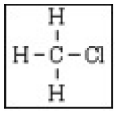
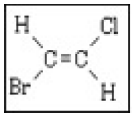
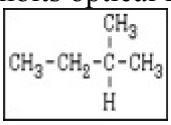
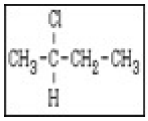
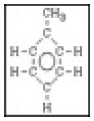
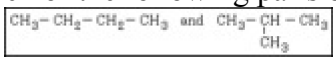
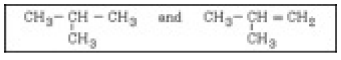
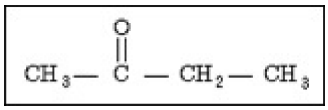
Nuclear/Organic Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. When $^{214}_{84}Po$ decays, the emission consists consecutively of an alpha particle, then two beta particles, and finally another alpha particle. The resulting stable nucleus is
   a. $^{206}_{83}Bi$ b. $^{210}_{83}Bi$ c. $^{206}_{82}Pb$ d. $^{208}_{82}Pb$ e. $^{210}_{81}Tl$
2. The radioactive decay of $^{14}_{6}C$ to $^{14}_{7}N$ occurs by the process of
   a. beta particle emission c. positron emission e. neutron capture
   b. alpha particle emission d. electron capture
3. $^{251}_{98}Cf$ ---> 2 n + $^{131}_{54}Xe$+ __
   What is the missing product in the nuclear reaction represented above?
   a. $^{114}_{42}Mo$ b. $^{118}_{44}Ru$ c. $^{120}_{42}Mo$ d. $^{120}_{44}Ru$ e. $^{122}_{46}Pd$
4. The specific rate constant k for radioactive element X is 0.023 min^{-1}. What weight of X was originally present in a sample if 40. grams is left after 60. minutes?
   a. 10. grams b. 20. grams c. 80. grams d. 120. grams e. 160. grams
5. Correct statements about alpha particles include which of the following?
   I. They have a mass number of 4 and a charge of +2.
   II. They are more penetrating than beta particles.
   III. They are helium nuclei.
   a. I only b. III only c. I and II d. I and III e. II and III
6. The nuclide $^{249}_{96}Cm$ is radioactive and decays by the loss of one beta particle. The product nuclide is
   a. $^{245}_{94}Pu$ b. $^{245}_{95}Am$ c. $^{248}_{96}Cm$ d. $^{250}_{96}Cm$ e. $^{249}_{97}Cm$
7. If 87.5 percent of a sample of pure ^{131}I decays in 24 days, what is the half-life of ^{131}I?
   a. 6 days b. 8 days c. 12 days d. 14 days e. 21 days
8. Which of the following compounds exhibits optical isomerism?
   a.  b.  c.  d.  e. 
9. Which of the following pairs of compounds are isomers?
   a. 
   b. 
   c. 
   d. 
   e. 

10. 

The organic compound represented above is an example of

a. an organic acid
b. an alcohol
c. an ether
d. an aldehyde
e. a ketone

11. Types of hybridization exhibited by the C atoms in propene, CH_3CHCH_2, include which of the following?

I. sp
II. sp^2
III. sp^3

a. I only
b. III only
c. I and II only
d. IIandIII only
e. I, II, and III

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Answer Section

MULTIPLE CHOICE

1. ANS: C
2. ANS: A
3. ANS: B
4. ANS: E
5. ANS: D
6. ANS: E
7. ANS: B
8. ANS: D
9. ANS: A
10. ANS: E
11. ANS: D