# Beta Decay Quiz Answer Key PDF

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**What is emitted during beta-minus decay?**

A. Proton
**C. Electron ✓**
D. Positron
C. Neutron

**Which type of beta decay involves the conversion of a neutron into a proton?**

A. Alpha decay
C. Beta-plus decay
D. Gamma decay
**C. Beta-minus decay ✓**

**Which of the following particles is nearly massless and emitted during beta decay?**

A. Photon
C. Electron
D. Proton
**C. Neutrino ✓**

**Describe how beta-plus decay affects the atomic number and mass number of an element.**

**In beta-plus decay, the atomic number decreases by 1 and the mass number remains the same.**

**Which conservation laws are applicable to beta decay? (Select all that apply)**

**A. Conservation of charge ✓**
C. Conservation of baryon number
**D. Conservation of mass-energy ✓**

**C. Conservation of lepton number ✓**

**Which of the following are emitted during beta-plus decay? (Select all that apply)**

**A. Positron ✓**

**C. Neutrino ✓**

D. Antineutrino

C. Electron

**How does beta decay contribute to the stability of isotopes in nature?**

**Beta decay contributes to the stability of isotopes by allowing unstable nuclei to convert a neutron into a proton (or vice versa), thus adjusting the neutron-to-proton ratio and leading to a more stable isotope.**

**Which of the following statements about beta decay are true? (Select all that apply)**

**A. It changes the element's identity. ✓**

**C. It involves a change in atomic number. ✓**

D. It is a form of nuclear fission.

C. It emits gamma rays.

**Explain the historical context of the discovery of beta decay and its impact on nuclear physics.**

**Beta decay was discovered in the early 1900s, with key contributions from scientists such as Ernest Rutherford and later James Chadwick, who identified the emission of electrons or positrons from unstable nuclei, which played a crucial role in the development of nuclear physics.**

**Which conservation law is not directly involved in beta decay?**

A. Conservation of charge

C. Conservation of mass-energy

**D. Conservation of angular momentum ✓**

C. Conservation of momentum

**In beta-plus decay, what particle is emitted from the nucleus?**

A. Electron
C. Proton
**D. Positron ✓**
C. Neutron

**What is the charge of a beta particle emitted during beta-minus decay?**

A. Positive
C. Neutral
D. Double positive
**C. Negative ✓**

**What happens to the atomic number of an element undergoing beta-minus decay?**

**A. Increases by 1 ✓**
C. Remains the same
D. Doubles
C. Decreases by 1

**What role do neutrinos play in beta decay, and why are they important for conservation laws?**

**Neutrinos play a crucial role in beta decay by balancing the energy and momentum, which is vital for the conservation laws of energy, momentum, and lepton number.**

**Discuss the significance of beta decay in medical applications, providing at least one example.**

**Beta decay plays a crucial role in medical applications, especially in cancer treatment, such as the use of iodine-131 for thyroid cancer therapy.**

**Which particles are involved in the process of beta-minus decay? (Select all that apply)**

A. Proton
**C. Electron ✓**
**D. Antineutrino ✓**
**C. Neutron ✓**

**What is the primary purpose of beta decay in nuclear physics?**

A. To increase atomic mass

C. To decrease atomic number

D. To produce gamma rays

**C. To stabilize an unstable nucleus ✓**

**Beta decay affects which of the following nuclear properties? (Select all that apply)**

**A. Atomic number ✓**

**C. Charge ✓**

**D. Element identity ✓**

C. Mass number

**In which applications is beta decay utilized? (Select all that apply)**

**A. Medical imaging ✓**

**C. Carbon dating ✓**

D. Metal refining

C. Nuclear power generation

**Explain the process of beta-minus decay, including the particles involved and the changes in the nucleus.**

**In beta-minus decay, a neutron decays into a proton, emitting a beta particle (electron) and an antineutrino. The nucleus changes by increasing its atomic number by one, resulting in the formation of a new element.**