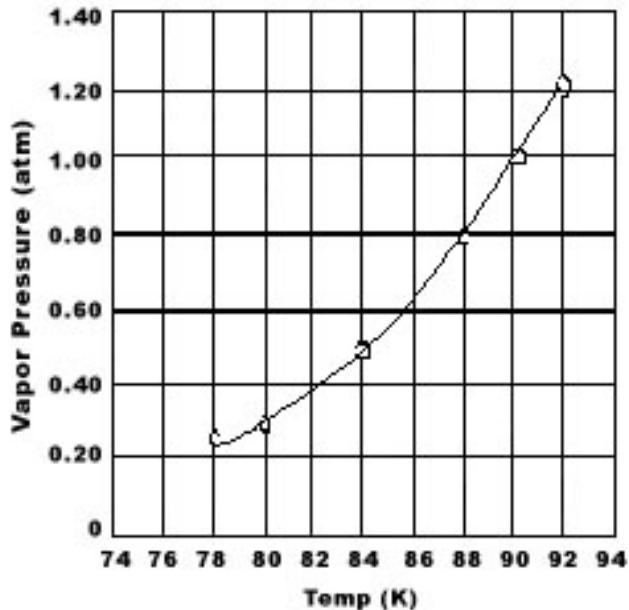


Spring 2013
CHEM 1110.20784
Test 4, Form A

MULTIPLE CHOICE: Clearly mark the correct choice on the scantron provided. (60pts)

- Which process defines how ionic compounds break apart into its constituent ions upon dissolution?
A) Decomposition B) Division C) Dissolution D) Electrolysis E) Dissociation
- Based on the solubility rules, which of these processes will occur if solutions of $\text{CuSO}_4(aq)$ and $\text{BaCl}_2(aq)$ are mixed?
A) CuSO_4 will precipitate; Ba^{2+} and Cl^- are spectator ions.
B) BaSO_4 will precipitate; Cu^{2+} and Cl^- are spectator ions.
C) No precipitate will form.
D) CuCl_2 will precipitate; Ba^{2+} and SO_4^{2-} are spectator ions.
E) BaCl_2 will precipitate; Cu^{2+} and SO_4^{2-} are spectator ions.
- Which of these compounds is a *strong electrolyte*?
A) $\text{C}_6\text{H}_{12}\text{O}_6$ (glucose) B) H_2SO_4 C) H_2O D) CH_3COOH (acetic acid) E) O_2
- Which of the following should have the lowest boiling point?
A) C_8H_{18} B) C_5H_{12} C) $\text{C}_{10}\text{H}_{22}$ D) $\text{C}_{12}\text{H}_{26}$ E) C_6H_{14}
- Use the graph of vapor pressure to determine the normal boiling point of O_2 .

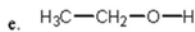
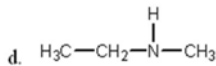
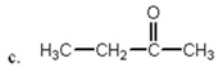
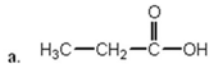


- A) O_2 doesn't boil because it is always a gas. B) 84 K C) 90 K D) 92 K E) 88 K
- Which is the correct description of a solution?
A) None of these
B) A homogeneous mixture of 2 or more substances.
C) May be gaseous, solid, or liquid.
D) A heterogeneous mixture of 2 or more substances.
E) answers b and c

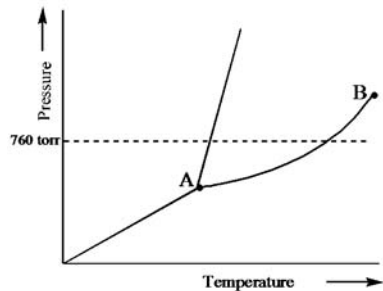
7. Arrange the following gases in order of increasing rate of effusion: C_2H_6 , Kr, HBr, and AsH_3 .
- A) $Kr < AsH_3 < HBr < C_2H_6$ D) $C_2H_6 < AsH_3 < HBr < Kr$
 B) $Kr < HBr < AsH_3 < C_2H_6$ E) $Kr < AsH_3 < C_2H_6 < HBr$
 C) $C_2H_6 < HBr < AsH_3 < Kr$

8. Which of the following is/are characteristic(s) of gases?
- A) High compressibility
 B) Relatively large distances between molecules
 C) Formation of homogeneous mixtures regardless of the nature of gases
 D) A and B
 E) A, B, and C

9. In which of the following compounds will the molecules *not* form hydrogen bonds with each other?

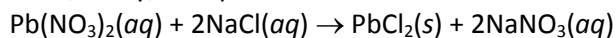


10. Examine the following phase diagram and identify the feature represented by point A.



- A) sublimation point B) melting point C) triple point D) boiling point E) critical point
11. For a substance that remains a gas under the conditions listed, deviation from the ideal gas law would be most pronounced at
- A) $0^\circ C$ and 2.0 atm. D) $-100^\circ C$ and 2.0 atm.
 B) $100^\circ C$ and 4.0 atm. E) $-100^\circ C$ and 4.0 atm.
 C) $100^\circ C$ and 2.0 atm.
12. Which of the following is a weak acid?
- A) HBr B) HCl C) H_2SO_4 D) HNO_3 E) HF
13. Based on the solubility rules, which one of these compounds should be *insoluble* in water?
- A) $MgBr_2$ B) AgBr C) $ZnCl_2$ D) $FeCl_2$ E) NaCl
14. Select the precipitate that forms when the following reactants are mixed: $Na_2CO_3(aq) + BaCl_2(aq) \rightarrow$
- A) NaCl B) Ba_2CO_3 C) $NaCl_2$ D) BaO E) $BaCO_3$

15. In the following reaction, what ions, if any, are spectator ions?



- A) $\text{Na}^+(\text{aq}), \text{NO}_3^-(\text{aq})$
B) $\text{Pb}^{2+}(\text{aq}), \text{NO}_3^-(\text{aq})$
C) There are no spectator ions
D) $\text{Pb}^{2+}(\text{aq}), \text{Cl}^-(\text{aq})$
E) $\text{Na}^+(\text{aq}), \text{Cl}^-(\text{aq})$

16. A sample of an ideal gas has its pressure doubled while its temperature and amount remain constant. If the original volume is 2.0L, what is the new volume?

- A) 2.5 L B) 0.5 L C) 2.0 L D) 1.0 L E) 5.0 L

17. The strongest intermolecular interactions between hydrogen sulfide (H_2S) molecules arise from

- A) hydrogen bonding.
B) disulfide linkages.
C) ion-dipole interactions.
D) London dispersion forces.
E) dipole-dipole forces.

18. The distinguishing characteristic of all electrolyte solutions is that they

- A) react with other solutions.
B) conduct heat.
C) conduct electricity.
D) contain molecules.
E) always contain acids.

19. _____ Law states that the volume of a gas is directly proportional to the temperature of a gas on contact pressure and number of moles.

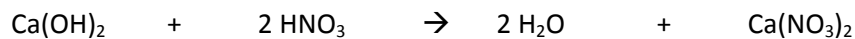
- A) Pauli's B) Hund's C) Avogadro's D) Charles's E) Boyle's

20. What is the temperature in Celsius at 77 K which is the temperature of liquid nitrogen?

- A) -196°C B) 196°C C) 3.55°C D) 350°C E) -350°C

CALCULATIONS: Clearly show all work on the blank space on the scantron answer sheet for full credit. (40 pts)

- What mass of lithium phosphate is needed to prepare 500. mL of a solution having a concentration of 0.125 M? (MM of $\text{Li}_3\text{PO}_4 = 115.79 \text{ g/mol}$)
- Calcium hydroxide reacts with nitric acid to form water and calcium nitrate. How many grams of calcium nitrate are produced if 0.250 g $\text{Ca}(\text{OH})_2$ are reacted with 25.0 mL of 0.100 M HNO_3 ? (MM of $\text{Ca}(\text{OH})_2 = 74.1 \text{ g/mol}$, MM of $\text{Ca}(\text{NO}_3)_2 = 164.09 \text{ g/mol}$)



- Gases are sold in large cylinders for laboratory use. What pressure, in atmospheres, will be exerted by $2.50 \times 10^3 \text{ g}$ of O_2 gas when stored at 22°C in a 40.0 L cylinder? (MM of $\text{O}_2 = 32.00 \text{ g/mol}$)
- A container at 745 mmHg contains 0.241 moles of hydrogen and 0.157 moles oxygen. What is the partial pressure of oxygen in the flask in **atm**?