

Examrace

Competitive Exams: Chemistry MCQs (Practice_Test 31 of 31)

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1. The carbon-14 activity of some ancient Peruvian corn was found to be 10 disintegrations/minute/gram. If present-day plant life shows 15 disintegrations/minute/gram, how old is the Peruvian corn? The half-life of carbon-14 is 5,730 years.
 - a. 1,455 years
 - b. 1,910 years
 - c. 3,350 years
 - d. 3,820 years
 - e. 9,080 years
2. Which type of nuclear process requires a temperature of over a million degrees?
 - a. beta particle production
 - b. fission reaction
 - c. alpha particle emission
 - d. fusion reaction
 - e. positron production
3. In passing through matter, alpha particles lose energy and damage tissues by producing:
 - a. neutrons.
 - b. gamma rays.
 - c. radiation.
 - d. beta particles.
 - e. ions.
4. It is well-known that uranium isotopes can undergo fission reactions and that hydrogen isotopes can undergo fusion reactions. These reactions are examples of a drive toward:

- a. equilibrium.
 - b. thermodynamic stability.
 - c. negative S.
 - d. kinetic stability.
 - e. positive G.
5. Which of the following balanced equations indicates a FUSION reaction?
- a. bismuth-209 + helium-4 \rightarrow astatine-211 + 2 neutrons
 - b. helium-2 + hydrogen-2 \rightarrow hydrogen-3 + hydrogen-1
 - c. plutonium-239 + neutron \rightarrow americium-240 + beta particle
 - d. uranium-239 \rightarrow neptunium-239 + beta particle
 - e. beryllium-7 + electron \rightarrow lithium-7
6. Which statement is FALSE?
- a. The larger the binding energy per nucleon, the more stable the nucleus.
 - b. The alpha particle has a charge of 2 + .
 - c. The mass of a nucleus is always less than the original mass of its constituent protons and neutrons.
 - d. Alpha particle production is the only route by which unstable nuclei can spontaneously decay.
 - e. Alpha particles are more massive than beta particles.
7. Iron-49 decays by positron emission with a half-life of 0.08 seconds. What nuclide is produced in this decay process?
- a. manganese-49
 - b. cobalt-49
 - c. chromium-45
 - d. iron-48
 - e. None of these.
8. The following are produced in radioactive decay processes. Which one has neither mass nor charge?
- a. alpha particles
 - b. beta particles
 - c. gamma rays

- d. positrons
 - e. neutrons
9. The function of the CONTROL RODS in a nuclear power plant is to:
- a. slow the neutrons down so that they can cause fission.
 - b. absorb the heat produced so that it can be carried to an external turbine.
 - c. absorb neutrons to control the amount of fission that is occurring.
 - d. provide the fuel needed for fission to occur.
 - e. None of the above:
10. Smoke detectors contain a small amount of americium-241. What is the final product nuclide if americium-241 radioactively decays by a total of eight alpha decays and four beta decays?
- a. rhenium-209
 - b. gold-209
 - c. bismuth-209
 - d. plutonium-237
 - e. americium-225

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