



**SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL
SCIENCES & TECHNOLOGY,
THIRUVANANTHAPURAM—695 011**

**ENTRANCE EXAMINATION : ACADEMIC SESSION JANUARY 2018
DIPLOMA IN ADVANCED MEDICAL IMAGING TECHNOLOGY**

Time: 90 min

Max.Marks: 100

**(Select the most appropriate answer)
(There are no negativemarks for wrong answers)**

1. Radioactivity

- a. Could be altered through high temperature and high pressure
- b. The SI unit is Bq
- c. Effective half life is more than both physical and biological half life
- d. Becomes zero after 5 half lives

2. Fixers

- a. Are alkaline
- b. Remove all unexposed silver ions from x-ray films
- c. Replenishment is not needed in automatic processor
- d. Should be changed while spectral matching differs

3. Partial volume artifact

- a. Does not arise in MRI
- b. Could be reduced by reducing the slice thickness
- c. Could be reduced by reducing the matrix size
- d. Does not arise in multi slice spiral CT

4. HR CT

- a. Uses low mAs
- b. Special reconstruction algorithms could be used without increasing the noise
- c. Very useful in pediatric cases
- d. High resolution CT images could be used to create high quality 3D reconstructed images

5. A TLD card has----- windows
- One
 - Two
 - Three
 - Four
6. Which one is not an ionizing radiation
- Gamma rays
 - IR
 - Beta radiation
 - UV
7. USG Probes
- Linear probes produce sector format images
 - As the probe frequency increases the crystal thickness decreases
 - As the probe frequency increases the tissue acoustic attenuation decreases
 - Mechanical probes are no longer used
8. Which one is used as input screen in II tube?
- CsI
 - AgBr
 - ZnCdS
 - NaI
9. Which imaging modality has high spatial resolution?
- Plain X-ray
 - CT
 - USG
 - MRI
10. Noise in CT
- As the slice thickness increases the image noise also will increase
 - As the mA or scanning time decreases the image noise also will decrease
 - Narrower window also makes noise more noticeable
 - Fourth generation CT scanners produce less noise compared to third generation
11. X-ray film characteristic curve is drawn between
- Log relative exposure and optical density
 - Relative exposure and optical density
 - mAs and KV
 - mAs and exposure

12. Atomic number is
- Number of neutrons
 - Number of neutrons and protons
 - Number of protons
 - Number of electrons, neutrons and protons
13. How many pixels make a 512X512 image matrix?
- 262144
 - 260000
 - 131777
 - 512
14. Which of the following statements is correct regarding spin-echo sequences?
- Selection of short TR and short TE gives T2- weighting
 - Selection of long TR and long TE gives T1-weighting
 - Selection of long TR and short TE gives T2-weighting
 - Selection of short TR and short TE gives T1-weighting
15. SAR
- Specific absorption rate
 - More in gradient echo sequence
 - Related to magnetic field strength
 - Is an imaging technique in MRI
16. The typical dose to the eye lens from a CT scan of the head is approximately
- <1Gy
 - 40 μ Gy
 - 4 mGy
 - 40 mGy
17. Small tumors could be missed on a CT scan because of
- Large section thickness
 - Incorrect window settings
 - Large table index
 - All of the above
18. Which of the following statements regarding detectors in CT scanners are correct?
- An ideal detector in a CT machine would have a long afterflow
 - Ionisation chambers use xenon gas at low pressure
 - Ionisation chambers are the most common detector in multislice scanners
 - Solid state detectors use rare earth materials such as bismuth germinate

19. Regarding the pitch of the CT scanners

- a. In a CT scanner pitch is the ratio of table movement during one full rotation to slice thickness
- b. If the table moves 10mm per rotation and the slice thickness is 5mm the pitch is 0.5
- c. The greater the pitch, the greater the patient dose
- d. A pitch of greater than 2 generally gives an unacceptable dose

20. Regarding cardiac CT, which one is not true?

- a. The primary challenges are high spatial and temporal resolution
- b. With multiple-row detector CT, the increasing number of detectors in the z direction allows a larger volume of the heart to be covered per gantry rotation.
- c. Prospective triggering is the mode of data acquisition used for calcium scoring studies
- d. The advantage of the retrospective gating mode of acquisition is the less radiation dose

21. A TLD card essentially consists of three ----- discs

- a. NaI (Tl)
- b. Cesium iodide : Dy- Teflon
- c. Lithium Fluoride: Dy-Teflon
- d. CaSO₄: Dy-Teflon

22. Which one could not be used to manage the aliasing artifact in USG?

- a. Increasing the PRF
- b. Decreasing the probe frequency
- c. Shifting the baseline
- d. Decreasing the angle of insonation

23. Subject contrast is generally decreased by:

- a. Film fog
- b. Tissues with similar densities
- c. Using 30KVp instead of 60KVp in mammography
- d. The use of contrast media

24. According to theory, what happens to the SNR when the magnetic field increases by a factor of 2?

- a. Remains constant
- b. Increases by a factor of 2
- c. Increases by a factor of 3
- d. Decreases by a factor of 4

25. Which of the following statements is correct regarding MRI generation?
- a. Raw data are directly translated into pixel intensity via back projection
 - b. Raw data are converted to image data via Fourier Transformation
 - c. K-space, the mathematical (virtual) space containing the image information is filled by the step-by-step frequency encoding
 - d. The number of phase encoding steps used for image generation depends on the size of the FOV
26. NAA peak occurs at
- a. 2.02 ppm
 - b. 2.03 ppm
 - c. 3.75 ppm
 - d. 1.3 ppm
27. Which of the following projections would best demonstrate the cervical intervertebral foramina
- a. PA oblique axial
 - b. Open mouth
 - c. Lateral
 - d. Extension
28. The common screen speed are
- a. High resolution screen – slow speed
 - b. Regular or standard screen – medium speed
 - c. Fast screen – past speed
 - d. All of the above
29. The following are advantages of miniature radiography except
- a. Huge saving in valuable storage space
 - b. Versatility
 - c. Cheap storage envelope
 - d. No need for any film reader
30. Deviation from normal development conditions of processor are revealed by checking important parameters except
- a. Speed
 - b. Contrast
 - c. Density of base fog
 - d. Ideal film density of 2-4
31. Regarding safe light the following are true except
- a. 25W lamp
 - b. Minimum of 1.2 meters from film
 - c. Intensity increases due to inverse square law
 - d. b & c are wrong

32. In reverse towne's position, the central ray enters the skull 1.5 in below the
- Mental point
 - External auditory meatus
 - External occipital protuberance
 - Glabella
33. The crista galli is well demonstrated in which of the following cranial projections
- PA
 - AP axial
 - Lateral
 - Full basal
34. The best projection for facial bone on an injured person who should not be turned prone is
- AP
 - Rhese
 - Water's
 - AP axial
35. The Haas view will clearly demonstrate the 1) dorsum sella 2) foramen ovale 3) petrous pyramids
- 1 & 2 only
 - 1 & 3 only
 - 2 & 3 only
 - 1, 2 & 3
36. Which of the following is part of mandible 1) mental foramen 2) Styloid process 3) coronoid process
- 1 & 2
 - 1 & 3
 - 3 & 4
 - 1, 2 & 3
37. The normal L5-S1 junction forms an angle of
- 20 – 25°
 - 30-35°
 - 40-45°
 - 60-80°
38. To demonstrate pleural effusion in the chest of a patient who is unable to be put in an exact position, which of the following positions might be of use
- Transthoracic
 - Supine
 - Lateral decubitus
 - Trendelenburg

39. Which of the following is well demonstrated in lateral chest projection
- Trachea
 - Interlobar fissures
 - Primary and secondary bronchi
 - Mediastinum
40. For lateral projection of sternum, the central ray is directed
- 6 cm superior from ensiform process
 - 4cm superior from suprasternal notch
 - 2cm inferior from manubrium sterni
 - 2cm inferior from sternal angle
41. RPO position of radiography of the ribs will demonstrate an injury along the
- Left margin
 - Costal cartilage
 - Right margin
 - Facet
42. Which of the following structures could not be demonstrated on a lateral skull radiograph
- Anterior clinoid process
 - Calcified pineal gland
 - Lambdoid
 - Occipital condyle
43. Which of the bone contain a paranasal sinus
- Parietal
 - Sphenoid
 - Occipital
 - Temporal
 - All of the above
44. Which of the following view will demonstrate the petrous pyramids, dorsum sella and posterior clinoid process
- Caldwell
 - AP axial
 - Waters
 - Schuller
45. An excellent view to demonstrate facial bone is
- Stenver's view
 - Waters
 - Rhese
 - Mayer's
46. Which of the statement is incorrect
- Caldwell projection demonstrate antereior ethmoid cells
 - PA demonstrates crista galli
 - Stenosis projection demonstrates optic foramen
 - Sub basal projection demonstrates jugular foramen

47. During a radiographers pregnancy, her exposure should not exceed
- 300 mrcm
 - 500mr cm ?
 - 1000mr cm
 - 5000mr cm
48. Which of the following is an intermediate or early radiation effect on humans
- Local tissue damage
 - Haematologic syndrome
 - Life span shortening
 - Leukaemia
49. Which of the following is considered a late or delayed radiation effect on humans
- Cryogenetic damage
 - Leukaemia
 - Local tissue damage
 - Hematologic depression
50. How much equivalent Al filtration does the glass window in most x-ray tubes provide
- 1.25mmAl
 - 1.5mm Al
 - 1mm Al
 - 1.5mm Al
51. Which of the following cell types is high in radiosensitivity
- Chondrocytes
 - Erythroblasts
 - Spermatids
 - Osteoblasts
52. Which of the following does not relate to attenuation of the beam
- Absorption
 - Anode materials
 - Inverse-square law
 - Scattering
53. The term Ortho voltage is used to denote a range of kilovoltage from
- 130-150 KV
 - 200-200 KV
 - 350-500 KV
 - 500-1000KV

54. The dose equivalent of gamma and x-radiation is calculated by using the formula
- rads x 1 = rcm
 - rads x 5 = rcm
 - rads x 10 = rcm
 - rads x 20 = rcm
55. Right anterior oblique radiographs of stomach filled with barium and high voltage technique will show
- Duodenal bulb
 - Distal esophagus
 - Greater curvature
 - Upper stomach
56. Fundus of stomach is well filled with barium on recumbent position when patient position is
- RAO
 - LPO
 - Left lateral
 - AP
57. MR contrast media acts by
- Attenuation of signals
 - Shortens T1 relaxation time
 - Prolongs T1 relaxation time
 - Shortens T2 relaxation time
58. Signal appears bright in blood vessels due to
- Rapid flow
 - Slow flow
 - T2 shortening of blood
 - Due to Gadolinium contrast
59. MR contrast media is not safe in
- Pregnancy
 - Renal failure
 - All of the above
 - GFR >60
60. Regarding K-space all are true except
- Mathematical data space
 - Uses a 2D FT
 - Central lines decide contrast
 - Central lines decide spatial resolution
61. Phase contrast study is a
- Slow
 - Uses contrast
 - Artifacts less
 - No additional gradient

62. Image acquisition time is directly related to
- Matrix size
 - NEX
 - Repetition time
 - Signal to noise ratio
63. Regarding MR arthrography following is true except
- Done without contrast
 - Undiluted contrast used
 - 1: 100 dilution used
 - Not useful in trauma
64. The strength of gradient is expressed by all except
- Maximum gradient strength
 - Rise time
 - Slow rate
 - Eddy currents
65. Double contrast study of barium meal involves the use of
- Barium sulphate suspension of food coating quality
 - Gas producing agent
 - A drug causing gastric atony
 - All of the above
66. The following are true regarding slip ring technology
- Abolishes the need for cable between generator and cathode
 - There are two rings
 - No backward and forward rotation
 - Brushes transmit power from stationary ring to anode
67. All are true regarding of spiral CT except
- Large volume of contrast media required
 - Very precise timing of enhancement required
 - Improved 3D images
 - Reduced MAS
68. The electron gun CT has followed except
- Electrons hit a large stationary anode
 - There is a focus coil and deflection coil
 - There is detector ring and target rings
 - The extent of circumference anode used is 360°
69. The following are true regarding bone density measurements except
- Single photon absorptiometry used
 - QCT can be used
 - Dual photon absorptiometry (DPA) used to measure BMD
 - DPA has short scanning time

70. Indication for bone mineral density measurements include all except
- Osteoporosis
 - Hyper parathyroidism
 - Corticosteroid therapy
 - Routine bone mineral survey in population
71. Regarding cardiac imaging following are true except
- SPECT can be used
 - Thallium 201 used
 - Right ventricular pressure measurement can be done by nuclear study
 - Phase contrast study used in SPECT
72. What is the % of radioopaque gallstones
- 2 %
 - 6%
 - 10%
 - 25%
73. Which matching is not correct
- biligraffin – gallstones
 - lipidiol – AVM embolisation
 - Barium sulphate – GI tract
 - myodil – Bronchography
74. For investigation of free gas under diaphragm in a ill patient the following is used
- Left lateral decubitus
 - Supine antero-posterior
 - Erect antero-poaterior
 - None of the above
75. Peripheral venography is carried out
- To determine the patency of deep veins
 - To determine the patency of valves
 - In case of deep vein thrombosis
 - All of the above
 - None of the above
76. The iliac crest in at the level of
- 1st lumbar
 - 1st & 2nd sacrum
 - D11
 - L4

77. All of the following views can be used both for mastoid and internal auditory canals except

- a. Lateral oblique
- b. Fronto-occipital
- c. Submento vertical
- d. None of the above.

78. Multislice helical CT scanners are equipped with

- a. Multiple x-ray tubes
- b. multi raw of detectors
- c. multiple x-ray tubes and multi raw of detectors
- d. multiple x-ray tubes and single raw of detectors

79. Alpha particles have a mass of approximately

- a. One-twelfth the mass of a carbon atom
- b. One-third the mass of a carbon atom
- c. One-half the mass of a carbon atom
- d. Twice the mass of a carbon atom

80. An increase in EMF in an X-ray tube will affect the

- a. Cathode temperature
- b. Quality of beam
- c. Quantity of beam
- d. Number of valve tubes utilized.

81. The focal spot size of an x-ray tube is best measured by

- a. Exposure with step-wedge device
- b. Pin-hole camera
- c. Spinning top
- d. Wire mesh exposure

82. Which of the following is most usually done investigation for lump in breast

- a. Soft tissue mammography
- b. Xeroradiography
- c. Contrast media injected into duct
- d. Ultrasonography.

83. PA View with ulnar deviation is useful in

- a. Scaphoid
- b. Carpal Tunnel
- c. Carpal bones
- d. All of the above.

84. High KV technique is useful in

- a. Hystero – salpingography
- b. Lateral views of LS Spine
- c. Barium examinations
- d. All of the above.

85. Discography is performed usually in

- a. Lumbosacral region.
- b. Thoracic region
- c. Upper cervical region
- d. Lower cervical region.

86. Regarding piezo electric effect all are true except

- a. Used in ultrasound
- b. Change in thickness by applying electric voltage.
- c. Barium platinocyanate is used
- d. Ceramic.

87. Iopamidol is a

- a. Nonionic monomer
- b. Ionic Monomer
- c. Ionic dimer
- d. Nonionic dimmer

88. The first Mutislice CT scanner was introduced in the year

- a. 1992
- b. 1989
- c. 1988
- d. 1991

89. The yearly MPD for radiation worker is

- a. 20 msv
- b. 500 msv
- c. 5000 msv
- d. 50,000 msv.

90. The umbilicus is at the level of

- a. L1
- b. L3-L4
- c. L5
- d. L2.

91. Which anatomic part is not seen open mouth view?

- a. Superior articular process.
- b. Transverse process
- c. Body of C1
- d. Joint of Luschka.

92. One Gray (Gy) equals

- a. 1/100 of rad
- b. 1/110 of rad
- c. 10 rads
- d. 100 rads

93. When Gadolinium is used as contrast agent

- a. T1 relaxation time is reduced
- b. T2 relaxation time is reduced
- c. T1 and T2 relaxation time are reduced
- d. T1 and T2 relaxation time is increased

94. The part of brain that controls cardiac function and respiration is termed as

- a. Pons
- b. Medulla
- c. Hypothalamus
- d. Cerebellum

95. RPO and LPO projections for barium enema are used to demonstrate.
- Sigmoid
 - Right and left colic flexures
 - Ileocaecal Junction
 - Rectosigmoid junction.
96. Noble prize for medicine was awarded to
- Hounsfield in 1976
 - Cormack and Hounsfield in 1976.
 - Cormack in 1972
 - Cormack and Hounsfield in 1972.
97. 'Pig-tail' catheter is used for
- Cerebral angiography
 - Aortography
 - Iliac angioplasty
 - None of the above
98. In spiral CT single data is obtained by all of the following except
- Slip ring technology
 - Table feed of 1 to 20 mm per 360°
 - Slice thickness 1 to 10 mm
 - Table feed distance almost thrice the thickness of a single slice.
99. Spiral CT shows the following features except
- Useful in children
 - High quality 3D display
 - Pitch >1 possible
 - Radiation dose is more when compared to conventional scan.
100. The following are true regarding CT scan except
- First generation CT is Translate – rotate geometry.
 - 2 nd generation is rotate only geometry.
 - 4th generation the ring of detector array rotates.
 - Pressurised ionisation chamber detector is used.

