Distillation Review Questions

1. What piece of glassware is really the only difference between a simple distillation and a fractional distillation?
2. When should a simple distillation be used and when must a fractional distillation be used?
3. What is the physical difference between a distilling column and a condenser?
4. What is the definition of “boiling point” for a liquid?
5. Explain why the boiling point is lower when it rains outside.
6. Why don’t foods cook in liquids, like water, the same at high altitudes as they do at sea level?
7. When a compound boils, what happens to the intermolecular forces of a compound?
8. What is the purpose of a boiling stone? When should they be used?
9. How much liquid can one put in a distilling flask?
10. What is the “reflux line” for a distillation?
11. If you heat a distillation for a mixture of compounds too hot too quickly, your results will be poor separation. Why?
12. When heating a mixture of compounds whose boiling points are different, what is the composition of the vapor above the liquid?
13. How does the distilling column aid in the separation process? What is the purpose of packing material?
14. Ideally, what would you hope would happen in a distillation to separate two liquids with different boiling points? What does the ideal distillation graph (Time versus Temp) look like?
15. What is “column hold-up”? How does it negatively impact your distillation?
16. Draw a fractional distillation apparatus and label all of the parts.
17. Why doesn’t the temperature on the thermometer increase as soon as boiling begins in the reaction flask?
18. Why is the clamp on the reaction flask the most important clamp on the apparatus set-up?
19. Why must the apparatus be assembled 4-6 inches above the benchtop?
20. When you assemble the apparatus, you have to attach two water hoses. One is for the water inlet and one for the water outlet. Which of the connections should water always go in – top or bottom (higher or lower)?
21. If the thermometer is set too low, too far into the apparatus, the temperature reading will not be accurate. Too high or too low, and why?
22. If the thermometer is set too high in the apparatus, the temperature reading will not be accurate. Too high or too low, and why?