



# Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF MEDICAL SCIENCES  
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF  
MEDICAL LABORATORY SCIENCES  
**BMLS 12S REGULAR**

## **AML 4406 : MEDICAL IMAGING**

SEMESTER EXAMINATION

APRIL 2014 SERIES

2 HOURS

Instructions to candidates:

This paper consists of **TWO** sections **A** and **B**

**Section A** -Contains MCQS, Answer **ALL** questions in **Section B**.

### **SECTION A - MCQs - (30marks)**

1. The Smallest amount matter that retains the properties atom is
  - a) Electron
  - b) Atom
  - c) Neutron
  - d) Proton
  - e) Molecule
2. Elements can be divided into
  - a) Molecule
  - b) Atoms
  - c) Neutrons
  - d) Medics
  - e) Biding energy
3. Establishment of electrons was done in the year

- a) 1936
  - b) 1946
  - c) 1906
  - d) 1916
4. Electrons have a mass of
- a)  $1/1835$  mass of a hydrogen atom
  - b)  $1/8135$  mass of a hydrogen atom
  - c)  $1/3815$  mass of a hydrogen atom
  - d)  $1/3518$  mass of a hydrogen atom
5. The properties of an element are defined by
- a) Proton number
  - b) Electron number
  - c) Neutron number
  - d) Electron number
  - e) Mass number
6. Standard measure of atomic mass
- a) Electron vault
  - b) Joules
  - c) Atomic mass circuit
  - d) Electron joule
  - e) Mass number
7. Number of neutrons in a nucleuses called
- a) Atomic number
  - b) Neutron number
  - c) Mass number
  - d) Proton number
  - e) Electron number
8. Isotopes in an element differ in
- a) Electrons
  - b) Atoms
  - c) Protons
  - d) Nuclei
  - e) Neutrons
9. What changes are allowed in conservation of mass number in conservation laws?
- a) Proton to neutron
  - b) Neutron to electrons
  - c) Proton to electron
  - d) Neutron charge change
  - e) Electron to neutron

10. Ultrasound is applied in the following excepts
- SONAR
  - Body imaging
  - Modification & manipulation of body issue
  - Treatment of physical ailment
  - Construction of safe
11. What is the distance covered by 1 cycle of a wave called
- Amplitude
  - Wave length
  - Hertz
  - Kilo hertz
  - Electron joules
12. Which of the following pulse sequences is tippal of  $90^\circ$  to orient position of protons
- Spin echo
  - Corn-purcell-metoon
  - Inversion recovery
  - Free induction
  - Forced induction
13.  $\alpha$  decay leads to reduction in atomic number by
- 5
  - 4
  - 3
  - 2
  - 1
14. Gamma radiation electromagnetic energy release in form of
- Bundles
  - Photons
  - Protons
  - $\alpha$  particles
  - $\beta$  particles
15. Medical x rays are produced by
- Colours interaction
  - Photon interaction
  - Nucleon decay
  - Positron annihilation
  - Palpoble decay
16. Radiation (back group) originating from the ground is called
- Cosmic ray
  - Terrestrial ray
  - Gamma ray
  - X ray
  - $\alpha$  ray

17. Components of on mRT machine include the following except
- Signed generator
  - Signal transducers
  - Analogue & digital convertor
  - Signal receiver
  - Signal convertor
18. Types of MRI maintenance include the following except
- Daily maintenance
  - Weekly maintenance
  - Monthly maintenance
  - Annual maintenance
  - Biannual maintenance
19. Monthly maintainance of MRI includes
- Image uniformty
  - Cleaning & dusting
  - Puke shape & amplitude
  - Linearly
  - Magnetic field homogeinesity
20. Which of the following is a temporary effect of an MRI on a person
- Photophospheresis
  - Chromophores
  - Magneto phosopthesis
  - Filenospheres
  - Electrophospheresis
21. Definition of on isomer
- Some number of electron
  - Some number of neutron
  - Some number of protons
  - Some number of Mass
  - Some number of Atoms
22.  $\alpha$  (alpha) decay is the emission of a
- Electron form orbit
  - Electron nucleus
  - Neutron from muscles
  - Helium particle
  - Hydrogen particle
23. In Kenyan law which body was established to regulate radiation
- Kenya radiation protection board
  - Kenya radiation protection Authority
  - Kenya radiation protection Act
  - Kenya radiation protection force

- e) Kenya radiation protection Association
24. Which of the following is a stochastic effect of radiation
- Hematopoietic syndrome
  - Gastrointestinal syndrome
  - Cerebrovascular syndrome
  - Mutagenesis syndrome
  - Steven Johnson syndrome
25. Tissue assessment in radionuclide studies include the following except
- Thyroid uptake
  - Kidney flow studies
  - Cardio angiography
  - Contrast CT scan of the Head
  - Vitamin B<sub>12</sub> uptake
26. Ultrasound velocity is mainly affected by
- Weight
  - Mass
  - Density
  - Attenuation
  - Distance
27. Attenuation of ultrasound means
- Reflection
  - Refraction
  - Scatter
  - Absorption
  - Deflection
28. Specular reflection permits visualization of
- Boundaries between organs
  - Tissue parenchyma
  - Tissue postulation
  - Tissue fluid
  - None of the above
29. Which of the following is not a motion suppression technique in MRI
- Respiratory gating
  - Gradient moment nulling
  - Gradient echo techniques
  - Half Fourier imaging
  - Flow suppression techniques
30. SI unit measure of radioactivity is
- Becquerel (Bq)

- b) Curie (Ci)
- c) KeV
- d) MeV
- e) rodium – 226

**SECTION B ESSAY**  
**(ANSWER ALL QUESTION IN THIS SECTION)**

1. (a) Describe the schtoic interactions of the body with radiation **(10marks)**  
(b) Detail the basic components of an MRI machine **(10marks)**
  
2. Describe the production of x –rays for imaging with the use of a simplified x-ray tube

**(20marks)**