Name: _____

TEST 4, FORM A
CHEM 1110, SPRING 2011
You may use a calculator on this test.

Part I: Multiple Choice (60 pts) – clearly circle the best answer.

1. Which one of the following has the highest boiling point?
   a. I_2
   b. Xe
   c. CH_3CH_2OH
   d. KF

2. What volume of NO is produced at STP when 40.5 L O_2 (at STP) reacts with an unlimited amount of ammonia?
   a. 40.5 L NO
   b. 32.4 L NO
   c. 50.6 L NO
   d. None of these

$$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O$$

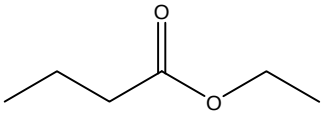
3. What is the partial pressure of N_2 in a mixture if the mole percent of N_2 is 65.9% and the total pressure is 742 mmHg?
   a. 742 mmHg
   b. 1130 mmHg
   c. 489 mmHg
   d. 8.88×10^{-4} mmHg

4. Whose gas law states that volume is inversely proportional to pressure?
   a. Avogadro
   b. Gay-Lussac
   c. Charles
   d. Boyle

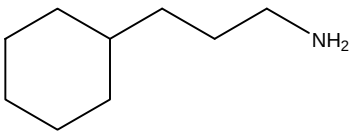
5. _____ is the resistance to flow.
   a. Wetting
   b. Surface tension
   c. Boiling point
   d. Viscosity

6. Which of the following ranks intermolecular/interparticle forces from strongest to weakest?
   a. Hydrogen bonding, Dipole-Dipole, Ion-Ion, London Dispersion
   b. Ion-Ion, Hydrogen bonding, Dipole-Dipole, London Dispersion
   c. London Dispersion, Dipole-Dipole, Hydrogen bonding, Ion-Ion
   d. London Dispersion, Ion-Ion, Dipole-Dipole, Hydrogen bonding

7. What is the main functional group in the following molecule?
   a. Ester
   b. Amine
   c. Aldehyde
   d. Ketone



8. What is the main functional group in the following molecule?
    a. Alcohol
    b. Alkene
    c. Amine
    d. Aldehyde



9. Which of the following is not contained within RNA molecules?
    a. deoxyribose
    b. phosphate linkages
    c. hydrogen bonding
    d. nitrogen containing organic bases

10. What would be the complimentary base pairing for this nucleotide sequence, TAGCGCCAAT?
    a. TAGCGCCAAT
    b. ATGCGCCTTA
    c. TACGCGGAAT
    d. ATCGCGGTTA

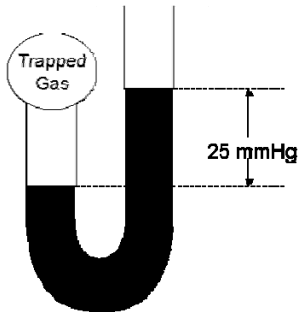
11. _____ is the phase change that occurs when a gas goes directly to a solid.
    a. Sublimation
    b. Deposition
    c. Condensation
    d. Freezing

12. Which of the following statements is true about an ideal gas?
    a. A gas is ideal over all ranges of temperatures and pressure.
    b. Ideal gas molecules react with one another.
    c. Gases are compressible.
    d. The volume of the gas molecule is very important when determining volume of an ideal gas.

13. The rate of diffusion (or effusion) of a molecule is inversely related to:
    a. The number of atoms in the molecule.
    b. The molar mass of the molecule.
    c. The number of electrons in the molecule.
    d. The polarity of the molecule.

14. Which of the following is NOT contained in a protein molecule?
    a. Amino acids
    b. Peptide linkages
    c. Nucleotides
    d. All of these

15. What is the pressure of the trapped gas (in atm) in the barometer if the atmospheric pressure is 717 mmHg?
    a. 0.911 atm
    b. 692 atm
    c. 742 atm
    d. 0.976 atm



Part II: Short Answer/Calculations (40 pts) – clearly show all work for full credit.

1. (10 pts) Consider the curve below:
   a. Give the phase(s) present at locations: A:_____, B: _____,

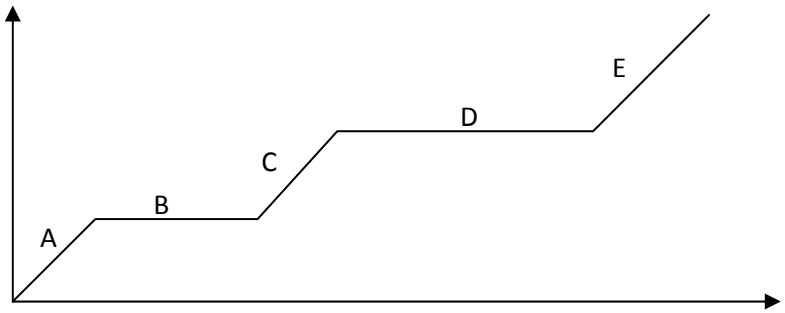
      C: _____, D: _____, and E: _____

   b. What phase changes occur at the locations indicated below?

      B: _____ and D: _____

   c. Give the labels for the x-axis:_____ and the y-axis:_____

   d. What type of curve is this? _____



2. (10 pts) A 75.0 g sample of N_2O is confined in a 3.1 L container. What is the pressure (in atm) at 155°C? (MM of N_2O = 44.02 g/mol)

3. (10 pts) A 93.0 L sample of dry air cools from 145°C to -22°C while the pressure is maintained at 2.85 atm. What is the final volume?

4. (10 pts) How many liters of gaseous elemental bromine (Br_2) at 300.°C and 0.855 atm are formed by the reaction of 275 g of sodium bromide with excess sodium bromate and sulfuric acid? (MM of NaBr = 102.89 g/mol)

$$5\ NaBr + NaBrO_3 + 3\ H_2SO_4 \rightarrow 3\ Br_2 + 3\ Na_2SO_4 + 3\ H_2O$$

	IA												IIIA	IVA	VA	VIA	VIIA	VIIIA
1	1 **H** 1.008	IIA																2 **He** 4.00
2	3 **Li** 6.94	4 **Be** 9.01											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
3	11 **Na** 22.99	12 **Mg** 24.31	IIIB	IVB	VB	VIB	VIIB	VIIIB			IB	IIB	13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.06	17 **Cl** 35.45	18 **Ar** 39.95
4	19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.90	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.71	29 **Cu** 63.55	30 **Zn** 65.37	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
5	37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** [98]	44 **Ru** 101.1	45 **Rh** 102.9	46 **Pd** 106.4	47 **Ag** 107.9	48 **Cd** 112.40	49 **In** 114.8	50 **Sn** 118.7	51 **Sb** 121.8	52 **Te** 127.60	53 **I** 126.90	54 **Xe** 131.30
6	55 **Cs** 132.9	56 **Ba** 137.3	71 **Lu** 175	72 **Hf** 178.5	73 **Ta** 181	74 **W** 183.9	75 **Re** 186.2	76 **Os** 190.2	77 **Ir** 192.2	78 **Pt** 195.1	79 **Au** 197	80 **Hg** 200.59	81 **Tl** 204.4	82 **Pb** 207.2	83 **Bi** 209	84 **Po** [209]	85 **At** [210]	86 **Rn** [222]
7	87 **Fr** [223]	88 **Ra** [226]	103 **Lr** [262]	104 **Rf** [267]	105 **Db** [268]	106 **Sg** [271]	107 **Bh** [272]	108 **Hs** [270]	109 **Mt** [276]	110 **Ds** [281]	111 **Rg** [280]	112 **Uub** [285]	113 **Uut** [284]	114 **Uuq** [289]	115 **Uup** [288]	116 **Uuh** [293]		118 **Uuo** [294]

57 **La** 138.9	58 **Ce** 140.1	59 **Pr** 140.9	60 **Nd** 144.2	61 **Pm** [145]	62 **Sm** 150.4	63 **Eu** 152	64 **Gd** 157.3	65 **Tb** 158.9	66 **Dy** 162.5	67 **Ho** 164.93	68 **Er** 167.3	69 **Tm** 168.9	70 **Yb** 173
89 **Ac** [227]	90 **Th** 232	91 **Pa** [231]	92 **U** 238	93 **Np** [237]	94 **Pu** [244]	95 **Am** [243]	96 **Cm** [247]	97 **Bk** [247]	98 **Cf** [251]	99 **Es** [252]	100 **Fm** [257]	101 **Md** [258]	102 **No** [259]