每題10分，共10題

1. A gas company in Massachusetts charges \$1.30 for 15ft^3 of natural gas (CH_4) measured at 20℃ and 1.0 atm. Calculate the cost of heating 200mL of water(enough to make a cup of coffee or tea) from 20℃ to 100℃. Assume that only 50 percent of the heat generated by the combustion is used to heat the water; the rest of the heat is lost to the surroundings.

2. A student gave a molecule the following name: 2-ethyl-3-methyl-5-isopropylhexane . However, her TA pointed out that although the molecule could be drawn correctly from this name, the name violates the systematic rules. What is the correct (systematic) name of the molecule?
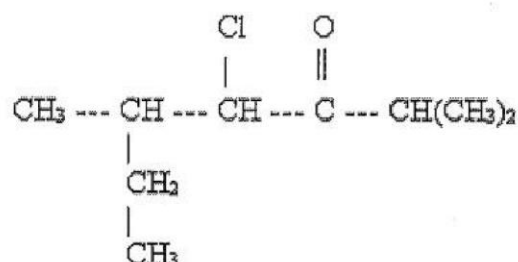
3. Name the following:
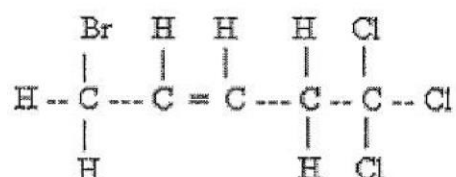
4.　Name the following compound.
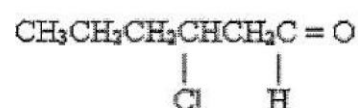
5.　Name the following.

6. The diffusion rate of methane was found to be 1.41 times faster than that of an unknown gas molecule at room temperature. Question: What is the density of the unknown gas molecule under STP condition? (CH_4= 16.04 g/mol)

7. A gas sample containing of CO_2 and N_2 in 1:2 molar ratio has a volume of 350 mL at 40℃ with a CO_2 partial pressure of 560 torr. What is the volume of the mixed gases under STP condition?

8. The pressure of a mixture of He and Kr in a container with volume of 200 L at 20.0℃ is 1.38 atm. The mass ration of He:Kr is 57%:43%. What is the mass of He?(He=4.00 g/mol, Kr= 83.8 g/mol)

9. An organic compound (hydrocarbon) containing only carbon and hydrogen is 85.3% C by mass. The molar mass of the hydrocarbon is between 50 and 60 g/mol. What is the formula of the compound .

10. Calculate the pH of a 0.011 M solution of NH_4NO_3 ($K_b(NH_3)$ = 1.8 x 10^{-5})