Chem / Envsty L111: Spring 2007 Quiz 8

Name _

- 1. Which of the following is/are true about Maximum Contaminant Level Goals (MCLGs)?
- I. The MCLG for any contaminant that is regulated as a carcinogen is set to zero.
- II. A person weighing 70 kg (154 lb) could drink two liters (about two quarts) of water containing a contaminant at the MCLG level everyday for 70 years without suffering any ill effects.
- III. The Maximum Contaminant Level (MCL) set by the EPA may be higher than the MCLG because it also takes into account the practical realities of financial and technical barriers that may make it difficult to achieve these goals.
- **IV**. The MCLG is always set to zero because this is the best goal.
 - a. II only
 - b. I, and II only
 - c. I, II and III only

15/20 correct

- d. I, II, III and IV
- 2. The main reason that water supplies are "chlorinated" is
 - a. to filter out solids from the water.
 - b. to kill bacteria in the water. 17/20
 - c. to make the water softer.
 - d. to remove lead salts from the water as insoluble lead chloride.
- 3. Which form of water disinfection continues to provide antibacterial protection after the water leaves the purification plant?
 - a. chlorination

16/20

- b. ozonation
- c. UV radiation
- d. filtration
- 4. Which statement related to hard water is *not* true?
 - a. The primary source of hard water is limestone rocks that are composed of calcium carbonate.
 - b. Hardness is usually expressed in parts per million of sodium carbonate by mass. (It's calcium carbonate sneaky, eh?) 14/20
 - c. Hard water may form a hard insoluble deposit of calcium carbonate in pipes and water heaters.
 - d. When hard water interacts with soap it results in the formation of soap scum and bathtub rings.

- 5. What ions are primarily responsible for hard water?
 - a. sodium and potassium
 - b. calcium and magnesium 20/20: well done!

c. sulfate and chloride

d. nitrate and ammonium

6. Which of these substances in drinking water pose a health risk?

I. Lead in water

II. Hard water ions

- III. Trihalomethanes in water
 - a. I only
 - b. **II** only
 - c. I and II only
 - d. I and III only 19/20
- 7. Which of these is **not** a trihalomethane?
 - "trihalomethane" means that it has 3 (tri) halogens. a. CH₃Cl
 - Choice a. only has one, while all the others DO have 3. b. CHCl₃ 8/20!
 - c. CHF_3
 - d. CHBr₂Cl
- 8. Fission is the process of creating energy by
 - a. combining small nuclei to form a larger, more stable nucleus.
 - b. combining small nuclei to form a larger, less stable nucleus.
 - c. splitting large nuclei with bombarding protons.
 - d. splitting large nuclei with bombarding neutrons. 19/20
- 9. In the famous equation $E = mc^2$, the symbols represent:
 - a. E = Einstein, m = matter, c = speed of light
 - b. E = energy, m = mass, c = characteristic of the particle
 - c. E = Einstein, m = meters, c = conversion
 - d. E = energy, m = mass, c = speed of light20/20!

- 10. Which is *not* a benefit associated with nuclear power plants?
 - a. efficient production of electricity
 - b. reduction of CO₂ in the atmosphere
 - c. inexpensive to operate

9/20

d. helps reduce the levels of acid rain

This one's pretty sneaky, too. Nuclear plants are *efficient* in that they produce a lot of power from very little fuel. Because they do not burn fossil fuels, using nuclear plants instead of fossil fuel plants *reduces the* CO_2 in the atmosphere. Similarly, using nuclear instead of coal *reduces the amount of* SO_2 *in the atmosphere* – SO_2 is the primary cause of acid rain (which we touched on while discussing London Smog). However, while the fuel for nuclear plants is cheap, it is very expensive to RUN a nuclear plant because of additional safety and security considerations, and because disposing of the fuel is very expensive. We haven't covered this explicitly yet, but we DID discuss that several nuclear plants in the U.S. closed because they couldn't compete economically with natural gas plants.