

1. (4 points) How do we know that the strong nuclear force exists?

- (a) Neutrons do not respond to gravitational forces
- (b) Protons exist together in an atomic nucleus**
- (c) Electrons keep far away from atomic nuclei
- (d) Neutrinos pass through the Earth as if it wasn't there
- (e) Quark interactions with muons have a large time scale

2. (4 points) You have a radioactive sample with mass 4.0 kg, composed of an isotope that has a half-life of 6.0 days. If you check after 10.0 days, what will the mass of the remaining radioactive isotope be? (You don't need to perform a calculation here!)

- (a) 1.3**
- (b) 5.9
- (c) 0.6
- (d) 2.3
- (e) 2.0

3. (4 points) Carbon dating was used to find the age of the Dead Sea Scrolls. Would this method have worked if the scrolls had been carved in stone?

**Answer:** No. Carbon dating works only on remains of living organisms.

4. (4 points) Which of the following processes manufactures some of the elements in the periodic table?

- (a) Chemical reactions
- (b) Inverted electromagnetic spectrum-dependent cryolapsis
- (c) High pressure at the core of Earth-like planets
- (d) Encounters with gamma radiation in outer space
- (e) Explosions of stars that have used up their nuclear fuel**

5. (4 points) What is responsible for astronomical objects tending to have spherical shapes?

- (a) Radioactive decay
- (b) Gravity**
- (c) Magnetism
- (d) The strong nuclear force
- (e) Half-lives