

- 1) C If atom A is an isotope of atom B, then atom A must:
- A) be a radioactive version of B.
  - B) have the same mass as atom B.
  - C) have the same chemical properties as B, but a different mass.
  - D) have different chemical properties than B.
  - E) have the same chemical properties and mass as B.
- 2) E If I attempt to disintegrate a proton, I will find that:
- A) It cannot be disintegrated, because it is a fundamental particle.
  - B) It will fall apart into individual quarks.
  - C) It will split into fragments with fractional charges.
  - D) It will explode and turn into pure energy.
  - E) It will split into two or more whole protons.
- 3) A A free neutron has an average lifetime of about:
- A) 10.6 minutes.
  - B) a femtosecond.
  - C) many billions of years.
  - D) It depends on what isotope emitted it.
- 4) B Which of the following statements about the neutrino is *false*?
- A) It is extremely difficult to detect.
  - B) It is a quite rare and exotic particle.
  - C) It does not respond to the nuclear strong force.
  - D) Mostly, it only interacts with the nuclear weak force.
  - E) It is capable of penetrating many thousands of miles of rock without any interaction.
- 5) D Which of the following statements about antimatter is true?
- A) It is just a science-fiction material used in Star Trek movies.
  - B) Antimatter is inherently unstable, and always explodes instantly upon creation.
  - C) It does not exist in the real Universe, except in theory.
  - D) It is exactly like normal matter, except with different signs on its quantum numbers.
  - E) It is repelled by gravity, and will levitate if created.