1. It was not until the 1960s that ———, the “father of mammography,” began teaching his mammographic technique.
A Robert Eibelhous  B Robert Egan  C Edgar Josef  D Edgar Johnson

2. By the mid-1970s, ——— mammographers reported the advantages of a new position – the oblique view.
A Japanese  B Columbian  C Scandinavian  D Turkish

3. In ———, MRI of the breast was recommended as a screening test done in conjunction with mammography for high-risk women.

4. Screening mammograms now account for approximately ———% of all mammograms done in the United States.
A 80  B 60  C 45  D 71

5. By the time a nonpalpable 0.5-cm lesion increases in size to a palpable 1 cm, its mass has increased ——— times.
A four  B five  C two  D eight

6. Cancer detected in women younger than ——— is usually more aggressive, with a faster growth rate.
A 70  B 80  C 50  D 90

7. Practicing routine breast self-examination allows lesions to be found about ——— smaller versus those discovered by non-practitioners.
A 0.4  B 0.75  C 0.32  D 0.5

8. Even the seating arrangement in the waiting room can affect a patient’s level.
A True  B False

9. MQSA requires that the patient be given the results of her mammogram:
A in writing  B verbally  C with a documented call  D only by the attending doctor

10. Age-eligible females from the Baby Boomers (some ——— women) constitute a large portion of women who will need mammograms.
A 300,000  B 5 million  C 15 million  D 40 million

11. Approximately ———% of all breast cancers occur in women age 40 and over according to the CDC.
A 75  B 82  C 94  D 65

12. The United States experienced its first recorded malpractice litigation in ———, 5 years after George Washington became president.
A 1812  B 1794  C 1854  D 1748

13. In ——— students began graduating from radiology assistant (RA) programs in the United States.

14. The external landmarks of the breast include the nipple, inframammary fold, and:
A lower inner quadrant  B base  C apex  D axilla

15. The supportive structures of the breast are ——— ligaments.
A Cooper’s  B Cento’s  C Conn’s  D Henderson’s

16. The two most prominent hormones active in breast physiology are estrogen and:
A ADH  B ACTH  C progesterone  D prolactin

17. During stage 2 of breast cancer, the tumor size is greater than 2 cm, but less than ——— cm.
A 4  B 6  C 5  D 7

18. Most experts believe that malignant disease develops through a process that starts with:
A mild fever  B epithelial hyperplasia  C weight loss  D fatigue

19. ———% of women with Paget disease also have an underlying intra-ductal breast cancer.
A 80  B 95  C 60  D 52

20. ——— is the radiologist’s greatest aid in determining abnormalities, both benign and malignant.
A Swelling  B Redness  C Pain  D Asymmetry
21. **A(n)———** is an island of glandular tissue separated from the normal ductal structures.
   A sebaceous hyperplasia   B seborrheic keratoses   C hamartoma   D adenosis

**CHAPTER SEVEN: MAMMOGRAPHIC POSITIONING**

22. In most cases, the 2 projections: cranial-caudal (CC) and medio——— oblique (MLO), provide the best coverage of the breast tissue.
   A lateral   B linear   C longitudinal   D lobular

23. About———% of patients (about 3 of 20) in a workday will need another view to image tissue missed on the 2-view mammogram.
   A 4
   B 7
   C 15
   D 30

24. Both the patient and technologist will find it easier if the patient is standing rather than sitting for the mammogram.
   A True
   B False

25. To produce adequate exposure, it is critical to position the——— tissue over the AEC detector.
   A glandular
   B fat
   C nipple
   D pectoralis major muscle

26. Direct ray (DR) FFDM units supply——— detector(s) and grid(s).
   A 2 sets of
   B 3 sets of
   C only one
   D 4 sets of

27. The——— projection will best visualize the subareolar, central, medial, and posteromedial aspects of the breast.
   A cranio-caudal (CC)
   B exaggerated CC
   C MLO
   D SIO

28. The pectoral muscle is evident on———% of CC images.
   A 12
   B 20 to 30
   C 50
   D 70 to 75

29. The——— projection best visualizes the posterior and upper outer quadrants of the breast.
   A exaggerated CC
   B SIO
   C CC
   D MLO

30. Regarding MLO positioning, the patient should stand with her hips slightly——— to the lower end of the image receptor.
   A lateral
   B medial
   C posterior
   D anterior

31. The SIO projection best demonstrates the UIQ——— of the breast.
   A and LIQ
   B and LOQ
   C and UOQ
   D only

32. The——— oblique demonstrates the entire glandular island with less superimposition versus the two-projection mammogram.
   A 10 degree
   B 50 degree
   C 20 degree
   D 80 degree

33. The——— is a useful replacement view for the MLO in patients who have a pacemaker (where compression paddle use is problematic).
   A LMO
   B CC
   C AT
   D LM

34. The——— position, an anterior-posterior projection, visualizes the axillary components.
   A CC
   B MLO
   C SIO
   D axilla

35. Regarding the tangential (TAN) view, a true lateral projection best visualizes abnormalities that approximate:
   A 12:00 or 6:00
   B 3:00 or 9:00
   C 4:00 or 10:00
   D 2:00 or 8:00

36. An angle of——— in an SIO or MLO (or sometimes both) projection from the CC will open up overlapped structures.
   A 50 to 60 degrees
   B 35 to 40 degrees
   C 5 to 20 degrees
   D 25 to 35 degrees

37. A——— view (either the medial roll, RM, or the lateral roll, RL) separates the glandular structures to determine pseudomass.
   A pushed
   B rolled
   C clearing
   D turning

**CHAPTER EIGHT: THE NONCONFORMING PATIENT**

38. A possible solution when failing to image the posterolateral tissue on the MLO with a small breast is to increase the C-arm angle up to:
   A 40 degrees
   B 50 degrees
   C 60 degrees
   D 70 degrees

39. Adding a——— MLO (SM-IL) to the standard mammogram can help image the extreme lateral tissue for 'wraparound' breasts.
   A 10 degree
   B 35 degree
   C 20 degree
   D 45 degree

40. Nodal involvement unilaterally implicates a(n)——— breast cancer.
   A ipsilateral
   B bilateral
   C metastatic
   D primary
CHAPTER NINE: THINKING IN THREE DIMENSIONS

41. 2:00 in the right breast represents the UIQ (upper-inner quadrant), whereas the same time in the left breast represents the:
A  LIQ  B  LOQ  C  UOQ  D  UUQ

42. When comparing the MLO projection to the true lateral projection, a lateral lesion will ——— on the lateral from its position on the MLO.
A  move up  B  move anterior  C  move posterior  D  move down

CHAPTER TEN: PRACTICAL APPLICATIONS IN PROBLEM SOLVING

43. The false negative (cancers that are not evident on the mammogram) rate for mammograms is about ——— %.
A  3  B  5 to 15  C  15 to 20  D  24

44. An old mammogram can eliminate the need for an extra view.
A  True  B  False

45. Tissue overlap, the effects of ——— ligaments, and blood vessels have all been found to contribute to findings known as mass effect.
A  Carter’s  B  Cooper’s  C  Cento’s  D  Anderson’s

46. The ——— view is useful to prove skin calcifications.
A  right-angle  B  coned-down magnified  C  slight oblique  D  tangential

47. The ——— view can better delineate the borders of a mass.
A  CC  B  right-angle  C  coned-down magnified  D  slight oblique

48. Hematoma or seroma presents in early stages as a ——— mass on the mammogram.
A  ill-defined  B  heterogeneous  C  spiky  D  smoothly outlined

49. Though breast augmentation surgery is useful for congenital anomalies, about ——— % of them are done for cosmetic purposes alone.
A  80  B  70  C  60  D  50

CHAPTER ELEVEN: ANALOG MAMMOGRAPHY MACHINES . . .

50. A new era of mammography began in the United States in the late ——— with the sale of the first dedicated mammography units.
A  1970s  B  1960s  C  1950s  D  1980s

51. Regarding density selection, there should be a ——— % difference in optical density between steps.
A  5 to 10  B  10 to 15  C  15 to 20  D  20 to 25

52. Regarding the back-up timer, the suggested limits are ——— (minimum/maximum) mAs exposure.
A  100/175  B  175/300  C  250/400  D  250/600

53. Three-quarters of the mass of adipose tissue is composed of ——— atoms.
A  nitrogen  B  oxygen  C  hydrogen  D  carbon

54. Regarding breast compression, forces higher than ——— N may be harmful and should not be obtainable.
A  100  B  250  C  350  D  300

55. Magnification ——— the radiation dose.
A  increases  B  greatly decreases  C  has no effect on  D  slightly decreases

56. Molybdenum target tubes use molybdenum filters, usually ——— mm thick, to provide an almost monochromatic beam when imaging.
A  0.01  B  1.2  C  0.2  D  0.03

57. Phototimers were first incorporated in mammography units in:
A  1965  B  the early 1970s  C  the early 1980s  D  1991

58. Film speed is ——— related to exposure.
A  inversely  B  directly  C  not  D  only sometimes

59. Chemistry should be used within ——— weeks of mixing the concentrate with water.
A  1  B  3  C  2  D  4

60. The ——— is used in the darkroom to sensitize, or expose, a step-wedge pattern of varying densities on an x-ray film.
A  densitometer  B  QC meter  C  sensitometer  D  AG meter
61. Radiographic ———— (the random variations in density perceived on an image) represents an important factor affecting image quality.
   A noise  B contrast  C pixel count  D fog

62. The humidity of the air in the darkroom should be set between ———— %.
   A 10 and 20  B 20 and 30  C 20 and 40  D 30 and 50

63. Improper ventilation of the darkroom and processor often causes ———— that ultimately leads to environmental artifacts on the film.
   A condensation on the rollers  B electrical transfer  C film pressure  D 'plus density'

64. For any facility to perform mammography in the United States, it must first be certified by the:
   A Food and Drug Administration  B Centers for Disease Control  C Health Services Department  D Health Services Admin.

65. According to MQSA, patient films and reports must be retained for at least ———— years.
   A 3  B 5  C 10  D 12

66. Regarding the BI-RADS assessment, category ———— is highly suggestive of malignancy.
   A 2  B 3  C 5  D 6

67. Regarding viewboxes, changing the bulbs at least every ———— months is a good rule of thumb.
   A 3-5  B 8-10  C 12-18  D 24-28

68. The measured half-value ———— (HVL) is the determinant of beam quality.
   A lobe  B layer  C level  D light

69. Regarding cancer identification QA, the number of small cancerous tumors found should be more than ———— % of total cancers found.
   A 20  B 30  C 40  D 7

70. The first prototype digital mammography machine was introduced at the ———— RSNA meeting.

71. Advance imaging techniques and 3D reconstruction utilize digital acquisition, which is possible with:
   A analog or digital systems  B analog systems only  C digital systems only  D neither digital nor analog

72. Regarding digital imaging advantages, the dynamic range by digital mammography ————:1 is superior over analog (100:1).
   A 160  B 1,600  C 2,400  D 16,000

73. The four basic functions in xray image production are: acquisition, processing, display, and:
   A transfer  B reconstruction  C storage  D deletion

74. Every place on the surface of the digital detector can receive a signal. The spaces, called ————, are arranged in rows and columns.
   A dots  B pixels  C arrays  D signals

75. The pixels each contain a transistor connected to a series of wires; this combination is called a ———— film transistor, or TFT.
   A transitory  B tertiary  C thin  D thick

76. The digital array captures 16,384 shades of gray. This is contracted to ———— shades in PACS.
   A 12,055  B 10,065  C 6,499  D 4,096

77. The computer and monitor interface between the gantry and the technologist is known as the:
   A MDRS  B AWS  C CAD  D PACS

78. Directly following exposure termination, the resulting preview image is a partial readout of the signal that accumulates ———— pixels.
   A 1.5-2 million  B 4-8 million  C 8-10 million  D 10-25 million

79. 5-MP mammography monitors are 2000 X ———— for a total of 5 million pixels; yet the digital array totals nearly 25 million pixels.
   A 1,500  B 1,750  C 2,500  D 3,000

80. Transitioning to FFDM is extremely expensive. It can cost anywhere from $——— and upward.
   A 50,000  B 80,000  C 120,000  D 200,000
81. IHE (Integrating the Healthcare) participation works toward compatibility issues for the mammography community as a whole.
A Enterprise  B Enigma  C Essentials  D Efficiency

82. ———— measures the ratio of the difference between an object's signal intensity and its background to the noise corrupting the signal.
A RNC  B NRC  C CNR  D CRN

83. A(n) ———— pixel is one that does not respond properly when exposed to radiation.
A dead  B flat  C exhausted  D spent

84. ———— is the maximum rate that data may be transferred across a network.
A Bandwidth  B RAID  C Redundant array  D DICOM

85. ———— area network (SAN) is the most expensive type of RAID.
A Server  B Switch  C Storage  D Sensitivity

86. During the localization procedure, a narrow compression paddle (approximately ———— cm) is usually used.
A 4  B 9  C 17  D 22

87. The main value of ———— imaging of the breast is in its ability to distinguish a cyst from a solid lesion.
A nuclear  B radiographic  C sonographic  D thermography

88. Ductography is also known as ———— or contrast-assisted mammography.
A tunnelography  B arteriography  C galactography  D pneumocystography

89. Fine needle aspiration ———— (FNAC) of the breast is often used to verify a suspected malignancy or to confirm a benign impression.
A cytology  B cryology  C chorology  D cariology

90. Regarding core biopsy, a specially designed ———— gauge needle or probe is placed in a rapid-fire automated biopsy instrument.
A 2 to 7  B 5 to 9  C 5 to 12  D 8 to 14

91. A ———— coordinate system defines a target by the distance from a fixed point, and the angular distance from a reference line.
A X-Y  B polar  C grid  D locator

92. Regarding stereotactic breast localization, the reference provides for an exact 3D position to within ———— mm.
A 1  B 2  C 3  D 4

93. Abnormality nonvisualization can occur when breast thickness is greater, usually ———— cm or more.
A 6  B 8  C 4  D 10

94. The core biopsy procedure is a “clean” procedure rather than a sterile procedure.
A True  B False

95. With an analog machine, obtain the greatest magnification factor by elevating a specimen while using the highest kVp setting possible.
A True  B False

96. Each biopsy device (also known as “gun” or “———”) is a spring-loaded system with a cocking device and firing button.
A piercer  B pointer  C sharp stick  D driver

97. Regarding vacuum assisted needle biopsies, an 11 gauge needle will render an approximate ———— mg biopsy.
A 35 to 40  B 40 to 80  C 83 to 110  D 250 to 310

98. The distance from the needle post-fire position (tip of the needle) to the breast support (allowing 4 mm for safety) is known as the:
A safety margin  B safety line  C stroke line  D stroke margin

99. Needle calibration is:
A specific to each unit  B standard for all units  C a complicated process  D performed by the radiologist

100. Under no circumstances should a study continue if the clinician cannot identify the abnormality on both stereo images.
A True  B False
101. With a ____ vacuum-assisted device, rotation of the collection chamber allows multiple sampling.
A bidirectional  B unidirectional  C multidirectional  D tri-directional

102. For most patients, the most uncomfortable part of the biopsy procedure is:
A standing for a long time  B the associated anxiety  C the sampling sequence  D the localization process

103. There ____ foot intake for core biopsy or FNAC alone.
A a 12 hour NPO  B is no need to limit  C a 24 hour NPO  D a 6 hour NPO

104. When using a prone unit, when the breast is dependent in a lateral projection, the abnormality will appear more ____ than expected.
A posterior  B inferior  C lateral  D medial

105. Often, placing the patient in a right anterior oblique (RAO) will provide access to the right breast and the ____ is for the left breast.
A RAO  B LPO  C RPO  D LAO

106. Greater thickness of the breast creates _____, thereby reducing image contrast.
A less attenuation  B less scatter  C more scatter  D less photon production

CHAPTER TWENTYONE: BREAST MR

107. A(n) ____ occurs when an object is placed into a magnetic field; all the atoms align in the direction of the magnetic force.
A magnetic event  B magnetic moment  C alignment event  D alignment moment

108. All ____ are bundled loops of wires that carry radiofrequency signals; all coils are part of an RF system.
A magnetic fields  B cryogens  C coils  D two-phase cycles

109. The hydrogen atom's property of spin with its _____phase cycle is the basis for MRI.
A single-  B two-  C three-  D four-

110. Fat saturation (or fat _____) has many uses in MR imaging, however distinguishing fatty and non-fatty tumors is most important.
A suppression  B contrast  C gradient  D subtraction

111. One MRI weakness is ____ for anomalies.
A specificity  B sensitivity  C distinguishing fat  D muscle definition

112. The sensitivity of breast MR has approached up to ____ % in some studies.
A 35  B 58  C 73  D 100

CHAPTER TWENTYTWO: BREAST CANCER DIAGNOSTIC TECHNOLOGIES

113. ____ is the most recognized adjunctive imaging technology of breast tissue.
A MRI  B Nuclear medicine  C Ultrasound  D CT

114. Scintimammography is a ____ approach to breast imaging.
A CT  B ultrasound  C nuclear medicine  D MRI

115. ____ CT generates 3D images with true isotropic resolution – possibly detecting tumors and other diseases in their earliest stages.
A Cylinder Beam  B Cone Beam  C Rhombus  D Pyramid Beam

116. An estimated ____ % of breast cancers begin in the cells lining the breast ducts.
A 50  B 95  C 27  D 72

117. A ____ study found that ductal lavage was ineffective at detecting breast cancer among women who had already been so diagnosed.

CHAPTER TWENTYTHREE: BREAST CANCER TREATMENTS

118. Today ____ % of all breast cancers are considered local disease because it is confined to the breast.
A 35  B 98  C 47  D 61

119. Regarding mastectomy versus lumpectomy, mastectomy would be the surgery of choice if the tumor is larger than ____ cm.
A 4  B 7  C 9  D 2

120. In contrast to the mechanism of standard external radiation treatment, ____ places the radiation at the tumor site.
A proximal therapy  B brachytherapy  C placement therapy  D injectotherapy
Fill in each blank. There are two options to submit the post-test.

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