



قائمة الاسئلة

اختبار النهائي للعام الجامعي 2025/2024-مكلية الهندسة :: تكنولوجيا الطب النووي - كلية الهندسة - قسم الطببية الحيوية- المستوى الخامس - 3 سا  
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- 1) What does the term radiation refer to in nuclear medicine?
  - 1)  Energy in transit
  - 2)  Energy stored in the nucleus
  - 3)  Energy from electron movement
  - 4)  Energy created from light waves
- 2) What is the termed used for the process where a proton is converted into neutron and a positron?
  - 1)  Beta minus decay
  - 2)  Beta plus decay
  - 3)  Alpha decay
  - 4)  Auger emission
- 3) Which energy that carries energy in the form of kinetic energy of mass in motion?
  - 1)  Electromagnetic radiation
  - 2)  Particulate radiation
  - 3)  Gamma rays
  - 4)  X rays
- 4) Which property distinguishes electromagnetic radiation from particulate radiation?
  - 1)  Electromagnetic radiation consists of moving particles
  - 2)  Electromagnetic radiation moves at the speed of light
  - 3)  Particulate radiation carries energy in the form of waves
  - 4)  Particulate radiation does not interact with matter
- 5) What is the process by which unstable atoms become more stable by emitting particles and radiation?
  - 1)  Radiation
  - 2)  Radionuclide
  - 3)  Radioactive decay
  - 4)  Radioactivity
- 6) What mode of decay is  $^{137}\text{Cs}$ ?
  - 1)  DECAY BY  $\beta^-$  EMISSION
  - 2)  DECAY BY  $(\beta^-, \gamma)$  EMISSION
  - 3)  POSITRON  $(\beta^+)$  AND  $(\beta^+, \gamma)$  DECAY
  - 4)  Neutron decay
- 7) Which of the following is a correct statement about radioactive decay?
  - 1)  It can be predicted precisely for individual atoms
  - 2)  It depends on environmental conditions
  - 3)  It occurs only in artificial isotopes
  - 4)  It is spontaneous process
- 8) What is radioisotope?
  - 1)  A stable form of an element
  - 2)  A radioactive form of an element
  - 3)  A molecule that emits visible light
  - 4)  A chemical used to reduce radiation exposure
- 9) What is the SI unit used to measure radioactivity?
  - 1)  Becquerel (Bq)
  - 2)  Sievert (Sv)
  - 3)  Gray (Gy)
  - 4)  Curie (Ci)
- 10) Which of the following particles is NOT commonly emitted during radioactive decay?





- 1)  Protons
  - 2)  Beta particles
  - 3)  Alpha particles
  - 4)  Gamma rays
- 11) Which of the following radioactive isotopes undergoes spontaneous decay by emitting a positron?
- 1)  Carbon-14
  - 2)  Fluorine 18
  - 3)  I131
  - 4)  Cs 137
- 12) What is the primary determining factor for the rate of radioactive decay of a substance?
- 1)  Mass number
  - 2)  Atomic number
  - 3)  Decay constant
  - 4)  Decay factor
- 13) Gamma rays are electromagnetic radiation consisting of .....
- 1)  Particles
  - 2)  Photons
  - 3)  Photons and particles
  - 4)  Neutrons
- 14) What are the primary characteristics of metastable nuclear states?
- 1)  High stability
  - 2)  Long life before decay
  - 3)  Transit existence
  - 4)  Non-radioactive
- 15) What is the key factor distinguishing photon from particle?
- 1)  Mass and charge
  - 2)  Speed only
  - 3)  Radioactive decay
  - 4)  Binding energy
- 16) What does SPECT stand for in nuclear medicine?
- 1)  Spectral emission tomography
  - 2)  Single photon emission computed tomography
  - 3)  Scintillation photon emission technique
  - 4)  Positron emission tomography
- 17) How does gamma camera create images in nuclear medicine?
- 1)  By capturing visible light
  - 2)  By converting light to electrical signal
  - 3)  By converting light to gamma rays and creating 3d images
  - 4)  By detecting emitted gamma rays and creating spatial map
- 18) What is the primary purpose of a gamma camera in nuclear medicine?
- 1)  PET imaging
  - 2)  SPECT imaging
  - 3)  MRI imaging
  - 4)  CT imaging
- 19) What does the power of nuclear medicine primarily lie in?
- 1)  Offering sensitive biological process measurements
  - 2)  Providing high resolution anatomic images
  - 3)  Reducing the radiation exposure to patients
  - 4)  Displaying images in real time





- 20) In linear accelerator what type of particles is commonly accelerated?
- 1) - X rays
  - 2) - Protons
  - 3)  Electrons
  - 4) - Alpha particles
- 21) In radiation therapy why is a linear accelerator preferred over Cobalt-60 machine?
- 1)  Higher energy output
  - 2) - shorter half-life of the radiation
  - 3) - small size
  - 4) - lower cost
- 22) Which component of the LINAC generates high frequency microwave for electrons acceleration?
- 1) - Modulator
  - 2) - accelerating waveguide
  - 3)  magnetron or klystron
  - 4) - power supply
- 23) How is Cobalt -60 primary produced?
- 1) - Bombardment with protons
  - 2) - Subjecting to gamma radiation
  - 3)  Placing cobalt -59 in strong neutron field
  - 4) - Exposure to ultraviolet light
- 24) Which of the following is NOT a major component of a LINAC?
- 1) - Electron gun
  - 2)  Cyclotron
  - 3) - Waveguide
  - 4) - Magnetron
- 25) What makes Cobalt-60 more suitable than Cesium-137 and Radium-226?
- 1)  Higher energy gamma rays
  - 2) - Longer half life
  - 3) - Enhanced precision in targeting tumors
  - 4) - Cruciate ligaments
- 26) Which type of decay does Cobalt 60 undergo?
- 1) - Gamma decay
  - 2)  Beta minus decay
  - 3) - Alpha decay
  - 4) - Neutron decay
- 27) What does FDG uptake in PET imaging primarily reflect ?
- 1) - Protein synthesis
  - 2)  Glucose metabolism
  - 3) - DNA replication
  - 4) - Lipid metabolism
- 28) The Auger effect primarily occurs when:
- 1) - Energy is transferred as electromagnetic radiation
  - 2) - An electron is absorbed by the nucleus
  - 3)  Energy is transferred to another electron, causing its ejection
  - 4) - Neutrons are emitted from the atom
- 29) The waveguide system in a medical linear accelerator is used to :
- 1) - Accelerate the electrons
  - 2)  Direct the microwave to the accelerator tube
  - 3) - Control the X ray energy level





- 4) - Rotate the gantry
- 30) What is the function of the pulse height analyzer in a Gamma Camera ?
- 1) + To measure and filter signals based on their amplitude
  - 2) - To adjust the positioning of gamma rays
  - 3) - To amplify electrical signals
  - 4) - To convert visible light into digital image