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Sample Question Bank_Biomedical Microsystem

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Q1.	MCQ
1.	Following law is used for the study of miniaturization effect
Option A:	Scaling Law
Option B:	Newton's First Law
Option C:	Ohms Law
Option D:	Newton's Second Law
2.	Following is a cleaning technique used for Silicon in MEMS
Option A:	RCA
Option B:	Deposition
Option C:	Doping
Option D:	Lithography
3.	Following is a chemical deposition technique
Option A:	E beam evaporation
Option B:	Thermal evaporation
Option C:	Sputtering
Option D:	Electrochemical deposition
4.	Following is the deposition technique
Option A:	Thermal Evaporation
Option B:	Lithography
Option C:	RIE
Option D:	Doping
5.	Silicon dioxide deposited by the following MEMS process
Option A:	RIE
Option B:	CVD
Option C:	Spinning
Option D:	Ion Plantation
6.	Following microfabrication technique suitable for high aspect ratio structures
Option A:	Surface Micromachining
Option B:	Bulk Micromachining
Option C:	LIGA
Option D:	Micro-contact Printing
7.	Following is a flow technique used in µTAS
Option A:	RCA
Option B:	RIE
Option C:	Electroosmosis
Option D:	LIGA
8.	µTAS also known as _____
Option A:	MEMS pressure sensor
Option B:	chemical sensor
Option C:	Micro Total Analysis System
Option D:	chip for testing
9.	_____ biosensor uses the current as a base for analysis.

Option A:	Potentiometric
Option B:	Amperometric
Option C:	Impedimetric
Option D:	Fibre Optics
10.	Tiny MEMS structures are protected by following technique
Option A:	Cleaning
Option B:	LIGA
Option C:	Packaging
Option D:	Doping
11.	Following chemical is used in HNA
Option A:	Acetone
Option B:	Ethanol
Option C:	Nitric acid
Option D:	Isopropanol
12.	Immunosensors contains ____ as receptor molecules
Option A:	microorganisms
Option B:	ammonia
Option C:	antibodies
Option D:	organelles
13.	In bulk micromachining technique, the overall height of the microstructure is limited by the …… of silicon wafers
Option A:	Thickness
Option B:	Diameter
Option C:	Uniformity
Option D:	Roughness
14.	A change in electrical resistance of solids when subjected to stress is known as……
Option A:	piezoelectricity
Option B:	piezocrystal
Option C:	piezocapacitance
Option D:	Piezoresistance
15.	DRIE stands for
Option A:	deep reactive ion etching
Option B:	diode reactive ion etching
Option C:	deep regenerative ion etching
Option D:	deep reflective ion etching
16.	Following deposition method used for Silicon dioxide
Option A:	Spinning
Option B:	Spray
Option C:	Wet Oxidation
Option D:	Electroplating
17.	Replica molding can be used in _____
Option A:	photolithography
Option B:	electron beam lithography
Option C:	X- ray lithography
Option D:	soft lithography

18.	What is the full form of µTAS?
Option A:	Mini Thermal Analytical System
Option B:	Micro Total Analysis System
Option C:	Micro Transfer Analytical System
Option D:	Micro Total Analytics Signal
19.	The simplest amperometric biosensors for glucose detection involve _____
Option A:	pH electrode
Option B:	Clark oxygen electrode
Option C:	Carbon dioxide electrode
Option D:	copper electrode
20.	Wafer dicing means
Option A:	sawing the wafer
Option B:	printing the wafer
Option C:	implanting the wafer
Option D:	surface bonding
21.	Hard bake is used for
Option A:	removing pinholes
Option B:	etching
Option C:	deposition
Option D:	cleaning
22.	Which of the following are essential steps of LIGA
Option A:	Lithography, Electroplating, Molding
Option B:	Lamination, Galvanization, Adhesion
Option C:	Lithography, Stamping, Adhesion
Option D:	Lamination, Electroplating, Molding
23.	Which biosensor measures changes in light absorption
Option A:	Thermal Biosensors
Option B:	Colorimetric biosensors
Option C:	Calorimetric biosensors
Option D:	Magnetic Biosensors
24.	____ level is Level 1 of microsystems packaging
Option A:	Die
Option B:	Device
Option C:	System
Option D:	Card
25.	Common semiconductor used in MEMs devices
Option A:	Mica
Option B:	Arsenic
Option C:	Silicon
Option D:	Zinc
26.	Which plane has lowest etch rate?
Option A:	{1,1,0}
Option B:	{1,0,0}
Option C:	{1,1,1}
Option D:	All the above

27.	Which is most common material used as absorber?
Option A:	Au
Option B:	Ag
Option C:	PMMA
Option D:	PDMA
28.	Which of the following process is the subtractive process?
Option A:	CVD
Option B:	PVD
Option C:	Etching
Option D:	Oxidation
29.	Which of the following is not applicable principle in microfluidics?
Option A:	Electrophoresis
Option B:	Electroosmosis
Option C:	Turbulent flow
Option D:	Laminar flow
30	Most common material used for making P type semi conducting material
Option A:	Argon
Option B:	Boron
Option C:	Phosphorous
Option D:	Zinc

	Five Marks Questions
1	Brief silicon properties
2	List different silicon derivatives
3	Explain Biosensor with the help of block diagram
4	Explain Surface micromachining with the help of diagram
5	List different detection techniques & explain anyone technique in µTAS
6	What are the different MEMS packaging materials
7	Explain anyone Scaling law
8	Compare CVD & PVD
9	Classify different types of biosensors
10	Compare dry and wet etching
11	Compare MEMS and BioMEMS
12	Discuss scaling in fluid mechanics
13	Explain thermal evaporation technique.
14	Explain fabrication of any one type of Microchannels with suitable diagrams.
15	Explain SOI fabrication technique.

	Ten marks Questions
1	Explain Photolithography with suitable example
2	What is microneedles Explain IDD system with the help of diagram
3	Explain CZ method
4	What is µTAS? Explain with the help of block diagram
5	What is PVD? Explain any one system of PVD with the help of diagram
6	What is MEMS packaging? Explain anyone type of MEMS packaging technique
7	Explain wafer bonding techniques
8	Explain different polymer coating techniques
9	Explain the development stages of cantilever-based biosensor
10	Explain Reactive Ion etching process in detail
11	Discuss different levels of microsystem packaging
12	Differentiate between evaporations and sputtering
13	Discuss evaporation with neat diagram.
14	With neat diagrams explain LIGA.
15	With neat diagrams explain working and fabrication of any one type of micropump.

Hospital Management – Sem VIII – Question Bank,

AY - 2021-22, (R-2016)

Sample questions

Long Questions (5 Marks)

1. What are the theories of motivation? Explain any one of them
2. What are the skills performed by the manager, Explain in detail?
3. What is depreciation? what are the methods to calculate them?
4. Write short note on Time savers and Time wasters.
5. What are different types of hospital
6. What the functions of Governing Board?
7. What is the role of Civil Engineer in planning and building hospital?
8. Write short note on Role of Pharmacy department in the hospital.
9. Write short note on Hospital Security
10. Write short note on Hospital dietary services
11. Explain drainage of our patients in the hospital
12. What are the problems faced by OPD?
13. Write down the role of computers in Hospital.
14. How Security ensures minimum pilferages.
15. Write short note on HVAC
16. Write short note on centralized Medical Gas Systems
17. Write short note on Communication services in the hospital
18. Write short note on Hospital Infection control
19. What is inventory management? explain its importance
20. What are different types of costs involved in purchase
21. Write short note on functioning of store in the hospital.
22. How scrap material is disposed in the hospital
23. What are different types of Budgets.
24. What is CMC and PMC?

Long Questions (10 Marks)

1. Write in brief about theories of motivation. Discuss the approaches and techniques to enhance motivation among the staff working in a public hospital
2. What are the guiding principles in Planning hospital facilities and services?
3. Explain in detail Management structure and organization of the hospital
4. Explain Outpatient Department in detail with flow diagram
5. Draw layout and discuss about Radiology department
6. Draw layout and discuss about ICU/ICCU department
7. Draw layout and discuss about OT complex department
8. Draw layout and discuss about PT department
9. Draw layout and discuss about Nuclear Medicine department

10. What are different supportive services in the hospital and state how outsourcing helps to improve the services.
11. What are the roles and responsibilities of Biomedical Engineer in the hospital?
12. Explain preparation required for handling disaster
13. Explain important functions of civil and electrical department in hospital.
14. Explain importance of Hospital information system and clinical support system in hospital.
15. Explain in detail Purchase Procedure
16. Explain in detail Inventory control
17. Explain in detail Stores department with layout.

Multiple Choice Questions (02 Marks each))

Q.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	In an organization, if the Output is less than the Input, the Management techniques adopted is _____
Option A:	Insufficient
Option B:	Satisfactory
Option C:	Efficient
Option D:	Very Poor
2.	While managing a task, Hindsight is considered as _____
Option A:	4th Stage
Option B:	2nd Stage
Option C:	1st Stage
Option D:	3rd Stage
3.	Identify the types of Employees who are Intelligent, good by nature and experience and completes the task within the stipulated time
Option A:	Inefficient and Unwilling
Option B:	Inefficient and Willing
Option C:	Efficient and Unwilling
Option D:	Efficient and Willing
4.	Identify the remark which can match with Theory Y
Option A:	People do not like responsibility
Option B:	People view work as a Natural Activity
Option C:	People inherently dislike work
Option D:	Average employees want to be directed
5.	Identify the management skills needed for an organization
Option A:	Motivating People
Option B:	Intruding
Option C:	Sarcasm
Option D:	Harassment

6.	Governing board is the _____ authority in the hospital
Option A:	Individuals
Option B:	Partial
Option C:	Supreme
Option D:	Temporary
7.	Important function of governing board is to search and selection of
Option A:	Department head
Option B:	Biomedical engineer
Option C:	CEO
Option D:	Doctors
8.	Biomedical engineer will work under
Option A:	Vice president facilities and engineering
Option B:	Vice president hospital information system
Option C:	Vice president marketing and public relation
Option D:	Vice president human resource development
9.	CEO recommends charges for all
Option A:	Maintenance services
Option B:	Cleaning services
Option C:	Hospital services
Option D:	Lodging services
10.	Linen is soaked in _____ for disinfection before sending it to laundry
Option A:	Sodium Hypochlorite
Option B:	Potassium solution
Option C:	Diluted hydrochloric acid
Option D:	Detergent
11.	For easy access, Blood bank is located near _____
Option A:	Outpatient Department
Option B:	In Patient Department
Option C:	Operation Theatre
Option D:	Radiology Department
12.	In layout of ICU _____ room is kept reserve for infected patient
Option A:	Emergency room
Option B:	Isolation room
Option C:	Storage room
Option D:	Recovery room
13.	Space required for OPD is estimated as
Option A:	1/2 sq. Foot per 1 outpatient visit per year
Option B:	1 sq. Foot per 1 outpatient visit per year
Option C:	2 sq. Foot per 1 outpatient visit per year
Option D:	1.5 sq. Foot per 1 outpatient visit per year

14.	Organ imaging is carried out in _____ laboratory.
Option A:	Haematology
Option B:	Biochemistry
Option C:	Radio isotope
Option D:	Microbiology
15.	Qualification of laboratory technician should be
Option A:	DMLT
Option B:	DEE
Option C:	DME
Option D:	DCE
16.	Before finalizing the plan for Radiology, it is necessary to obtain clearance from ------
Option A:	BARC
Option B:	TIFR
Option C:	ICMR
Option D:	TISS
17.	Following beds are included in scheduled bed strength
Option A:	Beds in diagnostic department
Option B:	Beds in general ward
Option C:	Beds in recovery room
Option D:	Beds in emergency
18.	Quality control of drugs received by the hospital is carried out by _____ department
Option A:	Microbiology
Option B:	Pathology
Option C:	Pharmacy
Option D:	Biochemistry
19.	Biomedical Engineer carries out _____ to minimize the down time
Option A:	Routine Maintenance
Option B:	Preventive Maintenance
Option C:	Emergency Maintenance
Option D:	Break down Maintenance
20.	Type of contract covers Components and part of the machine
Option A:	Comprehensive Contract
Option B:	One time Contract
Option C:	Annual Contract
Option D:	Monthly Contract
21.	When an instrument is in working condition and a maintenance is performed, it can avoid unexpected breakdown. This is called as _____
Option A:	PMC

Option B:	AMC
Option C:	CMC
Option D:	NMC
22.	Biomedical Engineer prepares _____ to initiate the purchase procedure
Option A:	Comparative statement
Option B:	Installation routine
Option C:	Requisition form
Option D:	Purchase order
23.	Purchasing a new equipment against an old equipment from the same company
Option A:	Exchange
Option B:	Upgradation
Option C:	Buy back
Option D:	Interchange
24.	Human Anatomical Waste are collected in _---------- colored bag.
Option A:	Red
Option B:	Black
Option C:	Green
Option D:	Yellow
25.	The medical gases installed in the hospital include
Option A:	Oxygen, Nitrous oxide and medical air
Option B:	CO, CO2 and O2
Option C:	Nitrogen
Option D:	Cooled air
26.	Cytotoxic and expired drugs are disposed of by
Option A:	Dumping
Option B:	Autoclave
Option C:	Incineration
Option D:	Chemical disinfection
27.	The following services play an important role in infection control
Option A:	Security
Option B:	Dietary
Option C:	CSSD
Option D:	Pharmacy
28.	A scientific technique that plans and controls the flow of materials needed for a hospital from their initial purchase to destination is called _____
Option A:	HR Management
Option B:	Materials Management
Option C:	Finance Management
Option D:	Marketing Management

29.	In ABC analysis, A corresponds to _____
Option A:	High level and very expensive items
Option B:	Expensive items
Option C:	Inexpensive items
Option D:	Poor quality items
30.	VED Analysis emphasis the _____ of an item in a hospital.
Option A:	Availability
Option B:	Criticality
Option C:	Absence
Option D:	Functionality

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Sample Question Bank-Health Care Informatics

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	A service-requesting AE is viewed as an _____, and a service providing AE is viewed as an _____
Option A:	SCP,SCU
Option B:	SCU, SCP
Option C:	SOP, SCP
Option D:	SCU, SOP
2.	Total No of VR in DICOM are
Option A:	27
Option B:	More than 2000
Option C:	200
Option D:	50
3.	The simplest DIMSE service is
Option A:	C-Move
Option B:	C-Get
Option C:	C-Store
Option D:	C-Echo
4.	The order of the four hierarchical levels in DICOM are
Option A:	Patient, Series, Study, Image
Option B:	Study, Patient, Image, Series
Option C:	Patient, Study, Series, Image
Option D:	Study, Series, Image, Patient
5.	What does DTD stand for?
Option A:	Dynamic Type Definition
Option B:	Discrete Type Definition
Option C:	Direct Type Definition
Option D:	Document Type Definition
6.	Data Dictionary is
Option A:	Registry of all standard data items (attributes) used in DICOM
Option B:	Registry of all VR type used in DICOM
Option C:	Registry of all Rules for DICOM
Option D:	Registry of all patient images
7.	The image file format most widely used throughout digital medical imaging is...
Option A:	BMP
Option B:	GIF

Option C:	DICOM
Option D:	JPEG
8.	The _____ IOD transmits the search attributes for the images to be retrieved
Option A:	C-Store
Option B:	C-Find
Option C:	C-Move
Option D:	C-Get
9.	The number of basic VRs are
Option A:	22
Option B:	25
Option C:	27
Option D:	29
10.	_____ data abstraction of a class of real-world objects.
Option A:	SOP
Option B:	SCU
Option C:	SCP
Option D:	IOD
11.	A _____ message allows to cancel searches in progress
Option A:	C-Cancel
Option B:	C-Abort
Option C:	C-Store
Option D:	C-Move
12.	Good DICOM software should implement
Option A:	implicit VR Little Endian,
Option B:	explicit VR Little Endian,
Option C:	explicit VR Big Endian.
Option D:	All of the above
13.	PDU stands for
Option A:	Protocol data unit
Option B:	Protocol Dynamic unit
Option C:	Protocol DICOM unit
Option D:	Protocol Device unit
14.	The Modality Worklist (MWL) SOP, is derived from C-Find
Option A:	C-Cancel
Option B:	C-Find
Option C:	C-Store
Option D:	C-Move
15.	What is the formula for the number of interfaces in relation with a system?

Option A:	(n*(n-1))/2
Option B:	n/2
Option C:	(n-1)/2
Option D:	2/(n*(n-1))
16.	Which of the following standards are used for consistent data flow among systems and organizations?
Option A:	Messaging and data interchange standards
Option B:	Terminology Standards
Option C:	Document Standards
Option D:	Conceptual standards
17.	Which of the following standards determine the way business rules are implemented?
Option A:	Architecture standards
Option B:	Application Standards
Option C:	Document Standards
Option D:	Conceptual standards
18.	What is the full form of ANSI?
Option A:	American National Standards Institute
Option B:	Australian National Standards
Option C:	A National Standards Institute
Option D:	American National Standards Institution
19.	Which of the following is not DICOM VR ?
Option A:	MSH
Option B:	PN
Option C:	TM
Option D:	CS
20.	What is the full form of NEMA?
Option A:	Nation Electronics Manufacturers Association
Option B:	National Electronics Manufacturers Association
Option C:	Nation Electrical Manufacturers Association
Option D:	National Electrical Manufacturers Association
21.	Unique Identifier primarily used to
Option A:	Identify instances of DICOM object
Option B:	Identify Patient Uniquely
Option C:	Identify Patient ID
Option D:	Correlate Patient and Physician relationship Uni
20.	An IOD that includes information about related Real-World Objects is called a
Option A:	Composite Information Object.
Option B:	Normalised IOD
Option C:	Attributes

Option D:	Elements
21.	CS, SH, LO, ST, LT, and UT, code string, short string, long string, short text, long text, and unlimited text belong to which type of VR?
Option A:	Date and Time VR
Option B:	Text VR
Option C:	Character VR
Option D:	None of tha above
22.	DICOM stands for
Option A:	Digital Imaging and Communications in Medicine
Option B:	Digital Information & Communication in Medicine
Option C:	Digital Imaging & Control in Medicine
Option D:	Digital Information & Control in Medicine
23.	_____ VR is reserved for manufacturer-specific (proprietary) data
Option A:	SQ
Option B:	UN
Option C:	OF
Option D:	AT
24.	Which IEEE standard is used as a standard for messages for medical device communications?
Option A:	IEEE1037
Option B:	IEEE1073
Option C:	IEEE3017
Option D:	IEEE3071
25.	In HL7, the ____ message delimiter is the component separator in a message.
Option A:	<CR>
Option B:	|
Option C:	^
Option D:	&
26.	What is the full form of CDA?
Option A:	Clinical Data Achieve
Option B:	Clinical Data Architecture
Option C:	Critical Document Achieve
Option D:	Clinical Document Architecture
27.	What is the long form of MSH?
Option A:	Message Type
Option B:	Message Header
Option C:	Multiple Header
Option D:	Multiple Types
28.	Which of the following UML diagrams has a static view?

Option A:	Collaboration
Option B:	Use case
Option C:	State chart
Option D:	Activity
29.	Which diagram in UML shows a complete or partial view of the structure of a modeled system at a specific time?
Option A:	Sequence Diagram
Option B:	Collaboration Diagram
Option C:	Class Diagram
Option D:	Object Diagram
30	Which of the following diagram is time oriented?
Option A:	Collaboration
Option B:	Sequence
Option C:	Activity
Option D:	None of the mentioned

Descriptive Questions (05 Marks each)

1. What is EMR?
2. Explain the Importance of Standards
3. Explain HL7 Data Types of Times and Dates.
4. Explain HL7 Data Types for Numbers and Quantities.
5. What are the rules for message formation?
6. What is a trigger event? How can events be triggered in HL7?
7. Write a note on Class Diagrams.
8. Write a note on Use Case Diagrams.
9. Write a note on Activity Diagrams.
10. Write a note on State Machine Diagrams.
11. Write a note on Sequence Diagrams.
12. Explain foreign and wild characters

    Write a note on
13. o C-Echo
14. o C-Find
15. o C-Find DIMSE

Descriptive Questions (10 Marks each)

1. How the standards are categorised?
2. How are standards developed? Explain the development stages of standards.
3. What is Health Level 7 and what is its mission?
4. What is HL7 V2.x? Explain in brief
5. How is the HL7 V2.x standard organized?
6. What is UML ? Give the overview of UML diagrams.
7. Explain DICOM data dictionary with tags, group attributes, data elements
8. Explain Little and Big Endian type of storage data with examples
9. How UIDs are used to define hierarchical relationship?
10. Explain need and importance of DICOM in medical imaging.

11. What is the conformance statement? How is it important in DICOM with respect to users
12. Explain DICOM retrieval.
13. Explain the parameters necessary to store DICOM image
14. Explain the Transfer Syntax
15. Explain the abstract syntax

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Sample Questions Bank- Nuclear Medicine

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	MCQ Questions
1.	For Carbon-12 calculate the ratio of N/Z
Option A:	1:1
Option B:	1:2
Option C:	2:1
Option D:	2:2
2.	What happens in Alpha Decay
Option A:	A- reduces by 4 and Z-reduces by 4
Option B:	A- reduces by 2 and Z-reduces by 2
Option C:	A- reduces by 4 and Z-reduces by 2
Option D:	A- reduces by 2 and Z-reduces by 4
3.	Radioactive Decay Curve is
Option A:	Linear
Option B:	Exponential
Option C:	Random
Option D:	Cyclic
4.	Radioactive decay rate of 3.7*10^10 decays per second is called as
Option A:	Becquerel
Option B:	Curie
Option C:	RAD
Option D:	Gray
5.	When radiation interacts with the living tissue, primarily there is_____ reaction
Option A:	Excitation
Option B:	Ionization
Option C:	Relaxation
Option D:	Nucleation
6.	Identify role of focusing grid used in Photomultiplier Tube
Option A:	Multiplies electrons in PMT
Option B:	Directs the photoelectrons toward the dynode
Option C:	Magnetically shields the PMT
Option D:	Creates a vacuum space in the PMT
7.	In a gas filled detector if the externally applied voltage across anode and cathode is less than Vs, it goes in
Option A:	Saturation Region
Option B:	Recombination Region
Option C:	Proportional Counter Region
Option D:	GM Counter Region

8.	If image size is I and object size is O, how is magnification/minification factor expressed
Option A:	I/O
Option B:	O/I
Option C:	I-O
Option D:	O-I
9.	Converging collimators gives what kind of image
Option A:	Magnified, Inverted
Option B:	Same size, Non Inverted
Option C:	Magnified, Non Inverted
Option D:	Minified, Non Inverted
10.	Thyroid uptake monitoring can be used to diagnose which types of diseases
Option A:	Jaundice
Option B:	Coronary Artery Disease (CAD)
Option C:	Alzheimers Disease
Option D:	Hyperthyroidism
11.	What is the average energy of the gamma photons ejected in PET scan
Option A:	511 Mev
Option B:	511 eV
Option C:	511 keV
Option D:	5.1 keV
12.	High sensitivity collimators have
Option A:	smaller & shorter holes
Option B:	smaller & longer holes
Option C:	Wider & longer holes
Option D:	Wider & shorter holes
13.	The preferred physical half-life for therapeutic radionuclides is around
Option A:	Between 6 hours and 7 days
Option B:	Less than 6 hours
Option C:	Few minutes
Option D:	Few seconds
14.	Half life of F-18 isotope use in PET is
Option A:	50 mins
Option B:	80 mins
Option C:	110 mins
Option D:	140 mins
15.	For thyroid uptake monitoring which of this radionuclide is preferred
Option A:	C-12
Option B:	I-123
Option C:	O-15
Option D:	N-17

16.	TLD stands for in personal dosimetry
Option A:	Time Life Dosimeter
Option B:	Thermoluminescent Dosimeter
Option C:	Thermal Latent Distance
Option D:	Translucent Latent Dosimeter
17.	number of counts per second in gamma camera obtains for each unit of activity is called as
Option A:	Uniformity
Option B:	Resolving time
Option C:	Sensitivity
Option D:	Resolution
18.	When both photons from an annihilation event are detected by detectors in coincidence is called as
Option A:	Random coincidence
Option B:	Scatter coincidence
Option C:	True coincidence
Option D:	False coincidence
19.	____ is the reactor produced radionuclide
Option A:	Fluorine-18
Option B:	Molybdenum-99
Option C:	Oxygen-15
Option D:	Nitrogen-13
20.	The probability of photoelectric interaction is _____-
Option A:	inversely proportional to the cube of γ-ray energy
Option B:	directly proportional to the cube of γ-ray energy
Option C:	inversely proportional to the square of γ-ray energy
Option D:	directly proportional to the square of γ-ray energy
21.	Best method to dispose radioactive waste with short half-life (5 days)
Option A:	Dilute and disperse
Option B:	Store and Decay
Option C:	Concentrate and bury
Option D:	Incineration
22.	Electron Capture involves _____
Option A:	an electron combining with a proton
Option B:	a neutron being ejected from the nucleus
Option C:	an electron being ejected from the nucleus
Option D:	an electron combining with a neutron
23.	What is a half life of Tc - 99m?
Option A:	67 days
Option B:	6 days
Option C:	67 hours
Option D:	6 hours

24.	In a typical nuclear medicine application, which of this detector is not used
Option A:	Gas filled detectors
Option B:	Semiconductor detectors
Option C:	Scintillation detectors
Option D:	Quantum detectors
25.	Which component is responsible for selecting a radioactive event based on its energy
Option A:	NaI (TI) detector
Option B:	Amplifier
Option C:	Pulse Height Analyzer
Option D:	Analog Ratemeter
26.	In RIA a known quantity of antigen is made radioactive by
Option A:	Labeling with Radioactive isotopes
Option B:	Fusion process in cyclotron
Option C:	Mixing with neutron rich element
Option D:	Nuclear Fission
27.	For a dual head gamma camera two simultaneous image can be acquired at an angle of
Option A:	90°
Option B:	120°
Option C:	180°
Option D:	270°
28.	Which is this a semiconductor detector?
Option A:	NaI(TI) Detector
Option B:	BGO Detector
Option C:	CsI(TI) Detector
Option D:	Si Detector
29.	Diameter range of scintillator crystal used in Gamma camera is
Option A:	5-10cm
Option B:	10-25cm
Option C:	25-40cm
Option D:	40-60cm
30.	PET-CT hybrid imaging provides
Option A:	Only Anatomical information of tissues
Option B:	Only Physiological information of tissues
Option C:	Both Anatomical and Physiological information of tissues
Option D:	None of Anatomical and Physiological information of tissues

Descriptive Questions (05 Marks each)

1. Draw spectra of commonly used radio nuclides Tc-99m, Cs-137.

2.Describe methods for Radioactive waste management.

3.Explain working principle of GM Counter.

4.What is RIA? Mention its clinical applications.

5. Write different units of radioactivity measurement.

6.What are the advantages of SPECT-CT over conventional CT Imaging.

7.Mention radionuclides used for therapeutic applications in nuclear medicine.

8.Write short notes on Palliative methods in cancer management.

9.Define following parameters.

Spatial Resolution.

Detector Efficiency

10.Write short notes on Single Isotope Method.

11.Mention advantages of Semiconductor detectors over Gas filled detectors.

12.Derive radioactive decay equation.

13.Compare PET and SPECT Imaging.

14. The half-life of 99mTc is 6 hours. After how much time will 1/8th of the radioisotope remains?

15.Write short notes on collimator used in gamma camera.

Descriptive Questions (10 Marks each)

1.How remote production of radionuclides is achieved using Tc-Mo Generator. Mention some of the issues involved in using Tc-Mo Generator.

2.Draw and explain block diagram of Liquid Scintillation Counting System.

3.With a neat, labelled diagram explain principle of operation of Gamma Camera.

4.With a neat block diagram explain working of Single and Multichannel Pulse Height Analyzers.

5.What is difference between Radionuclides and Radiopharmaceuticals. Explain different methods of radiolabeling for the preparation of radiopharmaceuticals.

6. Draw and explain block diagram of rectilinear scanner

7. Draw and explain block diagram of scintillation counting system.

8. Describe working principle of PET. Mention its five clinical applications

9. Describe working principle of SPECT. Mention its five clinical applications.

10. Explain prevention measures for internal radiation exposure.

11. Describe different types of gamma radiation interactions with matter

12.Explain block diagram of hybrid imaging PET-CT. State its two clinical applications

13. Explain alpha, beta and gamma decay

14. Describe quality control procedure of rectilinear scanner

15. Describe the concept of Statistics of Counting in nuclear medicine