CHM 130: Chapter 11 Homework

1. Check all of the following that are **properties of gases**:

    a) definite shape
    b) indefinite shape
    c) fixed volume
    d) can diffuse uniformly within same container
    e) can expand
    f) can compress
    g) cannot expand or compress
    h) have very low densities, about 1000 times less dense than water

2. Standard temperature and pressure (STP) are defined as _____.

    a) 273°C and 760 torr
    b) 273 K and 760 atm
    c) 273 K and 760 torr
    d) 0 K and 1 atm

3. The pressure of a gas decreases when either the number of collisions increases or the energy of collisions increases. True or False?

4. Which of the following statements is correct?

    a) Atmospheric pressure increases as altitude increases.
    b) Atmospheric pressure decreases as altitude increases.
    c) Atmospheric pressure is constant.
    d) Atmospheric pressure varies but is not affected by altitude.

5. Convert 35 psi to units of atmospheres (atm).

6. Convert 745 torr to units of mmHg.

7. Convert 725 mmHg to atm.

8. Check all of the statements below referring to the pressure exerted by gas molecules in a container that are **true**:

    a) Increasing the volume of the container increases the pressure.
    b) Decreasing the volume of the container decreases the pressure.
    c) Increasing the volume of the container decreases the pressure.
    d) Decreasing the volume of the container increases the pressure.
    e) The volume of the container and the pressure of the gas are **directly** related.
    f) The volume of the container and the pressure of the gas are **indirectly (or inversely)** related.

9. Check all of the statements below referring to the pressure exerted by gas molecules in a container that are **true**:

    a) Increasing the temperature increases the pressure.
    b) Decreasing the temperature decreases the pressure.
    c) Increasing the temperature decreases the pressure.
    d) Decreasing the temperature increases the pressure.
    e) The temperature and the pressure of the gas are **directly** related.
    f) The temperature and the pressure of the gas are **indirectly (or inversely)** related.

10. Check all of the statements below referring to the pressure exerted by gas molecules in a container that are **true**:

    a) Increasing the number of gas molecules increases the pressure.
    b) Decreasing the number of gas molecules decreases the pressure.
    c) Increasing the number of gas molecules decreases the pressure.
    d) Decreasing the number of gas molecules increases the pressure.
    e) The number of gas molecules and the pressure of the gas are **directly** related.
    f) The number of gas molecules and the pressure of the gas are **indirectly (or inversely)** related.

11. A 25.0 L sample of air at a pressure 1.00 atm is compressed to 12.5 L. What is the new pressure of the sample?

12. A 10.0 mL sample of nitrogen gas at 250.0 torr is expanded until the new pressure is 125.0 torr. Calculate the new volume of the sample.

13. A 25.0 mL sample of oxygen gas at -98.0 °C is heated to 77.0 °C. Calculate the new volume of the sample in mL.

14. A 20.0 L sample of helium is cooled from 250.0 K to 125.0 K. What is the new volume of the helium sample?

15. A sample of argon gas at 275 K and 0.950 atm is heated to 375 K. What is the new pressure for the gas?

16. A sample of gas at 25°C and 1.25 atm is heated to 182°C . Calculate the new pressure for the gas.

17. A 5.00 L sample of helium at 955 torr was cooled from 675 K to 225 K and compressed to a new volume of 2.50 L. Calculate the new pressure for the helium sample.

18. A 25.0 L sample of gas has a pressure of 2.50 atm at 20.0°C. Calculate the volume of the gas at STP.

19. Gas molecules are not attracted to one another. True or False?

20. If the temperature of a sample of gas is **decreased**, the average kinetic energy of the gas will _____.

    a) Decrease

    b) Increase

    c) Remain the same