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DIPLOMA IN ADVANCED MEDICAL IMAGING AND TECHNOLOGY

ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2024

Time:90 Minutes Max.Marks: 100

(Select the most appropriate answer)

(There are no negative marks for wrong answers)

1 Slip ring technology created a development in CT called

- a First generation CT
- b Contrast enhanced CT
- c Spiral CT
- d Synthetic CT

2 Which of the following is a common MR contrast reaction

- a Nephrogenic systemic fibrosis
- b Liver necrosis
- c Angina
- d Nausea

3 Hounsfield unit is dependent on

- a Attenuation Coefficient of the object being scanned
- b Efficiency of the CT detector
- c Energy of the X ray produced
- d X ray photon intensity reaching the pixel

4 Which of the following is an Ultrasound contrast agent ?

a Omniscan

b Sonovue

c SPIO

d Mangafodipir

5 Amniocentesis is usually guided by using this imaging method

a Mammography

b Ultrasound

c Hysterosalpingiography

d CT pelvis

6 Imaging method that can detect stroke early is

a Susceptibility weighted imaging

b Diffusion weighted imaging

c MR spectroscopy

d BOLD imaging

7 FLAIR is a sequence which uses

a Echoplanar imaging

b Gradient echo

c Inversion recovery

d Spin echo

8 Following scientists have been associated with Magnetic Resonance except

a Richard Ernst

b Paul Lauterbur

c Kurt Wüthrich

d Alfred Nobel

9 Vertebral arteries enter the cranium through

a Foramen spinosum

b Zygomatic foramen

c Foramen ovale

d Foramen Magnum

10 Amount of chemical shift artifact is dependent on

a Matrix size

b Frequency encoding direction

c Magnetic field strength

d Phase encoding direction

11 SVC and IVC empty blood into

a Left ventricle

b Right atrium

c Left atrium

d Right ventricle

12 Which of the following techniques is used to image the white matter tracts ?

a Resting state fMRI

b Diffusion tensor imaging

c Perfusion imaging

d MRI CSF cisterography

13 ASPECTS score in CT is used for

a Stroke

b Epilepsy

c Dementia

d Leukodystrophy

14 Oblique view of petrous temporal region is called

a Kandell view

b Martiz view

c Stenver view

d Caldwell view

15 Delayed gadolinium sequences are used in

a Spleen imaging

b Cardiac imaging

c Lung imaging

d Vessel imaging

16 Which of the following is not diamagnetic ?

a DeoxyHemoglobin

b Oxy Hemoglobin

c Water

d Carbon

17 Which of the following has the least spatial resolution

a X ray

b CT

c MRI

d PET

18 In a T1 weighted image we use

a Long TR/Short TE

b Long TR/Long TE

c Short TR /Short TE

d Short TR/ Long TE

19 Which organism causes Malaria

a Virus

b Mosquito

c Parasite

d Bacteria

20 Which of the following is not a tarsal bone ?

a Navicular

b Cuneiform

c Pisiform

d Cuboid

21. Which of the following is a perfusion imaging parameter

a. Magnetisation transfer

b. Mean transit time

c. Volume rendering

d. Tissue harmonic imaging

22. X-Ray are produced by

a. Acceleration of electron in vacuum

b. Deceleration of electron by target

c. Heating of the tungsten filament

d. All the above

23. In a tungsten target the characteristic X-rays useful for making radiograph is from

a. K shell

b. L shell

c. M shell

d. N shell

24. Which of the following disease can be transmitted via infected blood?

a. HIV

b. Hepatitis B

c. Hepatitis C

d. All the above

25. Which is the most frequently used site for catheter angiogram?

a. Carotid artery

b. Axillary artery

c. Common femoral artery

d. Subclavian artery

26. Which of the following is a functional study used to demonstrate the degree of motion present in the cervical spine?

a. Open-mount projection

b. Moving mandible AP

c. Flexion and extension laterals

d. Right and left bending

27. The voltage ripple associated with a 3-phase, 12-pulse rectified generator is approximately

a. 3

b. 3.5

c. 0.35

d. 0.035

28. Under exposure of a radiograph can be caused by all of the following, except

a. Insufficient mA

b. Insufficient exposure time

c. Insufficient kV

d. Insufficient SID

29. Law of Beer–Lambert used in the image formation of

a. CT

b. USS

c. MRI

d. DSA

30. All of the following are true regarding single source dural energy CT except?

a. Poor temporal resolution

b. Larger FOV possible

c. Poor spectral separation

d. Less accurate material characterization

31. Scan time of an MRI sequence is

a. TR × number of excitations × number of phase encodings

b. TR + number of excitations + number of phase encodings

c. TR + number of excitations

d. TR x number of excitations

32. Which is not an MRI artifact

a. Section Cross Talk Artifacts

b. Fringe Artifact

c. Beam hardening artifact

d.Truncation Artifacts

33. Which is true regarding direct conversion detectors

a. Amorphous selenium give electric signal

b. Photo diode gives electric signal

c. Caesium iodide is used

d. Gadolinium oxysulphide is used

34. Grid controlled X ray tubes

a. Used in pulsed fluoroscopy

b. Used in continuous fluoroscopy

c. Used to avoid flicker effect

d. Increase the radiation dose to patient

35. Pigtail catheter can be used in all vessels except

a. Main pulmonary artery

b. Aorta

c. Carotid artery

d. Inferior vevacava

36. The protective control booth from which the radiographer makes the x-ray exposure is a:

a. Primary barrier

b. Secondary barrier

c. Useful beam barrier

d. Remnant radiation barrier

37. Which of the following image matrix sizes will result in the best resolution?

a. 128 × 128

b. 512 × 512

c. 1024 × 1024

d. 2048 × 2048

38. Which of the following pathologic conditions would require an increase in exposure factors?

a. Pneumoperitoneum

b. Ascites

c. Renal colic

d. Obstructed bowel

39. What is considered the normal creatinine range?

a. 0.6–1.2 mg/100 mL

b. 4.5–6 mg/100 mL

c. 8–25 mg/100 mL

d. up to 50 mg/100 mL

40. Which of the following is used to evaluate focal spot size?

a. Spinning top

b. Wire-mesh

c. Slit camera

d. Penetrometer

41 Below 20 degree Celsius, metallic gadolinium is

a Ferromagnetic

b Diamagnetic

c Paramagnetic

d Superparamagnetic

42 Catheters used for cerebral angiogram are all except

a Berenstein catheter

b Vertebral glide catheter

c Simmons Catheter

d Roberts catheter

43 What is the relationship between the esophagus and the trachea?

a Esophagus is posterior to the trachea

b Trachea is posterior to the esophagus

c Esophagus is lateral to the trachea

d Trachea is lateral to the esophagus

44 What is not true about photoelectric effect?

a It produces characteristic rays

b It is a major contributor to the patient dose

c Occurs in absorbers having high atomic number

d Produces image fog

45 The type of dose-response curve used to predict stochastic effects of radiation is

a Nonlinear threshold

b Linear threshold

c Linear nonthreshold

d Nonlinear Nonthreshold

46 Greatest number of reported nephrogenic systemic fibrosis

a Gadoxetate

b Gadodiamide

c Gadoteridol

d Gadoterate

47 Beryllium has an inherent filtration of approximately ___ mm Al equivalent

a 0.10 mm

b 0.15 mm

c 0.2 mm

d 0.25 mm

48 Which parameter cannot be changed by the monographer

a Duty factor

b Spatial pulse length

c Pulse repetition period

d Pulse repetition frequency

49 Intensity of scattered x-ray photon at 1 meter from the scattering object is what fraction of its original intensity

a 1/10

b 1/100

c 1/500

d 1/1000

50 Which of the following is not the correct option regarding the radiation monitoring devices?

a Optically stimulated luminescence dosimeters are stimulated with green light to read radiation exposure

b Radiation exposure is measured by heating the chip inside the thermoluminescent dosimeter

c Radiation exposure could be directly read by exposing the pocket dosimeter to geiger muller counter

d Film badge has various filters in it which is used to evaluate and find the dose

51 Which Gadolinium chelates are less stable

a Linear ionic

b Linear nonionic

c Macrocyclic ionic

d Macrocyclic nonionic

52 The centring of a routine chest PA view is at

a Shoulder

b Inferior scapula

c Umbilicus

d Iliac crest

53 The absolute frequency difference (chemical shift) between fat and water protons at 3T is

a 215 Hz

b 320 Hz

c 430 Hz

d 510 Hz

54 Which of the following is an inversion recovery sequence in MRI

a MEDIC

b STIR

c FLASH

d SSFP

55 Intercostal artery arises from

a Aorta

b Subclavian artery

c Renal artery

d Celiac trunk

56 Broad peaks in MR spectroscopy is due to which metabolite

a Choline

b Creatine

c N acetyl aspartate

d Lipids

57 Last image hold is useful in

a CT guided biopsy

b Interventional radiology

c Planning MR sequences

d Achieving correct breath-hold for CT angiogram

58 Single phase rectification produces a waveform having

a 0% ripple

b 4% ripple

c 13% ripple

d 100% ripple

59 CTDI is used for

a Radiation dose modulation

b Collimation

c Post processing

d Dose calculation

60 Changes in window width in digital imaging result in changes in

a Contrast

b Density

c Resolution

d Distortion

61 Which of the following is not a feature of contrast allergy?

a Itching and redness over the body

b Respiratory difficulty with wheeze

c Reduction in BP

d Bulging of contrast injection site

62 Which of the following devices is unsafe inside an MRI?

a Knee Joint Implant

b Cochlear implant

c Coronary stent

d Peripheral arterial stent

63 What is the structure of the iso-osmolar contrast agent "iodixanol"

a Ionic monomer

b Nonionic monomer

c Ionic dimer

d Nonionic dimer

64 Embolic protection device is used for which vascular intervention

a Carotid artery stenting

b Peripheral angioplasty

c Coronary angioplasty

d Central venoplasty

65 Which is the best location for IV cannula placement for a Coronary CT angiogram

a Right anterior cubital vein

b Right radial artery

c Left cephalic vein

d Left femoral vein

66 Triple-phase CT angiogram is commonly used for identifying

a Carotid stenosis

b Coronary stenosis

c Liver Tumors

d Mediastinal Tumors

67 Which one of the below options is not a property of anti-scatter grids

a Reduce noise and thus improve contrast in an X-ray image

b Absorbs scattered radiation

c The main component is lead strips

d Reduces the radiation to the patient

68 Which of the following techniques will increase the scatter of radiation

a Collimation of the beam.

b Increasing the kvp.

c Using an air gap between the patient and the detector.

d Using compression on the patient.

69 Which of the following is not a Component of direct digital radiography?

a Image intensifier.

b Image management system.

c Digital image processing unit.

d Scintillator layer

70 Find which is not a component of the fluoroscopic image intensifier tube

a Input phosphor.

b Photocathode.

c Electrostatic focusing lens.

d Thin-film transistor

71 All concepts are used in ALARP except

a Shielding

b Distance

c Optimization

d Time

72 Technique to reduce the CT dose includes all except

a Limiting the coverage of the scan.

b Increasing MA.

c Utilisation of body mass index chart.

d Using the 3d dose modulation.

73 Identify the true statement regarding magnetic resonance imaging sequences

a FLAIR is used for suppression of fatty tissues.

b Gadolinium reduces both T1 and T2 relaxation times.

c The TR used to obtain T1W images is long.

d T1 relaxation occurs first, followed by the initiating of T2 relaxation

74 Find out the false statement regarding Gradient echo sequence:

a Gradient echo signal is generated only through gradient reversal.

b 180 degree pulse is used for echo generation

c Excitation angles less than 90° are normally used.

d Lesser total RF power is applied to the patient compared to SE sequence

75 Identify the true statement regarding image intensifier

a The output phosphor liberates light when bombarded by light photons.

b The input screen liberates visible lights when stimulated by X-rays.

c Resolution improves by using a thicker input phosphor.

d It is measured in pixels

76 Which among the following is not a CT image reconstruction algorithm

a Filtered back projection

b Iterative reconstruction

c Latent image formation

d Fourier transformation

77 Which of the following artefact is uncommon in MRI

a Zipper artefact

b Truncation artefact

c Chemical shift artefact

d Stair Step artefact

78 All are blood vessels in the neck except:

a Common Carotid artery

b Internal Jugular Vein

c Vertebral artery

d Cephalic vein

79 Which among the following is not true regarding deterministic effects

a It is also known as non-stochastic effects.

b The effect will not occur if the threshold value does not exceed.

c The risk of the effect increases with dose.

d Most deterministic effects have a repair mechanism.

80 Which one among the following statements regarding Heel effect is false

a Due to the attenuation of X-rays at the target material.

b Greater intensity rays will be on the cathode side of the X-ray field.

c Decreases for a smaller anode angle.

d Useful in spine radiographs.

81. DLP IS used in

a) CT

b) MRI

c) DSA

d) Digital radiography

82. Molybdenum filters are used in

a. Dual-energy CT

b. Large FOV CT

c. Mammography

d. Portable radiograph

83. Susceptibility artefacts are increased in

a. Lower MR strength

b. Spin echo sequence

c. Gradient echo sequence

d. Use of thin slices

84. Which of the following is associated with MR contrast agents made of gadolinium?
    a. Liver failure
    b. Nephrogenic systemic fibrosis
    c. Pulmonary fibrosis
    d. Bone sclerosis
85. The SAR in MRI depends on
    a. Weight of patient
    b. Height of patient
    c. Slice thickness
    d. Presence of artefacts
86. Which of the following is a contrast agent
    a. Gadolinium
    b. Iodine
    c. Ferumoxotol
    d. All of the above
87. Venetian blind artefact seen in
    a. MR angiography
    b. Dynamic MRI of joint
    c. MR arthrography
    d. MRI of hip implants
88. Which of the following is a fat suppression technique in MRI
    a. TRICKS
    b. DIXON
    c. MEDIC
    d. TOF
89. 'Image gently 'is related with
    a. Reducing contrast drug reaction
    b. Reducing radiation in CT
    c. Reducing metal artifacts in MRI
    d. Reducing the Mechanical index of ultrasound in imaging
90. MARS is a technique used in MRI for
    a. Auto acquisition of MR images
    b. Imaging in implants
    c. Imaging of lungs
    d. Imaging of cartilage

91. Selective tin filter is used in
    a. High KVP technique
    b. Grid controlled x-ray tubes
    c. Dual energy CT
    d. Mammography

92. If the rotation time (TI) of a dual source detector is 280 ms . Then the temporal resolution of the scanner if using 180 interpolation algorithm will be
    a. 280ms
    b. 140ms
    c. 70 ms
    d. 560ms

93. Minimum intensity projection is used to view
    a. Aortic vessels
    b. Brain parenchyma
    c. Trachea
    d. Liver mass

94. The addition of thorium to tungsten filament
    a. Increases filament life
    b. Decreases the space charge effect
    c. Reduces the saturation current
    d. Decreases efficiency of thermionic emission

95. Exposure to ionizing radiation can be limited by
    a. Use of shielding
    b. Decreasing distance from source
    c. Increasing exposure time
    d. All of the above

96. Swimmers view is used in radiographs of
    a. Cervical spine
    b. Shoulder
    c. Hip joint
    d. Sacroiliac joint

97. TLD is used for
    a. Exposure control
    b. Improving image latitude
    c. Radiation protection
    d. Radiation monitoring

98. Usual Kvp used in x-ray for Conventional screen film radiography of Chest PA view is system is around

a. 50 kVp
b. 80 kVp
c. 100 kVp
d. 120 Kvp

99. The regulator of radiation protection in India is

a. ICMR
b. AERB
c. NCRP
d. IAEA

100. Judet view is used in radiography of

a. Cervical spine
b. Hip joint
c. Pelvis
d. Knee joint

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ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2024

Program: **Diploma in advanced Medical Imaging and Technology**

Answer Key

Question No.	Correct answer	Question No.	Correct answer	Question No.	Correct answer
1.	C	38.	B	75.	B
2.	D	39.	A	76.	C
3.	A	40.	C	77.	D
4.	B	41.	A	78.	D
5.	B	42.	D	79.	C
6.	B	43.	A	80.	C
7.	C	44.	D	81.	A
8.	D	45.	C	82.	C
9.	D	46.	B	83.	C
10.	C	47.	A	84.	B
11.	B	48.	B	85.	A
12.	B	49.	D	86.	D
13.	A	50.	C	87.	A
14.	C	51.	B	88.	B
15.	B	52.	B	89.	B
16.	A	53.	C	90.	B
17.	D	54.	B	91.	C
18.	C	55.	A	92.	C
19.	C	56.	D	93.	C
20.	C	57.	B	94.	A
21.	B	58.	D	95.	A
22.	D	59.	D	96.	A
23.	A	60.	A	97.	D
24.	D	61.	D	98.	A
25.	C	62.	B	99.	B
26.	C	63.	D	100.	C
27.	D	64.	A		
28.	D	65.	A		
29.	A	66.	C		
30.	A	67.	D		
31.	A	68.	B		
32.	C	69.	A		
33.	A	70.	D		
34.	A	71.	C		
35.	C	72.	B		
36.	B	73.	B		
37.	D	74.	B		