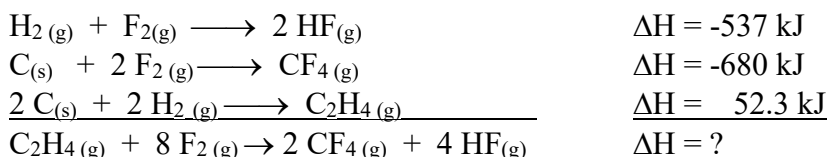


Multiple Choice: (4 points each. Put answers in left margin as capital letters.)
 $h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$

1. What is the oxidation number of the nitrogen atom in $\text{Ca}(\text{NO}_2)_2$?

- A) -3 B) -1 C) +1 D) +3 E) +5

2. What is ΔH for the net reaction below?



- A) -2486 kJ B) -1702 kJ C) -1165 kJ D) 234 kJ E) 1165 kJ

3. Which of the following is false?

- A) The energy of any electron in a hydrogen atom depends only on n .
B) A node (or nodal surface) is a place of zero electron density.
C) In any atom, no two electrons may have the same four quantum numbers.
D) The lowest energy state for an atom is its ground state.
E) Effective nuclear charge is the number of protons in an atom.

4. The electrons in which orbital type shields **most poorly**?

- A) d B) f C) p D) s

5. The $\ell = 2$ subshell may hold a maximum of _____ electrons.

- A) 1 B) 2 C) 6 D) 10 E) 14

6. Which of the following is isoelectronic to Y^{3+} ?

- A) Ag^+ B) K^+ C) Kr D) Se^{2-} E) Zr^{2+}

7. With respect to electronegativity values,

- A) $\text{B} > \text{N} > \text{Al}$ B) $\text{Al} > \text{N} > \text{B}$ C) $\text{N} > \text{B} > \text{Al}$ D) $\text{B} > \text{Al} > \text{N}$ E) $\text{Al} > \text{B} > \text{N}$

8. Four of the following five statements are almost always true of compounds possessing ionic bonds. Which one is not?

- A) Compounds that dissolve well in water.
B) Compounds that are solids at room temperature.
C) Compounds that are brittle.
D) Compounds that conduct electricity well when liquids.
E) Compounds that are hard.

6. Based on their positions in the periodic table, predict which atom of the following pairs will have the larger atomic radius. Provide the physical rationale for your choices. (10 points)

a) O, Ne –

b) Mg, Sr –

7. Draw the Lewis structures of PCl_3 and H_3PO_4 . Which is the most electronegative element in each molecule? (12 points)