage rule.
    E. Density rule. 17:64

16. Devices which may be used for a practical evaluation of focus size include the
    I - Pinhole camera.
    II - Star pattern resolution test.
    III - Wire-mesh screen test.
    A. I
    B. I, II
    C. I, II, III
    D. II, III
    E. I, III 5:25

17. Which of the following represents the body's naturally occurring densities from the least dense to the most dense?
    A. Cartilage, fat, gas, empty hollow organs, filled hollow organs, solid organs, muscle, bone
    B. Gas, fat, cartilage, empty hollow organs, muscles, solid organs, filled hollow organs, bone
    C. Empty hollow organs, gas, cartilage, fat, solid organs, muscles, filled hollow organs, bone
    D. Gas, cartilage, muscles, fat, empty hollow organs, filled hollow organs, solid organs, bone
    E. Gas, empty hollow organs, filled hollow organs, solid organs, fat, cartilage, muscles, bone

    5:92

18. Radiographic contrast may be defined as
    A. The degree of film density.
    B. The lack of black metallic silver.
    C. An excessive number of clear areas on a film.
    D. The margin for error in the choice of exposure factors.
    E. None of these.

    24:112

19. Any x-ray equipment manufactured after _____ is required to have automatic collimation.
    A. August, 1974
    B. June, 1976
    C. January, 1978
    D. August, 1980
    E. January, 1984

    24:89

20. The rule of increasing 10 kVp to reduce exposure by half is true only in the _____ kVp range.
    A. 30 to 50
    B. 40 to 65
    C. 66 to 86
    D. 80 to 95
    E. 96 to 106

    8:13

21. Which of the following factors does <u>not</u> have a direct effect on radiographic contrast?
    A. mAs
    B. Kilovoltage
    C. Patient
    D. Film
    E. Processing

    8:21

22. Factors which control the geometric sharpness of a radiograph include
    I - Object-film distance.
    II - Focal spot size.
    III - Processing.
    A. I, II, III
    B. I, II
    C. I, III
    D. II, III
    E. I

    8:30

23. Factors which must be standardized before calibration of equipment is attempted include
I - Exposure factors.
II - Processing.
III - Screen speed.
IV - Film.
A. I, II
B. I, II, III
C. I, II, III, IV
D. III, IV
E. IV
8:73

24. Which of the following is not a factor in film contrast?
A. Density
B. Processing
C. Tissue opacity
D. Method of exposure
E. Emulsion type
17:94

25. Defining and measuring the limitations of x-ray imaging systems as they relate to material unsharpness is accomplished with the
A. Linear energy transfer.
B. Linear attenuation coefficient.
C. Modulation transfer function.
D. Line pairs per millimeter measurement.
E. None of these.
5:14

26. Radiographic studies which would require a high contrast technique include
I - Intravenous urography.
II - Cholecystography.
III - Angiocardiography.
IV - Cerebral angiography.
A. I, II, III, IV
B. I, III, IV
C. II, III, IV
D. I, II, IV
E. I, II, III
4:96

27. One mil is _____ of an inch.
A. 1/10
B. 1/100
C. 1/1000
D. 1/100,000
E. 1/1,000,000
24:19

28. Long scale contrast is
A. Low contrast.
B. High contrast.
C. Achieved by using a grid.
D. Achieved by using intensifying screens.
E. None of these.
5:98

29. Machine calibration tests which could be performed by the technologist include
I - Radiation output testing with a step wedge.
II - Timer accuracy determination using a spinning top.
III - Accuracy of the kilovoltage supply from the external source.
A. I, II
B. I, II, III
C. II, III
D. I, III
E. II
4:91

30. Examinations which are particularly well suited to phototiming technics include
I - Chest.
II - Fluoroscopic spot films.
III - Abdominal studies using barium.
A. I
B. I, II
C. I, II, III
D. I, III
E. II, III
4:83

31. As more filtration is added in the path of the x-ray beam
I - More of the soft x-ray photons are absorbed.
II - The x-ray beam is hardened.
III - The average photon energy is increased.
IV - There is a concomitant increase in latitude.
A. I, II
B. I, II, III
C. I, II, III, IV
D. II, III, IV
E. III, IV
24:89

32. Factors which influence the intensity of x-rays reaching the film include
I - Thickness of the material through which the x-rays pass.
II - Atomic composition of the material through which the x-rays pass.
III - Specific gravity of the material through which the x-rays pass.
A. I, II, III
B. I, II
C. I, III
D. II, III
E. I
8:10

33. Purposeful magnification as an aid to diagnosis is best accomplished with a focal spot no larger than _____ mm.
A. 0.3
B. 0.8
C. 1.0
D. 1.5
E. 2.0
8:38

34. The maximum kilovoltage at which a 16:1 ratio grid should be used is _____ kVp.
A. 70
B. 90
C. 100
D. 120
E. 150 8:55

35. The type of phosphor used in an intensifying screen may affect
I - Screen speed.
II - Detail.
III - Quantum noise.
A. I
B. I, II
C. I, II, III
D. I, III
E. II, III 8:59

36. If a specific area of a radiograph viewed on an illuminator transmits 1/100 of the light from the illuminator, then this area would have a density of
A. 0
B. 1
C. 1.5
D. 2
E. 3 22:339

37. An original technique is 400 mA at 0.25 second with par speed screens. It is necessary to change to high speed screens. In order to maintain radiographic density, the new technique is
A. 400 mA at 0.50 second.
B. 200 mA at 0.50 second.
C. 400 mA at 0.125 second.
D. 200 mA at 0.125 second.
E. 800 mA at 0.50 second. 5:11

38. At a focal-film distance of 60 inches, a diaphragm with a 1 inch diameter hole placed 3 inches from the tube focus would record a _____ inch diameter field.
A. 3
B. 20
C. 40
D. 60
E. 180 5:105

39. Forty inches is equal to _____ centimeters.
A. 30.5
B. 91.4
C. 101.6
D. 182.88
E. 202.12 24:13

40. A radiograph is taken at a 60 inch FFD using 1/3 second exposure time. Due to positioning difficulties, the FFD must be decreased to 24 inches. The exposure time to maintain equivalent density at the new distance is _____ second.
    A. 1/5
    B. 1/4
    C. 1/8
    D. 1/10
    E. 1/20 24:167

41. Grid radius is defined as the
    A. Degree of canting of the interspace material.
    B. Distance from the face of the grid to the points of conversion of the lead strips.
    C. Number of lead lines per inch in a parallel or focused grid.
    D. Degree to which grid lines may be eliminated by the superimposition of two wafer grids with the strips at right angles to each other.
    E. None of these. 8:41

42. Penumbra is <u>not</u> influenced by
    A. OID.
    B. Focal spot size.
    C. Object-film alignment.
    D. mA.
    E. SID. 24:127

For each word or phrase, select the one heading which is most closely related to it. Each heading may be used once, more than once, or not at all.

Features and uses	Grid ratio
43. No longer manufactured	A. 6:1 linear
44. For image intensification and spot filming	B. 4:1 linear C. 10:1, 133 line, linear
45. Good positioning latitude, easy to use	D. 12:1 linear E. 16:1 linear
46. Very high cleanup; excellent for high kilovoltage radiography	
47. Very little positioning latitude; used for both low and high kilovoltage techniques	

24:100

48. Perversion of the shape of the radiographic image may result from misalignment of the
I - X-ray tube.
II - Part.
III - Film.
A. I
B. II
C. III
D. I, II
E. I, II, III 8:36

49. Benefits of using fixed kilovoltage techniques include
I - Improved control of radiographic contrast.
II - Reduction in exposure to the patient.
III - Increased exposure latitude.
IV - Less heating in the x-ray tube.
A. I
B. I, II
C. I, II, III
D. I, II, III, IV
E. II 8:89

50. The notation .0083 is the equivalent of
I - 8.3 milliseconds.
II - 1/120 second.
III - 83 microseconds.
A. I
B. I, II
C. I, III
D. II, III
E. II 17:77

51. Collimation is effective in
I - Restricting the primary beam.
II - Filtering out low energy x-rays.
III - Reducing the amount of secondary radiation produced.
A. I
B. I, II
C. I, III
D. I, II, III
E. II, III 5:105

52. An original technique is 400 mA and 0.125 second at a FFD of 40 inches. The FFD must be decreased to 25 inches. The new technique to maintain radiographic density is
A. 400 mA at 0.067 second.
B. 400 mA at 0.05 second.
C. 200 mA at 0.067 second.
D. 200 mA at 0.05 second.
E. 200 mA at 0.125 second. 5:11

53. The intensification factor of intensifying screens is influenced by
I - Film speed.
II - Screen speed.
III - Kilovoltage.
A. I
B. I, II
C. I, II, III
D. II, III
E. II

5:15

54. If the usual technical factors are used for chest radiography of a patient with pulmonary edema, the resultant radiographs will be
A. Overexposed.
B. Underexposed.
C. Satisfactory.
D. Satisfactory if developed for longer than usual.
E. Satisfactory if developed for less than the usual time.

4:92

55. Pathological conditions which are easy to penetrate radiographically include
I - Aseptic necrosis.
II - Degenerative arthritis.
III - Disuse atrophy.
IV - Radiation necrosis.
A. I, II, IV
B. III, IV
C. I, III, IV
D. II, III, IV
E. I, II, III, IV

24:241

56. Radiographic contrast would <u>not</u> be impaired by
A. Poor collimation.
B. Incorrect film storage.
C. Excessive kVp.
D. Outdated film.
E. Motion.

8:34

57. Causes of film fogging include
I - Improper film storage.
II - Incorrect processing technique.
III - Incorrect exposure factors.
A. II, III
B. I, II, III
C. II
D. III
E. I

8:26

58. Assessing the accuracy of a timer on a three-phase unit requires the use of a(an)
A. Spinning top.
B. Aluminum step wedge.
C. Oscilloscope.
D. Penetrometer.
E. Potentiometer. 8:73

59. In order to obtain a stereoscopic effect, exposures must be made
A. With a high mAs and low kVp.
B. Over a long arc.
C. With a rapid film changer.
D. From two different locations.
E. From two different distances. 22:412

60. A correctly formulated technique chart will be satisfactory for _____ percent of the patients examined in the average x-ray department.
A. 50
B. 70
C. 85
D. 95
E. 100 8:90

61. If radiographic fog is increased, _____ is decreased.
A. Density
B. Definition
C. Film blackening
D. Distortion
E. Contrast 5:100

62. An original technique is 400 mA at 0.05 second and 60 kV. The kV is changed to 69. What mA and time would maintain radiographic density?
A. 400 mA at 0.025 second
B. 400 mA at 0.125 second
C. 400 mA at 0.25 second
D. 400 mA at 0.50 second
E. None of these 5:11

63. If film E requires half as much exposure as film F to produce the same useful density, then
A. Film E is said to be twice as fast as film F.
B. Film E is said to be half as fast as film F.
C. Film E is said to be half as sensitive as film F.
D. Film E is said to be a screen type film, and film F is a non-screen type of film.
E. The logarithm of film E is 2, and the logarithm of film F is 1. 7:27