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(एक राष्ट्रीय महत्व का संस्थान, विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार)  
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## ENTRANCE EXAMINATION - ACADEMIC SESSION JANUARY 2025

Program: PG 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	The basic requirements for construction of room for a CT machine is formulated based on	
	a	AERB guidelines
	b	BARC guidelines
	c	SCCT guidelines
	d	ISRT guidelines
2	In which year was Wilhelm Conrad Roentgen awarded Nobel prize for discovering 'X' rays	
	a	1895
	b	1896
	c	1900
	d	1901
3	Which of the following factors primarily affects the spatial resolution in a CT scan?	
	a	Tube voltage (kVp)
	b	Rows of detectors
	c	Patient size
	d	Contrast agent used
4	Which of the following is the principal risk of using intravenous contrast in CT?	
	a	Claustrophobia
	b	Nephrotoxicity
	c	Pulmonary embolism
	d	Radiation exposure
5	Which type of artifact occurs when metallic objects are present in the scan field during a CT scan?	
	a	Ring artifact
	b	Motion artifact
	c	Beam Hardening artefact
	d	Metal artifact
6	In CT imaging, what is the significance of the Hounsfield Unit (HU)?	
	a	Measures image noise
	b	Quantifies tissue density
	c	Determines scan speed
	d	Represents spatial resolution



7	What is the typical CT dose index (CTDI) used to measure?
	a Image sharpness
	b Radiation dose to the patient
	c Contrast enhancement
	d Maximum Kvp
8	In a CT scan, what is HU value of CSF near to
	a -40
	b 65
	c 0
	d 1000
9	What element is primarily responsible for the MRI signal?
	a Carbon
	b Hydrogen
	c Oxygen
	d Sodium
10	In MRI, what does T1 relaxation refer to?
	a Spin-lattice relaxation
	b Spin-spin relaxation
	c Magnetic susceptibility
	d Image resolution
11	What is the role of gadolinium contrast in MRI?
	a To reduce scan time
	b To increase tissue contrast
	c To protect patients from radiation
	d To increase magnetic field strength
12	Which pulse sequence is most used to suppress fat signal in MRI?
	a Gradient echo
	b Spin echo
	c Inversion recovery
	d Fast spin echo
13	Which of the following types of MRI is most useful for visualizing fluid-filled spaces like the ventricles of the brain?
	a T1-weighted
	b T2-weighted
	c Diffusion-weighted imaging (DWI)
	d Proton density
14	Which of the following MRI sequences is best for detecting small areas of acute stroke from chronic ischemia?
	a T1-weighted
	b T2-weighted
	c Diffusion-weighted imaging (DWI)
	d Gradient echo
15	What is the role of the radiofrequency (RF) pulse in MRI?
	a It generates the magnetic field
	b It excites hydrogen protons
	c It creates a signal from tissue interfaces
	d It enhances tissue density contrast
16	Which of the following is a common indication for using DSA?
	a Brain tumour imaging
	b Pulmonary embolism
	c Vascular stenosis or occlusion



	d	Bone fractures
17		Which vessel is typically looked in cerebral angiography during DSA?
	a	Carotid artery
	b	Femoral artery
	c	Brachial artery
	d	Radial artery
18		What is the purpose of using a subtraction technique in DSA?
	a	To reduce the radiation dose
	b	To enhance vessel contrast
	c	To remove bone and tissue structures from the image
	d	To speed up the procedure
19		Which contrast medium is typically used in DSA procedures?
	a	Gadolinium
	b	Iodinated contrast
	c	Barium sulfate
	d	Saline
20		What type of radiation is used in DSA?
	a	Radiofrequency
	b	Gamma rays
	c	X-rays
	d	Alpha particles
21		What technology is integrated into modern DSA to minimize radiation exposure?
	a	Grid-controlled X-ray tubes
	b	Adaptive collimation
	c	Flat-panel detectors
	d	Magnetic shielding
22		Which of the following tissues appears darkest on a conventional X-ray image?
	a	Bone
	b	Air
	c	Muscle
	d	Fat
23		What is the purpose of using a grid in X-ray imaging?
	a	To magnify the image
	b	To increase contrast by reducing scattered radiation
	c	To enhance spatial resolution
	d	To reduce the radiation dose
24		Which of the following factors directly affects the contrast in an X-ray image?
	a	kVp (kilovoltage peak)
	b	mAs (milliampere-seconds)
	c	Tube current
	d	Focal spot size
25		Which of the following is a common method of reducing patient dose in X-ray imaging?
	a	Increasing the exposure time
	b	Using a higher kVp and lower mAs
	c	Using a lower kVp and higher mAs
	d	Increasing the source-to-image distance (SID)
26		Which of the following materials is commonly used as a filter in Mammogram X-ray tube?
	a	Copper
	b	Molybdenum
	c	Lead
	d	Tungsten



27	What does the “mAs” setting on an X-ray machine control?
a	The quality of the X-ray beam
b	The duration of the exposure and the quantity of radiation produced
c	The energy of the X-ray beam
d	The patient positioning
28	Which imaging modality is commonly combined with X-rays to provide real-time moving images during procedures?
a	MRI
b	CT
c	Ultrasound
d	Fluoroscopy
29	What is ALARA, a principle in radiology, stand for?
a	As Long As Radiation is Applicable
b	As Low As Reasonably Achievable
c	All Levels Are Radiation Approved
d	As Low As Radiation Allowed
30	In diagnostic imaging, what is the purpose of collimation?
a	To increase the field of view
b	To reduce patient movement
c	To limit the X-ray beam to the area of interest
d	To adjust contrast
31	What is the recommended method to reduce radiation dose for pediatric patients in radiology?
a	Increase mAs and reduce kVp
b	Use lead shielding and adjust exposure parameters
c	Increase exposure time
d	Use higher doses of contrast agents
32	Which of the following methods is used to prevent scatter radiation from reaching the X-ray detector?
a	Collimation
b	Filtration
c	Air Gap
d	Contrast agents
33	What is the primary risk of repeated exposure to ionizing radiation in radiology?
a	Fatigue
b	Infection
c	Increased risk of cancer
d	Loss of contrast sensitivity
34	Which artery is not connected to heart directly?
a	Aorta
b	Pulmonary artery
c	Coronary artery
d	Renal artery
35	STIR is a sequence which uses
a	Echoplanar imaging
b	Gradient echo
c	Inversion recovery
d	Spin echo
36	Ventilation perfusion images are used in
a	Spleen imaging
b	Cardiac imaging

	c	Lung imaging
	d	Vessel imaging
37	Which of the following image matrix sizes will result in the poor resolution?	
	a	128 × 128
	b	512 × 512
	c	1024 × 1024
	d	2048 × 2048
38	The centering of a routine chest PA view is at	
	a	Shoulder
	b	Inferior scapula
	c	Umbilicus
	d	Iliac crest
39	MIP is used for	
	a	Radiation dose modulation
	b	Collimation
	c	Post processing
	d	Dose calculation
40	Which of the following devices is unsafe inside an MRI?	
	a	Knee Joint Implant
	b	Metallic ocular foreign body
	c	Coronary stent
	d	Peripheral arterial stent
41	What is the structure of the iso-osmolar contrast agent “iohexol”	
	a	Ionic monomer
	b	Nonionic monomer
	c	Ionic dimer
	d	Nonionic dimer
42	CT calcium scoring is commonly used for identifying	
	a	Carotid stenosis
	b	Coronary artery lesions
	c	Liver Tumors
	d	Mediastinal Tumors
43	Which is CT artefact?	
	a	Zipper artefact
	b	Truncation artefact
	c	Chemical shift artefact
	d	Stair Step artefact
44	The first modality routinely done to detect intracranial bleed is	
	a	Plain CT
	b	MRI
	c	DSA
	d	Xray
45	Tin filters are used in	
	a	CT
	b	MRI
	c	DSA
	d	Mammography
46	‘Safety Zone’ is used in safety of	
	a	MRI
	b	CT



	c	DSA
	d	Mammography
47	In T2W images we use	
	a	Long TR/Short TE
	b	Long TR/Long TE
	c	Short TR /Short TE
	d	Short TR/ Long TE
48	Last image hold is used in	
	a	MRI
	b	CT
	c	DSA
	d	Ultrasound
49	The regulation of radiation protection in India is done by	
	a	ICMR
	b	AERB
	c	NCRP
	d	IAEA
50	kVp used in chest radiograph PA view in digital radiography is	
	a	40
	b	60
	c	100
	d	120
51	Which of the following is a fat suppression technique in MRI	
	a	TRANCE
	b	MEDIC
	c	STIR
	d	TOF
52	Which of the following is associated with MR contrast agents made of gadolinium?	
	a	Contrast induced nephropathy
	b	Nephrogenic systemic fibrosis
	c	Pulmonary fibrosis
	d	All the above
53	Which standard is used for handling, storing, printing, and transmitting information in medical imaging?	
	a	DICOM
	b	HL7
	c	SNOWMED
	d	HTML
54	Thermoluminescence method is used for	
	a	Exposure control
	b	Improving image quality
	c	Radiation monitoring
	d	Radiation protection
55	Grid controlled X-ray tubes is used for	
	a	Reducing scatter
	b	Improving beam penetration

	c	Intermittent fluoroscopy
	d	Reducing FOV
56		Judets view is used in radiography of
	a	Hip
	b	Shoulder
	c	Ankle
	d	Orbit
57		Enteroclysis is used to examine
	a	Ear
	b	Bowel
	c	Brain
	d	Lungs
58		The source to detector distance in Chest radiography PA view is
	a	100cm
	b	180 cm
	c	200 cm
	d	360 cm
59		Collimators are used to
	a	Reduce the radiation beam spread
	b	Increase the film latitude
	c	Decrease the film latitude
	d	For intermittent fluoroscopy
60		Pitch of CT scanner in step and shoot technique is
	a	0
	b	0.5
	c	1
	d	2
61		SWI sequence is used to detect
	a	Bleed
	b	Calcification
	c	Clot in vessel
	d	All of the above
62		AEC is used in radiography to
	a	Reduce the image noise
	b	Collimate the beam
	c	Reduce patient dose
	d	Reduce the time of scan
63		Double contrast barium is used in examination of
	a	Colon
	b	Stomach
	c	Oesophagus
	d	All of the above
64		The most common vessel accessed for angiography is
	a	Tibial
	b	Femoral
	c	Ulnar
	d	Carotid
65		Skyline view is used in evaluation of
	a	Patella
	b	Fabella
	c	Mandible



	d	Maxilla
66		Piezoelectric effect is used in
	a	USG
	b	MRI
	c	CT
	d	DSA
67		Late gadolinium sequence is used in
	a	MRI
	b	CT
	c	DSA
	d	Mammography
68		Which among the following is false?
	a	X rays are like photons
	b	Alpha particles are essentially Hydrogen nuclei
	c	Beta particles are like electrons
	d	Gamma rays are like photons
69		In the X Ray tube, electrons from cathode are emitted by the process of
	a	Compton Effect
	b	Thermionic emission
	c	Photoelectric effect
	d	Magnetohydrodynamic effect
70		X ray tube anode is made of which material
	a	Nickel Cadmium alloy
	b	Cadmium
	c	Aluminium
	d	Tungsten
71		Cystogram refers to contrast radiography of which structure
	a	Urethra
	b	Urinary bladder
	c	Gall bladder
	d	Anorectal fistula
72		Plain radiography of lower limb in adduction means
	a	Externally rotated
	b	Limb is moved away from centre of body
	c	Positioned neutrally
	d	Limb is moved towards centre of body
73		Dysprosium is an element used in which of the following
	a	CR cassette
	b	Developer solution
	c	TLD
	d	Mammography x ray tube
74		Isotopes of an element differ in their
	a	Atomic weight
	b	Atomic number
	c	Electron number
	d	Charge
75		Which is true regarding ultrasonography
	a	Higher wavelength results in deeper penetration
	b	Probes work on the principle of Bernoulli effect
	c	Higher frequency probes result in better resolution
	d	Higher frequency probes give more deeper penetration



76	DICOM stands for
a	Digital imaging and connections in medicine
b	Digital Images and connections in medicine
c	Direct Information and communications in medicine
d	Digital Imaging and communications in medicine
77	Orthopantomogram is used in evaluation of
a	Jaw lesions
b	Frontal sinus
c	Single tooth
d	Nasal bone
78	Largest sesamoid bone in the human body is
a	Talus
b	Patella
c	Scaphoid
d	Femur
79	Sialography is radiological evaluation of
a	Sylvian fissure
b	Salivary gland
c	Swallowing
d	Sternum
80	What is the atomic number of Gadolinium
a	34
b	108
c	64
d	42
81	Who among the following won the Nobel prize for developing the MR principle
a	Roentgen
b	Hounsfield
c	Mansfield
d	Gruntzig
82	Which is a Stochastic effect of radiation
a	Cancers
b	Skin burns
c	Hair loss
d	Cataracts
83	Which is the investigation of choice to diagnose pulmonary embolism
a	X Ray
b	Ultrasound
c	MRI
d	CT
84	Which of the following modalities has poor anatomical information?
a	CT
b	MRI
c	X Ray
d	Scintigraphy
85	Effective dose unit is
a	Curie
b	Joules/kg
c	Sievert
d	Coulomb



86	In acute infarct in brain MRI, DWI shows	
	a	Facilitation
	b	Restriction
	c	Hypo intensity
	d	T2 shine through
87	In MRI, CSF is usually	
	a	T1 Bright , T2 Bright
	b	T1 Bright , T2 Dark
	c	T1 Dark , T2 Dark
	d	T1 Dark , T2 bright
88	DSA is based on the basic principle of	
	a	Fluoroscopy
	b	Scintigraphy
	c	MR
	d	CT
89	Stryker view is for	
	a	Wrist
	b	Shoulder
	c	Elbow
	d	Clavicle
90	Contrast radiography study for Posterior Urethral Valve	
	a	IVP
	b	RGU
	c	MCU
	d	Barium Swallow
91	Ring artefact in CT is due to	
	a	Metallic objects
	b	Motion artefact
	c	Tube miscalibration
	d	Detector issue
92	Low KVp X rays are used for the purpose of	
	a	Increasing contrast
	b	Increasing patient exposure
	c	Increasing penetration
	d	Increasing acquisition time
93	Lead Free Apron for radiation protection are made of all except	
	a	Antimony
	b	Bismuth
	c	Barium
	d	Beryllium
94	Developer solution in X ray development contains	
	a	Hydrogen sulphide
	b	N methyl amino phenol sulphate
	c	Barium
	d	Sodium hypochlorite
95	Which of the following artifacts is seen in Cardiac MRI	
	a	Aliasing
	b	Beam hardening
	c	Ring artefact
	d	Photon starvation



96	Temperature of liquid helium is	
	a	0 K
	b	200 K
	c	200 C
	d	4 K
97	Ultrasound refers to frequencies above	
	a	2 KHz
	b	20 KHz
	c	20000 KHz
	d	200 Hz
98	Which is an MR contrast agent	
	a	Sonovue
	b	SPIO
	c	Iohexol
	d	Omnipaque
99	All are ultrasound artefacts except	
	a	Wrap around
	b	Comet tail
	c	Twinkling
	d	Speckle
100	The superconducting magnet in most MR scanners is made of usually	
	a	Nickel and Copper
	b	Niobium and Copper
	c	Niobium and Titanium
	d	Niobium and Nickel



