Accompanying Questions
Topic 07: Intermolecular Forces, States of Matter, and Energy

Objective:

This is to provide guiding questions to help you comprehend the material we have covered in this section of the class. These questions or very similar questions have been answered within the video lecture and/or live class.

Instructions and Notes:

- Most of these questions/concepts are taken or derived from the chapters in the Chemistry: Atoms First 2e Online Textbook (OpenStax)
- Book sections covered: 10.1, 10.2, 10.3 (heating/cooling curves only), 10.4, 9.1

Submission:

Students do not submit this and it is not graded.

Helpful Tips:

- These questions or very similar questions may appear on the exams so I strongly recommend that you complete them.
- Download the lectures and rewatch the lectures.
- Pause the lectures and rewind them through concepts you don't fully understand.
- Go to tutoring in the ASTC or MESA, ask your classmates in our Discord room, watch YouTube Videos, come to office hours, etc.

In-Lecture Questions

Lecture 1 of 2

1. What is a physical change?
2. What keeps solids and liquids together?
3. Give two examples of intramolecular forces.
4. What is stronger, intramolecular or intermolecular forces?
5. List the three (3) intermolecular forces (IMF) from weakest to strongest.
6. What types of molecules can participate in dipole-dipole attractions? How many molecules are required?
7. Fill in the blank: Hydrogen bonding is the strongest type of _____?
8. Hydrogen bonding occurs when hydrogens are covalently bonded to which three atoms?
9. True/False: dispersion forces can happen in all molecules?
10. True/False: molecules that are normally nonpolar can have instantaneous moments of polarity because electrons can sometimes move to one side of the molecule.
11. What can break intermolecular forces (IMF)?
12. True/False: stronger intermolecular forces (IMF) are harder to break so stronger IMF means it would be harder to vaporize or boil something.
13. Describe what viscosity is. How are IMF related to that?

14. What is surface tension?
15. Do attractive IMF cause a meniscus to have a higher or lower fluid level?
16. Describe capillary action. What causes the fluid to rise? What prevents the fluid from going to the top of the capillary tubes?

Lecture 2 of 2

17. List the 6 different phase changes and the phases they are transitioning from and to (i.e. freezing; (l) -> (s)
18. What are the labels on the x-axis (bottom) and y-axis (left side) of the phase diagram?
19. What is a triple point?
20. Using figure 10.31, What phase changes can water undergo as the temperature changes if the pressure is held at 0.3 kPa? If the pressure is held at 50 kPa?
21. Using figure 10.34, Identify the phase changes that carbon dioxide will undergo as its temperature is increased from −100 °C while holding its pressure constant at 1500 kPa. At 50 kPa. At what approximate temperatures do these phase changes occur?
22. Explain the difference between heat and temperature.
23. For heating and cooling curves, what is happening at the flat horizontal lines? What about the diagonal lines?
24. What is the SI unit of energy? What is energy?
25. Explain heat capacity in your own words.
26. List all the variables in the heat equation and describe what they are.
27. Briefly describe what exothermic and endothermic reactions are.
28. How much heat, in joules, must be added to a 502 g iron skillet to increase its temperature from 25 °C to 250 °C? The specific heat of iron is 0.449 J/g °C.
29. A piece of unknown metal weighs 217 g. When the metal piece absorbs 1.43 kJ of heat, its temperature increases from 24.5 °C to 39.1 °C. Determine the specific heat of this metal, and predict its identity.