Competitive Exams: Chemistry MCQs (Practice_Test 29 of 31)

1. The function of the MODERATOR in a nuclear power plant is to:
   a. carry the heat produced from the fission reactions to an external turbine.
   b. absorb neutrons and thereby control the fission reactions.
   c. protect the workers and the environment from radiation.
   d. slow down the neutrons produced from the fission reactions so that they can be absorbed by more fuel.
   e. None of the above responses is correct.
2. In lecture, you observed an “EXIT” sign that contained a radioactive nuclide. Which of the following nuclides was used in the “EXIT” sign?
   a. uranium-238
   b. potassium-40
   c. hydrogen-3 (tritium)
   d. phosphorus-32
   e. carbon-14
3. The neutron often plays a key role in radioactive decay because it is:
   a. attracted by the strong force.
   b. capable of converting to a proton and an electron.
   c. unaffected by the coulombic force.
   d. able to act as a nuclear “glue”
   e. All of these statements are true.
4. When polonium-216 decays by the emission of one alpha particle and two beta particles, the product is the isotope:
   a. polonium-210
   b. polonium-212
   c. polonium-214

d. polonium-218

e. polonium-220

5. The nuclide sulfur-35 is neutron-rich, therefore, it is likely to undergo radioactive decay by:

a. beta emission.

b. electron capture.

c. positron emission.

d. neutron emission.

e. alpha emission.

6. Which of the following is heaviest?

a. silicon-30

b. germanium-72

c. barium-130

d. radon-216

e. All of the above:

7. In a graph of binding energy per nucleon vs. Atomic mass, Fe, has the highest binding energy per nucleon of all nuclei. This means that:

a. Fe is more stable than any other nuclide.

b. Nuclei lighter than Fe become more stable by fission processes.

c. Fe decays by positron emission.

d. Nuclei heavier than Fe become more stable by fusion processes.

e. All of these statements are true.

8. The mass of one atom of chromium-52 is 51.9405 amu. The binding energy per nucleon for the chromium-52 nucleus is:

a. 7.1 MeV

b. 7.9 MeV

c. 8.8 MeV

d. 10.1 MeV

e. 12.4 MeV

9. Which of the following processes is an example of nuclear fusion?

a. bismuth-209 + helium-4 → astatine-211 + 2 neutrons

b. hydrogen-2 + hydrogen-2 → hydrogen-3 + hydrogen-1

c. plutonium-239 + neutron → americium-240 + beta particle

d. uranium-239 → neptunium-239 + beta particle

e. None of the reactions involve fusion.

10. Uranium-238 has a binding energy of approximately 7.5 MeV per nucleon. What spontaneous radioactive decay process would be predicted to occur as a result of bombarding uranium-238 with neutrons?

a. beta particle emission

b. a fission reaction

c. electron capture

d. a fusion reaction

e. positron emission