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

ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2019

PROGRAM: DIPLOMA IN ADVANCED MEDICAL IMAGING TECHNOLOGY

Time: 90 Minutes

Max.Marks: 100

(Select the most appropriate answer)

(There are no negative marks for wrong answers)

1. Which one of the following is a unit of radioactivity?
 - a. Gray
 - b. Sievert
 - c. Becquerel
 - d. Joules/Kg
2. 50 Rads is equal to
 - a. 50Gy
 - b. 0.5 Gy
 - c. 1 Gy
 - d. 5.000Gy
3. The Compton Effect only occurs with
 - a. Atomic nuclei
 - b. Electrons which are essentially free
 - c. Very tightly bound electrons
 - d. Inner shell electrons
4. Fission occurs in a
 - a. A cyclotron
 - b. An isotope calibrator
 - c. A nuclear reactor
 - d. A radioisotope generator
5. What is the SI unit of Luminous Intensity?
 - a. Meter
 - b. Kelvin
 - c. Ampere
 - d. Candela
6. Which among the following is the most radiation sensitive part?
 - a. Eye lens
 - b. Lungs
 - c. Skin
 - d. Bone marrow
7. In a film badge which filter is used for detecting neutrons?
 - a. Lead
 - b. copper
 - c. Cadmium
 - d. Plastic

8. Larmour frequency =-----x strength of magnetic field
- Gyromagnetic ratio
 - Flip angle
 - Wavelength
 - all of these
9. Which device is used to improve radiographic quality by reducing scattered radiation?
- X-ray table
 - Grids
 - Film cassette
 - All of these
10. CT table movement per gantry rotation/collimation width is called
- Window level
 - Voxel
 - Pitch
 - pixel
11. The atoms of nuclei with same number of protons but different number of neutrons are called----
- isobars
 - isomers
 - isotopes
 - isotones
12. The process of converting alternating current to direct current
- Rectification
 - Amplification
 - Modulation
 - None of these
13. Radiographic contrast is caused by
- Compton scattering
 - Photo electric effect
 - Thompson scattering
 - Pair production
14. Annual effective dose limits prescribed by AERB for Occupational worker is
- 20mSv/year
 - 10mSv/year
 - 200mSv/year
 - 20Sv/year
15. A photon does not have
- Rest mass
 - Charge
 - Both a&b
 - Energy

16. In common the lead apron has
 - a. 0.5mmPb
 - b. 1mmPb
 - c. 2mmPb
 - d. 5mmPb
17. In India, TL phosphor used in the personal monitoring badge
 - a. $\text{CaSO}_4:\text{Dy}$
 - b. LiF
 - c. CsF
 - d. KSO_4
18. The most damaging type of radiation is
 - a. Beta rays
 - b. X-rays
 - c. Alpha rays
 - d. Gamma
19. The process occurring at the energy levels of diagnostic radiology is....
 - a. Photoelectric absorption and Compton scattering
 - b. Pair Production
 - c. Compton Scattering alone
 - d. Annihilation
20. The effective radiation from a PA chest examination is typically
 - a. 0.2 mSv
 - b. 20 mSv
 - c. 0.02 mSv
 - d. 2mSv
21. What does an MRI system use to convert mathematical data into a picture?
 - a. Rutherford filtration
 - b. RF pulse converter
 - c. Fourier transforms
 - d. Electron precession
22. Transverse plane is also called as
 - a. Sagittal
 - b. Coronal
 - c. Median sagittal
 - d. Axial
23. Which one of the following types of magnet in an MRI system consumes electricity to maintain its magnetic field?
 - a. Permanent magnet
 - b. Resistive magnet
 - c. Superconducting magnet
 - d. Cryogenic magnet

24. For Hipjoint AP view
 - a. Knees extended
 - b. Knees flexed
 - c. Knees abducted
 - d. None of the above
25. Which of the following material is added to the anode disc of a rotating X-ray tube to prevent the crazing effect?
 - a. Molybdenum
 - b. tungsten
 - c. Rhenium
 - d. Copper
26. The filtration of an X-ray beam has the effect of
 - a. Improving the quality of the transmitted X-ray beam
 - b. Improving the quantity of the transmitted X-ray beam
 - c. Reducing the quantity and decreasing quality of the transmitted X-ray beam
 - d. Improving the quality and increasing quantity of the transmitted X-ray
27. High speed anode with rotation speed of 10000rpm is required in
 - a. Ba Series studies
 - b. ERCP
 - c. DSA
 - d. Myelography
28. Which of the following is used to measure the cooling time of an X-ray Tube?
 - a. Tube rating chart
 - b. Anode heat storage chart
 - c. Cathode heat storage chart
 - d. Cooling chart
29. The exposure of a radiograph is directly proportional to the time of exposure. What will happen to the exposure if the time is doubled?
 - a. Reduced by half
 - b. Unchanged
 - c. Doubled
 - d. Tripled
30. The binding energy of an electron is defined as:
 - a. The rest energy of the electron
 - b. The energy that keeps the electron in its atomic orbit
 - c. The energy required to rise the electron from one atomic shell to another
 - d. The energy associated with electron capture by the nucleus
31. What will be the centering point for Chest AP supine view ?
 - a. Sternal notch
 - b. T4
 - c. Xiphisternum
 - d. Acromioclavicular joint

32. Thumb has phalanges
- 2
 - 3
 - 4
 - 1
33. Scintillation crystals are materials those will producewhen radiation interacts.
- Electricity
 - Light
 - Mechanical vibration
 - Magnetism
34. What will be the approximate magnetic field of a permanent magnet?
- 10T
 - 0.3T
 - 5T
 - 2T
35. Which among the following shows paramagnetism?
- Nickel
 - Cobalt
 - Copper
 - Manganese
36. Which of the following is measured in millimeters?
- Energy resolution
 - Spatial resolution
 - Field uniformity
 - Temporal resolution
37. SI unit of magnetic field is
- Tesla
 - Volt
 - Decibel
 - Joules/Kg
38. The focal spot size of an X-ray tube is best measured by
- Spinning top
 - Lead calipers
 - Pin-hole camera
 - Step wedge exposure
39. Imaging systems are often evaluated by measuring their resolution (line pairs/mm). Resolution is characteristic which is not directly related to
- Image noise
 - Image blurring
 - Image unsharpness
 - Visibility of anatomical details

40. The most appropriate instrument for measuring the scattered x-ray exposure from a patient is a
 - a. Geiger counter
 - b. Large ionization chamber
 - c. Small ionization chamber
 - d. Scintillation detector
41. The value of a CT number (in Hounsfield units) is determined primarily by
 - a. Matrix size
 - b. Slice thickness
 - c. KV
 - d. Tissue density
42. The maximum field of view which can be obtained with a specific radiographic system is generally limited by the :
 - a. Focal spot size
 - b. Anode size
 - c. Anode angle
 - d. Tube current
43. Molybdenum is the most common filter material in mammographic systems. It is used because it produces
 - a. Characteristic radiation
 - b. Increased breast penetration
 - c. High absorption above the K-edge energy
 - d. High absorption below the K-edge energy
44. The thickness of an intensifying screen has no effect on
 - a. Image contrast
 - b. Image blurring
 - c. Receptor sensitivity
 - d. Patient exposure
45. The amount of contrast in a radiograph is not affected by
 - a. The latitude of the film
 - b. Processing conditions
 - c. Amount of exposure
 - d. Film-screen contact
46. Possible advantages of using a higher KV (90 rather than 70) in radiography include
 - a. Decreased area contrast
 - b. Reduced X-ray tube heating
 - c. Shorter exposure times
 - d. All the above
47. When using a magnification technique in radiography it is essential to have
 - a. A small focal point
 - b. Low mAS
 - c. A short exposure time
 - d. Low KV

48. A small focal spot is used to
- Reduce image blurring
 - Decrease image noise
 - Reduce patient exposure
 - Both B & C
49. An air gap technique will generally improve image contrast because
- It is used with a small focal spot
 - The air absorbs scattered radiation
 - It is used with a small field of view
 - The scatter is more diverging than the primary beam
50. The matrix size selected for a digital image will have a significant and direct effect on:
- Image contrast
 - Field of view
 - Storage requirements
 - Both A & B
51. During the magnetic resonance relaxation process after a 90 degree pulse
- Longitudinal magnetization increases
 - Transverse magnetization increases
 - Proton density increases
 - All the above
52. Where will you keep the cassette for PA view?
- Anterior
 - Posterior
 - Lateral
 - Medial
53. For Chest radiography exposure is made at :
- Arrested Full expiration
 - Arrested Full inspiration
 - Normal breathing
 - All the above
54. While fluoroscopy, the gain of the image intensifier tube can be increased by increasing the
- KV
 - Density control
 - Gain control
 - Field of view (mode)
55. The efficiency of x-ray production (exposure/heat unit) can generally be increased by increasing the
- Focal spot size
 - KV
 - mA
 - Exposure time

56. When a photon engages in a Compton interaction it will:
- Loss energy
 - Ionize the atom
 - Change direction
 - All the above
57. The exposure output of an X-ray tube can be changed without changing the spectrum by adjusting the
- KV
 - mAs
 - filter
 - Focal-spot size
58. The surface entrance exposure to a patient in a radiographic procedure can be changed by changing the
- KV
 - Focal spot size
 - Grid ratio
 - Both A&C
59. How to calculate mass of an atom
- Total number of electron and proton
 - Total number of neutron and proton
 - Total number of electron and neutron
 - Total number of electron, neutron and proton
60. An alpha-particle is same as
- An hydrogen nucleus
 - An Helium nucleus
 - An Oxygen nucleus
 - An Carbon nucleus
61. A typical alpha emitter is
- Radium
 - Radon
 - Cobalt
 - Uranium
62. Which of the following is the smallest?
- A molecule
 - An atom
 - A nucleus
 - An electron
63. In diagnostic X-ray department main source of scattered radiation
- X-ray tube
 - Patient
 - Cassette
 - X ray table

64. The radiation that emerges from the source through its protective barriers is known as
- Primary radiation
 - Scattered radiation
 - Leakage radiation
 - Background radiation
65. X-Ray are produced by
- Acceleration of electron in vacuum
 - Deceleration of electron by target
 - Heating of the tungsten filament
 - All the above
66. Which of the following is not the reason for making vacuum inside the X-ray tube
- Eliminate the chance of ionization
 - Increase the speed of cathode stream electrons
 - Proper control over tube current
 - Improve anode cooling
67. To obtain optimal density in the radiograph;
- A. use proper kVp
 - Use proper mAs
 - Use proper grid
 - Do proper positioning
68. Photoelectric effect is also known as
- Edison effect
 - Hertz Effect
 - Absorption effect
 - Augur effect
69. Which standard is used for handling, storing, printing, and transmitting information in medical imaging
- DICOM
 - HL7
 - IHE
 - SNOMED
70. Which post processing technique reconstructs the axial images into coronal, sagittal and oblique anatomical planes to create a volume of interest 3D image?
- Multiimage Reconstruction (MPR)
 - Multiplanar Reconstruction (MPR)
 - Multiframe Reconstruction (MPR)
 - Multiregion Reconstruction (MPR)
71. Compton process is an example of
- Inelastic scattering
 - Elastic scattering
 - Coherent scattering
 - Thomson's scattering

72. Bremsstrahlung radiation
- Is emitted when an incoming electron interacts with a bound electron
 - Is responsible for the line spectrum of X-rays emitted from the target
 - Has a minimum photon energy which varies with the kVp set
 - Has a maximum photon energy in keV numerically equal to the applied kVp
73. In some X-ray tube there are two filaments
- To reduce space charge effect
 - To ensure saturation current
 - To provide two focal spot
 - To inhibit inverse current
74. Anterior superior iliac spine is related and closer to
- Shoulder
 - Hip
 - Knee
 - Skull
75. In a tungsten target the characteristic X-rays useful for making radiograph is from
- K shell
 - L shell
 - M shell
 - N shell
76. Disadvantage of 3 phase compared to single phase is
- Longer minimum exposure time
 - Higher electrical operating cost
 - Lower radiation output
 - Softer radiation
77. The characteristic curve is obtained by plotting log of relative exposure to
- Speed
 - Sensitivity
 - Optical density
 - Log of optical density
78. MRI contrast agent gadolinium
- Shortens T1 relaxation time
 - Shortens T2 relaxation time
 - Increases T1 relaxation time
 - Increases T2 relaxation time
79. Coracoid process is seen in
- Scapula
 - Radius
 - Ulna
 - Fibula

80.is the mathematical space for storage of the measured raw data before the MR image is reconstructed by applying 2D or 3D Fourier transform.
- F space
 - MR space
 - K space
 - D space
81. Which of the following will not affect subject contrast?
- Patient thickness
 - KVp setting
 - Atomic number
 - Processor temperature
82. Which of the following components of an image intensifier converts light in to electrons
- Anode
 - Filament
 - Input fluorescent screen
 - Photo cathode
83. The main component of radiographic noise is
- Structure mottle
 - Quantum mottle
 - Random mottle
 - Graininess
84. The addition of thorium to tungsten filament
- Increases filament life
 - Decreases the space charge effect
 - Reduces the saturation current
 - Increases efficiency of thermionic emission
85. Most rotating anode X-ray tube
- Have a tungsten target embedded in Cu anode
 - Have a larger focal spot than stationary anode X-ray tube
 - Have a Cu target embedded in tungsten anode
 - Incorporates the line focus principle
86. The voltage supplied to the X-ray machine is 220 V, the high voltage used in radiography is generated by
- Rheostat
 - Auto transformer
 - Filament transformer
 - High voltage transformer
87. The quality of an X-ray beam is chiefly governed by its
- mA
 - KVp
 - Field size
 - Target material

88. Adding filtration to an X-ray tube will
- Increase the X-ray quality
 - Increase the X-ray quantity
 - Decrease the X-ray quantity
 - Decrease the X-ray quality
89. Which is coldest
- Nitrogen
 - Liquid nitrogen
 - Helium
 - Liquid helium
90. Recommendations proposed for portable X-ray machines state that the exposure cord should be at least.....
- 2m
 - 1.5m
 - 1m
 - 0.5m
91. In radiography of lumbar spine, which technique would provide the least radiation exposure?
- 84KVp, 100mAs
 - 90KVp, 100mAs
 - 100KVp, 50mAs
 - 120KVp, 25mAs
92. All the following procedures help to reduce patient dose during X-ray examination except using
- Cones
 - Fast screens
 - Grids
 - Filtration
93. Grid ratio means
- Ratio of the height of the lead strip to the distance between the strips
 - Number of lead strips per cm
 - The ratio between the height and thickness of lead strips
 - The ratio between the thickness of lead strip to the distance between the lead strips
94. During discovery of X-ray Roentgen was working in
- University of Petersburg
 - University of Wurzburg
 - University of Johannesburg
 - University of Vermonte
95. The efficiency of intensifying screen means.
- Prevention of scatter
 - Sharpening of image
 - Higher percentage of conversion of X-ray to light energy
 - Intensify the X-ray beam

96. The following are rare earth except
- Gadolinium
 - Lanthanum
 - Yttrium
 - Molybdenum
97. The regulatory board for radiation installations in India is
- Bhabha Atomic Research Centre
 - Board of Radiation and Isotope Technology
 - Atomic Energy Regulatory Board
 - Indian Association of Medical Physicists
98. Following are properties of X-ray except
- Highly penetrating invisible rays
 - Electrically neutral
 - Can be focused by lens
 - Ionize gases
99. The following statements are correct regarding automated film processing except
- Shortens total processing time
 - It has all steps of manual processing
 - Improves quality control
 - The processing temperature is high
100. All the following is related to CT scan except
- EMI laboratory
 - Godfrey Hounsfield
 - Dr. James Ambrose
 - Dr. Paul Lauterberg

