Q=QUESTION A=ANSWER	question_description answer_description	question_explanation answer_explanation	question_type answer_isright	question_difficulty answer_position
Q	What are isomers?		M	1
A	Excited state of a nuclide		1	1
A	Nuclides having the same number of protons		0	2
A	Nuclides having the same atomic mass		0	3
A	Nuclides having the same number of neutron		0	4
Q	When two light nuclei combine to form a heavier nucleus, the process is called as		M	1
A	nuclear fusion		1	1
A	nuclear fission		0	2
A	nuclear power		0	3
A	nuclear transmutation		0	4
Q	In SI base units, 1 Bq is equal to		M	1
A	0.5 disintegration per second		0	1
A	1 disintegration per second		1	2
A	10 disintegration per second		0	3
A	1.5 disintegration per second		0	4
Q	In air, alpha particles have range of		M	1
A	several thousand meters		0	1
A	several hundred meters		0	2
A	few centimeters		1	3
A	several meters		0	4
Q	The fast-moving photons are		M	1
A	alpha radiation		0	1
A	beta radiations		0	2
A	gamma radiation		1	3
A	no radiation		0	4
Q	What are radionuclides?		M	1
A	unstable nuclides		1	1
A	seminuclides		0	2
A	neutral nuclides		0	3
A	stable nuclide		0	4
Q	A process in which heavy nucleus splits into two by bombarding a slow-moving neutron is called		M	1
A	radioactivity		0	1
A	nuclear fusion		0	2

A	nuclear fission			1	3
A	nuclear splitting			0	4
Q	Nuclei bombarded with protons, neutron or alpha particles are changed to		M		1
A	stable nuclide			0	1
A	radioisotopes			1	2
A	element having atomic number less than 82			0	3
A	seminuclides			0	4
Q	Which is a cyclotron produced radionuclide		M		1
A	Fluorine-18			1	1
A	Chromium-51			0	2
A	Molybdenum-99			0	3
A	Xenon-133			0	4
Q	Excited state of a nuclide is _____		M		1
A	isotones			0	1
A	isobars			0	2
A	isotopes			0	3
A	isomers			1	4
Q	The minimum amount of energy necessary to free an electron from an atom is ____ energy of the electron in that atom		M		1
A	potential			0	1
A	kinetic			0	2
A	binding			1	3
A	passive			0	4
Q	During alpha decay the atomic number of the resulting nuclide (daughter nuclide) will be_____		M		1
A	reduced by 4			0	1
A	reduced by 2			1	2
A	increased by 1			0	3
A	reduced by 1			0	4
Q	When the electron absorbs an amount of energy that is just sufficient to move it into a higher unoccupied shell, the process is known as _____		M		1
A	excitation			1	1
A	calibration			0	2
A	radiation			0	3
A	ionization			0	4
Q	1 Becquerel (Bq) corresponds to _____		M		1

A	37 kCi			0	1
A	27.03 pCi			1	2
A	2.7 kCi			0	3
A	37 Ci			0	4
Q	Energy emitted from the nucleus as a high-energy photon is known as _____		M		1
A	X- ray			0	1
A	Beta emission			0	2
A	Gamma ray			1	3
A	Alpha emission			0	4
Q	____ is the reactor produced radionuclide		M		1
A	Fluorine-18			0	1
A	Molybdenum-99			1	2
A	Oxygen-15			0	3
A	Nitrogen-13			0	4
Q	_____ dominates in low atomic number materials such as soft tissue and bone above 100 kev		M		1
A	Compton interaction			1	1
A	Photoelectric interaction			0	2
A	Pair production			0	3
A	Electron capture			0	4
Q	The transient equilibrium occurs if _____		M		1
A	parent and daughter radionuclide half life differs by a factor of about 10–50			1	1
A	parent and daughter radionuclide half life differs by a factor of 100			0	2
A	parent and daughter radionuclide half life is equal			0	3
A	parent radionuclide half life is less than daughter radionuclide half life			0	4
Q	During beta minus (β−) decay the atomic mass number (A) ____		M		1
A	increased by one			0	1
A	decreased by one			0	2
A	remains unchanged			1	3
A	decreased by two			0	4
Q	The probability of photoelectric interaction is _____-		M		1
A	inversely proportional to the cube of γ-ray energy			1	1
A	directly proportional to the cube of γ-ray energy			0	2
A	inversely proportional to the square of γ-ray energy			0	3
A	directly proportional to the square of γ-ray energy			0	4
Q	A moderator is used in nuclear reactor to slow___		M		1
A	protons			0	1

A	alpha particles			0	2
A	neutrons			1	3
A	beta particles			0	4
Q	the kinetic energy of the alpha particle emitted during Rn-222 alpha decay is ____		M		1
A	4.78 MeV			1	1
A	4.78 kev			0	2
A	2keV			0	3
A	15 MeV			0	4
Q	An alpha particle is also known as		M		1
A	a photon			0	1
A	a positron			0	2
A	an electron			0	3
A	a helium nucleus			1	4
Q	Gamma-ray have _____		M		1
A	no mass and no electric charge			1	1
A	no mass and an electric charge of +2			0	2
A	no mass and an electric charge of -1			0	3
A	no mass and an electric charge of +1			0	4
Q	In the symbol Tc-99, the number 99 represents		M		1
A	the number of electrons			0	1
A	Avogadro's number			0	2
A	the atomic number			0	3
A	the atomic mass number			1	4
Q	For Bone pain palliation ____ is used commonly.		M		1
A	strontium-89			1	1
A	Tc-99m			0	2
A	Yttrium-90			0	3
A	I - 131			0	4
Q	Radionuclides that emit _____ are preferred for the treatment of bulky tumours		M		1
A	γ-radiation			0	1
A	energetic α- or β-particles			1	2
A	X-rays			0	3
A	Auger electrons			0	4
Q	Photon energy of _____ is release from the radiation source used in Cobalt teletherapy unit		M		1
A	1 keV			0	1
A	1.17 or 1.33 MeV			1	2

A	50 keV			0	3
A	100 keV			0	4
Q	Cobalt unit is used to treat ___		M		1
A	coronary blockages			0	1
A	pneumonia			0	2
A	ulcers			0	3
A	Cancers			1	4
Q	Gamma Knife is used to manage___		M		1
A	pneumonia			0	1
A	brain tumours			1	2
A	ulcers			0	3
A	infections			0	4
Q	Cobalt therapy uses ___ from the radioisotope cobalt-60.		M		1
A	alpha particles			0	1
A	delta rays			0	2
A	gamma rays			1	3
A	x-rays			0	4
Q	Effective half life of ideal radiopharmaceutical		M		1
A	20*test duration			0	1
A	1.5*test duration			1	2
A	10*test duration			0	3
A	30*test duration			0	4
Q	Compare to following four , Who is more susceptible to injurious radiation effects?		M		1
A	Children			0	1
A	Adult			0	2
A	Fetus			1	3
A	senior citizen			0	4
Q	Acute effects generally appears within following days of exposure to radiations		M		1
A	90 days			0	1
A	120 days			0	2
A	150 days			0	3
A	60 days			1	4
Q	1µCi*hr cumulated activity in MIRD is equivalent to		M		1
A	1.332 × 10^2 MBq *sec			1	1
A	1.332 × 10^3 MBq *sec			0	2
A	1.332 × 10^5 MBq *sec			0	3

A	1.332 × 10^4 MBq *sec			0	4
Q	Which is more damaging in absorbed dose?		M		1
A	Gamma radiations			1	1
A	Alpha particle			0	2
A	Beta+ particle			0	3
A	Beta - particle			0	4
Q	External radiations exposure to body is increased by		M		1
A	Increase the distance from the source			0	1
A	Decrease the time of exposure			0	2
A	Use shielding between yourself and the source			0	3
A	Decreasing your distance from the source			1	4
Q	What is the cumulated activity in the liver for an injection of 100 MBq of a 99mTc-labeled sulfur colloid, assuming that 60% of the injected colloid is trapped by the liver and retained there indefinitely? (Half life of 99mTc= 6 hours)		M		1
A	5.18 MBq*hr			0	1
A	5184 MBq*hr			0	2
A	51.84 MBq*hr			0	3
A	518.4 MBq*hr			1	4
Q	Material used in TLD chip for detection of radiations		M		1
A	Lithium Fluoride			1	1
A	Sodium chloride			0	2
A	calcium carbonate			0	3
A	cadmium sulphate			0	4
Q	Calculate the radiation dose to spleen (sp) to an average adult male for an injection of 100MBq of 99mTc sulfur colloid. Assume that 30% of the activity is trapped by spleen (SP) with instantaneous uptake and no biologic excretion. (Half life of 99mTc= 6 hours)		M		1
A	9.33 *10^5 MBq.Sec			1	1
A	933 *10^5 MBq.Sec			0	2
A	93.3 *10^5 MBq.Sec			0	3
A	0.933 *10^5 MBq.Sec			0	4
Q	Biological effects such as Chromosomal aberrations and mutations occurs at following level		M		1
A	Cell			1	1
A	Tissue			0	2
A	Organ			0	3

A	Whole body			0	4
Q	Amount of dose required to reduction in fertility in male is		M		1
A	3-4 Gy			1	1
A	3-4 mGy			0	2
A	0.3 - 0.4 Gy			0	3
A	0.3 - 0.4 mGy			0	4
Q	Amount of dose required to cause Epilation		M		1
A	0.1-0.2 mGy			0	1
A	0.1-0.2 Gy			0	2
A	2-6 mGy			0	3
A	2-6 Gy			1	4
Q	The air kerma rate at 10-cm distance from a syringe containing 1GBq of 99mTc. (air kerma rate constant Γ is 0.0141 mGy • m2/GBq • hr)		M		1
A	14.1 mGy/hr			0	1
A	1.41 mGy/hr			1	2
A	141 mGy/hr			0	3
A	1410 mGy/hr			0	4
Q	99mTc-DTPA is commonly used in		M		1
A	Bone scans			0	1
A	Renal function			1	2
A	Myocardial perfusion			0	3
A	Cerebral perfusion			0	4
Q	Which is mechanism of localization for Bone scanning with 99mTc-labeled phosphate compound?		M		1
A	antibody-antigen			0	1
A	Simple exchange or diffusion			1	2
A	Cell sequestration			0	3
A	Receptor binding			0	4
Q	Which of the given option is inappropriate Radiation effect on Oral Tissues?		M		1
A	jaw osteoradionecrosis			0	1
A	Xerostomia			0	2
A	Sterility			1	3
A	Mucositis			0	4
Q	Time involved in radiation damage of alterations of biologically important molecules		M		1
A	micro second			0	1
A	upto millisecond			0	2
A	seconds to hours			1	3

A	hours to years			0	4
Q	For a dual head gamma camera two simultaneous image can be acquired at an angle of		M		1
A	90°			0	1
A	120°			0	2
A	180°			1	3
A	270°			0	4
Q	What does the ‘P’ in PET stand for?		M		1
A	Positron			1	1
A	Photon			0	2
A	Proton			0	3
A	P-orbital			0	4
Q	What makes PET and SPECT so unique when it comes to nuclear imaging?		M		1
A	Do not require dyes			0	1
A	Do not require X – Rays			0	2
A	They show the metabolic functions			1	3
A	They give more details about the imaged organ/tissue			0	4
Q	The most preferred radioisotope element for SPECT is		M		1
A	Mo			0	1
A	W			0	2
A	Tc			1	3
A	Ba			0	4
Q	As compared to PET, SPECT isotopes have _____ half life.		M		1
A	Longer			1	1
A	Shorter			0	2
A	Equivalent			0	3
A	Unstable			0	4
Q	The detector of PET is made of _____		M		1
A	Silver			0	1
A	Bismuth Germinate			1	2
A	Tungsten			0	3
A	Lead			0	4
Q	Which of the following radiations are used for imaging purposes?		M		1
A	Alpha			0	1
A	Beta			0	2
A	Gamma			1	3
A	Delta			0	4

Q	If a PET scan is being used to detect tumors, an important constituent of the injected radioligand will be _____		M		1
A	glucose			1	1
A	lipids			0	2
A	keratin			0	3
A	riboflavin			0	4
Q	PET-CT hybrid imaging provides		M		1
A	Only Anatomical information of tissues			0	1
A	Only Physiological information of tissues			0	2
A	Both Anatomical and Physiological information of tissues			1	3
A	None of Anatomical and Physiological information of tissues			0	4
Q	PET-CT hybrid imaging is most commonly used for detection of		M		1
A	Cancer			1	1
A	Bone fracture			0	2
A	Blockages in Blood vessels			0	3
A	Kidney stone			0	4
Q	In SPECT, Projections are acquired at defined points during the rotation, typically every		M		1
A	3–6 degrees			1	1
A	10–12 degrees			0	2
A	16–18 degrees			0	3
A	20–22degrees			0	4
Q	Which type of collimator used in SPECT?		M		1
A	Focusing			0	1
A	Diverging			0	2
A	Inverging			0	3
A	Parallel hole			1	4
Q	In SPECT following isotope used for Thyroid examination		M		1
A	iodine-131			1	1
A	indium-111			0	2
A	thallium-201			0	3
A	technetium-99m			0	4
Q	When both photons from an annihilation event are detected by detectors in coincidence is called as		M		1
A	Random coincidence			0	1
A	Scatter coincidence			0	2
A	True coincidence			1	3
A	False coincidence			0	4

Q	Half life of O-15 isotope use in PET is		M		1
A	51 sec			0	1
A	122 sec			1	2
A	244 sec			0	3
A	488 sec			0	4
Q	Half life of C-11 isotope use in PET is		M		1
A	5 mins			0	1
A	10 mins			0	2
A	15 mins			0	3
A	20 mins			1	4
Q	Which scanner has detectors in the form ring around the patient?		M		1
A	PET			1	1
A	SPECT			0	2
A	Gamma Camera			0	3
A	Rectilinear Scanner			0	4
Q	Which of these materials have got lowest density		M		1
A	Air			1	1
A	Si(Li)			0	2
A	Ge(Li)			0	3
A	CdTe			0	4
Q	Identify the detector which has got poor energy resolution		M		1
A	Ionization Chamber			1	1
A	Si detector			0	2
A	Ge detector			0	3
A	NaI(TI) Counter			0	4
Q	For any detector the size of electrical signal is proportional to		M		1
A	amount of radiation deposited			1	1
A	detector construction			0	2
A	detector size			0	3
A	detector cost			0	4
Q	How electron traps can be avoided in semiconductor detectors		M		1
A	Addition of impurity atoms(ex. Li)			1	1
A	Operating detector at low temperatures			0	2
A	Reducing the size of the detector			0	3
A	Increasing the size of the detector			0	4
Q	In RIA a known quantity of antigen is made radioactive by		M		1
A	Labelling with Radioactive isotopes			1	1
A	Fusion process in cyclotron			0	2

A	Mixing with neutron rich element			0	3
A	Nuclear Fission			0	4
Q	IN RIA To separate Free Antigens from Antigen-Antibody complex, which of this techniques is irrelevant		M		1
A	Electroporation			1	1
A	Electrophoresis			0	2
A	Chromatography			0	3
A	Ultracentrifugation			0	4
Q	RIA technqiue is used for		M		1
A	measuring concentration of antibodies			0	1
A	measuring concentration of antigens			1	2
A	finding spectrum of radioactive material			0	3
A	detection in gamma ray			0	4
Q	What is the major problem in working with RIA Technique		M		1
A	Process is complicated			0	1
A	Skilled manpower is required			0	2
A	Risk of handling radioactive antigens			1	3
A	RIA Technique is inefficient for detecting radioactivity			0	4
Q	What is Freunds Adjuvant used in RIA		M		1
A	Radioactive antigen			0	1
A	Radioactive antibody			0	2
A	Mixture of mineral oil, waxes, and killed bacilli			1	3
A	Liquid scintillator			0	4
Q	What is the effect of Ionization reaction in atoms		M		1
A	Results in formation of ion pairs			1	1
A	Makes atoms radioactive			0	2
A	Atoms become stable in nature			0	3
A	No change is seens in the atomic structure			0	4
Q	Which of the given operating mode is irrelevant for gas filled detectors		M		1
A	Ionization chamber			0	1
A	Proportional counter			0	2
A	GM counter			0	3
A	Quantum counter			1	4
Q	To use gas filled detector as Ionization chamber what should be typical voltage around the anode and cathode plates		M		1
A	voltage should be equal to saturation voltage (Vs)			0	1
A	voltage should be less than saturation voltage (Vs)			0	2
A	voltage should be greater than saturation voltage (Vs)			1	3

A	No voltage source is required			0	4
Q	In ionization chamber how much energy is expelled to produce one ion pair		M		1
A	1 eV			0	1
A	34 eV			1	2
A	100 eV			0	3
A	3400 eV			0	4
Q	What is special feature of a scintillator crystals		M		1
A	Generates equivalent voltage when stuck by light photons			0	1
A	Generates equivalent light photons when stuck by radiation			1	2
A	Can be used for detecting IR and UV Rays too			0	3
A	Work as an efficient temperature sensor			0	4
Q	Dynodes used in PMT are held at		M		1
A	Negative potential			0	1
A	Positive potential			1	2
A	Zero potential			0	3
A	Varying negative potential			0	4
Q	In scintillation detector instead of PMT which of this component can also be used to detect light photons		M		1
A	Si detector			0	1
A	GM Counter			0	2
A	Proportional counter			0	3
A	Si Photodiode			1	4
Q	What is density of NaI(Tl) crystals		M		1
A	1.03 g/cm3			0	1
A	3.67 g/cm3			1	2
A	4.51 g/cm3			0	3
A	7.13 g/cm3			0	4
Q	Density of which of these detector is much higher		M		1
A	Gas filled detector			0	1
A	Semiconductor detector			1	2
A	Scintillation detector			0	3
A	Quantum detectors			0	4
Q	Which is this is a semiconductor detector		M		1
A	NaI(Tl) Detector			0	1
A	BGO Detector			0	2
A	CsI(Tl) Detector			0	3
A	Si Detector			1	4

Q	For a semiconductor detector, to produce 1 ion pair how much energy is expelled		Q		1
A	1 eV			0	1
A	3-5 eV			1	2
A	30-50 eV			0	3
A	300-500 eV			0	4
Q	Which of this is a function of organic solvent in Liquid Scintillation Detector		M		1
A	Dissolves Scintillator material			1	1
A	Doesnot Dissolves Radioactive sample in it			0	2
A	Emits Radiation			0	3
A	Emits secondary ionization			0	4
Q	The fraction of the chemical present in the organ at any time is called as		M		1
A	Uptake of the organ			1	1
A	Intake of the organ			0	2
A	Chemical distribution			0	3
A	Effective concentration			0	4
Q	Which component is responsible for selecting a radioactive event based on its energy		M		1
A	NaI (TI) detector			0	1
A	Amplifier			0	2
A	Pulse Height Analyzer			1	3
A	Analog Ratemeter			0	4
Q	Half life of I-131 is		M		1
A	8.1 days			1	1
A	12 days			0	2
A	6 days			0	3
A	6 hours			0	4
Q	Who is credited for the invention of Gamma Camera		M		1
A	Benedict Cassen			0	1
A	Marie Currie			0	2
A	James Currie			0	3
A	Hal Anger			1	4
Q	What is the purpose of collimators in gamma camera		M		1
A	Absorption of scattered and randomly directed gamma photons			1	1
A	Transmission of gamma photons to NaI(TI) detectors			0	2
A	Conversion of gamma photons to electrical signal			0	3
A	Protect the patient from scattered radiations			0	4

Q	In gamma camera electrical signals from PM Tubes split into		M		1
A	X+, Y+ signal component			0	1
A	X, Y, Z, W signal component			0	2
A	X-, Y- signal component			0	3
A	X,Y, E signal Component			1	4
Q	What is the typical size of NaI(TI) detector used in gamma camera		M		1
A	60 X 40 mm			0	1
A	60 X 40 cm			1	2
A	6 X 4 mm			0	3
A	600 X 400 cm			0	4
Q	With increasing detector thickness in gamma camera, intrinsic spatial resolution _____		M		1
A	Decreases			1	1
A	Increases			0	2
A	Remains same			0	3
A	Becomes Uneven			0	4
Q	What is the reason for poor quality of Radionuclide Images in gamma camera		M		1
A	Inefficient detectors used in Gamma Camera			0	1
A	Potentially useful radiation travelling towards detector are absorbed by collimator			1	2
A	Low dose of Radionuclide given to patient			0	3
A	Inefficient Image Reconstruction Algorithm			0	4
Q	In an pinhole collimator, if we decrease the distance between object and the collimator aperture, image size		M		1
A	Decreases			0	1
A	Increases			1	2
A	Remains same			0	3
A	No image is available			0	4
Q	Diverging collimators gives what kind of image		M		1
A	Minified, Non Inverted			1	1
A	Same size, Non Inverted			0	2
A	Magnified, Inverted			0	3
A	Magnified, Non Inverted			0	4
Q	Which performance characteristic signifies sharpness and details of gamma camera images		M		1
A	Energy Resolution			0	1
A	Detection Efficiency			0	2
A	Intrinsic Spatial Resolution			1	3
A	High Counting Rates			0	4

Q	Higher detection efficiency will be obtained from which detector thickness		M		1
A	0.64 cm			0	1
A	1.27 cm			0	2
A	2.54 cm			0	3
A	5.08 cm			1	4
Q	In gamma camera the Z Signal from Amplifier/ADC represents		M		1
A	Horizontal position of radiation event			0	1
A	Vertical position of radiation event			0	2
A	Energy deposited by the gamma ray			1	3
A	Noise			0	4