1. Which of the following is a product of α-decay of uranium-238?

   a) ^{234}Th
   b) ^{238}Np
   c) ^{238}Pa
   d) ^{235}U
   e) ^{242}Pu

2. What is the missing product in the following nuclear transmutation equation?

$$^{43}_{20}Ca + \alpha \rightarrow \_\_\_\_\_ + {}^{1}_{1}H$$

   a) $^{46}_{22}Ti$
   b) $^{46}_{21}Sc$
   c) $^{44}_{22}Ti$
   d) $^{42}_{18}Ar$

3. What nuclide product is necessary to balance the following fission reaction?

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow 3{}^{1}_{0}n + {}^{139}_{56}Ba + \_\_\_\_\_$$

   a) $^{96}_{35}Br$
   b) $^{96}_{36}Kr$
   c) $^{94}_{37}Rb$
   d) $^{94}_{36}Kr$
   e) $^{90}_{38}Sr$

4. Electron capture transforms ^{7}Be into what nuclide?
   a) ^{6}Li
   b) ^{7}B
   c) ^{7}Li
   d) ^{6}B
   e) ^{12}C

5. ^{32}P radioactively decays by beta emission. Its half-life is 14.3 days. How long would it take for 90% of a given sample of ^{32}P to decay?
   a) 69.1 days
   b) 51.7 days
   c) 42.3 days
   d) 47.5 days

6. A sample of wood from an Egyptian mummy case has a carbon-14 activity of 9.4 disintegrations per minute per gram of carbon (d/min·g). How old is the wood? (Given: the ratio of ^{12}C : ^{14}C in living organisms results in a specific activity of 15.3 d/min·g, and the half-life of ^{14}C is 5730 years.)
   a) 6400 yr
   b) 4570 yr
   c) 4030 yr
   d) 3420 yr
   e) none of these

Answers:
1. a
2. b
3. d
4. c
5. d
6. c