Holiday Homework Test Chemistry 11 2017

Total Marks___/49 **Student Name:_____**

Questions:

1. Explain why the pressure of a gas does not change if the number of moles and the temperature and volume do not change, **using the kinetic molecular theory**. [4 marks]

2. Brownian motion is the random movement of gas particles. Explain why gas particles move randomly. [2 marks]

3. A pressurised cylinder contains air (which is a mixture of nitrogen, oxygen, carbon dioxide etc. Using **kinetic molecular theory**, explain why gas particles in the cylinder might be moving at different speeds even though the temperature of the air is constant and not changing. Include as much detail as possible for this answer. [5 marks]

4. **Using kinetic molecular theory**, explain why the piston in a cylinder will lower if the pressure decreases. [2 marks]

5. If you take a half full petrol can and tightly close the lid so no fumes come out explain what could happen to the can if there is no safety valve that can open when the outside temperature increases by 20ºC. Explain this event **using kinetic molecular theory**. [3 marks]

6. If you could see individual gas particles describe their motion inside a closed cylinder of fixed volume under the following condition. Remember to not only talk about how fast particles are moving but also talk about the type of movement and likelihood of collisions under these circumstances.

High number of moles at low temperature. [2 marks]

7. If you had 2 L of helium in one container and 2 L of xenon in another container both containers are at STP then what can you say about the number of moles in each container? Explain your answer. [2 marks]

8. Read the problem the determine the gas law involved (Boyles, Charles or Combined gas law) and solve for the unknown variable.

a) A cylinder with a moveable piston contains 150 mL of gas that is at 25^{o}C. The cylinder of gas is then heated to 125 ^{o}C. What is the new volume of the gas?

i. Gas Law involved:_____[1 mark]
ii. Solve for new pressure using this gas law. [2 marks]

b) 4.7 moles of gas is in a 1.5 L cylinder with a moveable piston. The pressure of the gas is 105 kPa under these conditions. If the temperature is held constant and the gas is compressed to 0.5 L what is the new pressure?

i. Gas Law involved:_____[1 mark]

ii. Solve for new pressure using this gas law.[2 marks]

iii. Using PV=nRT solve for the temperature of the gas.[2 marks]

c) A gas is in a cylinder with a moveable piston. The gas is initially at 40^{o}C, 150kPa and 2.5L. If the piston is pushed down and its new pressure of the gas is 220kPa and the new volume is 1.45L. Did the gas heat up or cool down?

i. Gas Law involved:_____ [1 mark]
ii. Solve for new temperature using this gas law.[2 marks]

iii. Explain using kinetic molecular theory why the gas heated up or cooled down. [3 marks]

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iii. Using PV=nRT how many moles of gas is in the cylinder. [2 marks]

9. More challenging stoichiometry questions.
   A. Calcium carbonate is reacted with an excess of hydrochloric acid to produce 14.32 mL of carbon dioxide gas at STP.
      i. What is the mass of pure calcium carbonate originally used? [4 marks]

      ii. If you started with impure limestone that contained only 65.2% by weight calcium carbonate then what is the original mass of limestone used for this reaction. [2 marks]

   B. 2.35 g of zinc is reacted with excess hydrochloric acid.

      i. What is the volume of hydrogen gas produced at STP due to this reaction? Assume the metal was pure zinc. [3 marks]

ii. If the reaction was conducted at 36^{o}C, 110.5 kPa, what volume of hydrogen gas would be produced by this reaction assuming all the magnesium reacted. [2 marks]

iii. How many moles of hydrochloric acid were consumed by this reaction? [2 marks]