Name_____

Instructions

– All Backpacks, Purses, Cell Phones, Textbooks, Notes, etc. should be placed at the front of the classroom.
– Write your name, and bubble in your exam version (A, B, C, etc.) on your scantron!
– Do not write any equations, or work out any problems on your scantron (this may be considered cheating).
– Be careful to check all answers and make sure mistakes on your scantron are properly erased before turning in your exam. (Grade corrections for incorrectly marked scantrons will not be made.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) If a gas pressure gauge reads 15 Torr, what is the pressure in atmospheres? 1) _____
A) 0.20 atm B) 11,000 atm C) 0.020 atm D) 1100 atm E) 15 atm

2) A sample of neon gas at 1.20 atm compresses from 0.250 L to 0.125 L. If the temperature and number of moles remain constant, what is the final pressure in atm? 2) _____
A) 1.20 atm
B) 1.00 atm
C) 0.600 atm
D) 2.40 atm
E) none of the above

3) If a volume of air at 375 K increases from 10.0 L to 15.0 L, what is the final Kelvin temperature? Assume pressure and number of moles remain constant. 3) _____
A) 563 K B) 344 K C) 375 K D) 153 K E) 250 K

4) If a volume of nitric oxide gas at 25.0 °C increases from 2.00 L to 3.00 L, what is the final Celsius temperature? Assume pressure and number of moles remain constant. 4) _____
A) 38 °C B) –74 °C C) 17 °C D) 174 °C E) 199 °C

5) If oxygen gas is collected over water at 25 °C and 775 torr, what is the partial pressure of the O_2? The vapor pressure of water at 25 °C is 23.8 torr. 5) _____
A) 751 torr B) 23.8 torr C) 750 torr D) 799 torr E) 775 torr

6) If 0.795 mol of ammonia gas occupies 24.5 L at 0.853 atm, what is the Celsius temperature? (R = 0.0821 atm•L/mol•K) 6) _____
A) 320 °C B) 278 °C C) –71 °C D) 5 °C E) 47 °C

7) If 0.250 mol of hydrogen gas occupies 0.333 L at 20.0 °C, what is the pressure in atmospheres? (R = 0.0821 atm•L/mol•K) 7) _____
A) 1.23 atm
B) 0.00554 atm
C) 18.1 atm
D) 4750 atm
E) 32.0 atm

8) An unknown gas occupies a volume of 4.75 L at 1227 °C and 5.00 atm. If the mass is 5.45 g, what is the molar mass of the gas? (R = 0.0821 atm•L/mol•K) 8) _____
A) 21.5 g/mol B) 344 g/mol C) 28.3 g/mol D) 141 g/mol E) 23.8 g/mol

9) Calculate the heat absorbed when 10.0 g of ice at 0 °C melts to water at the same temperature. The specific heat of water is 1.00 cal/(g x °C); the heat of fusion is 80.0cal/g; and the heat of vaporization is 540.0 cal/g. 9) _____

A) 10.0 cal
B) 54.0 cal
C) 8.00×10^2 cal
D) 5.40×10^3 cal
E) 8.0 cal

10) Which of the following illustrates the *like dissolves like* rule for a solid solute in a liquid solvent? 10) _____

A) An ionic compound is soluble in a nonpolar solvent.
B) A nonpolar compound is soluble in a polar solvent.
C) A polar compound is soluble in a nonpolar solvent.
D) A nonpolar compound is soluble in a nonpolar solvent.
E) none of the above

11) If 10.0 mL of blood plasma has a mass of 10.279 g and contains 0.870 g of protein, what is the mass percent concentration of protein in the blood plasma? 11) _____

A) 97.3% B) 8.70% C) 32.1% D) 0.870% E) 8.46%

12) What is the mass of sugar dissolved in 10.0 g of 5.00% sugar solution? 12) _____

A) 10.0 g B) 0.900 g C) 9.50 g D) 0.180 g E) 0.500 g

13) What is the molarity of a glucose solution that contains 10.0 g of $C_6H_{12}O_6$ (180.18 g/mol) dissolved in 100.0 mL of solution? 13) _____

A) 0.00555 *M* B) 0.0555 *M* C) 18.0 *M* D) 1.80 *M* E) 0.555 *M*

14) What is the mass of zinc acetate (183.49 g/mol) dissolved in 0.200 L of 0.500 *M* $Zn(C_2H_3O_2)_2$ solution? 14) _____

A) 1.83 g B) 12.4 g C) 91.7 g D) 18.3 g E) 36.7 g

15) What is the molarity of a hydrochloric acid solution prepared by diluting 250.0 mL of 6.00 *M* HCl to a total volume of 2.50 L? 15) _____

A) 2.50 *M* B) 0.250 *M* C) 6.00 *M* D) 0.600 *M* E) 0.0600 *M*

16) What volume of 12 *M* acid must be diluted with distilled water to prepare 5.0 L of 0.10 *M* acid? 16) _____

A) 60 mL B) 0.042 mL C) 6 mL D) 42 mL E) 420 mL

17) Which of the following aqueous solutions would be expected to freeze at the lowest temperature? 17) _____

A) 1 molality NaCl
B) 1 molality $CaCl_2$
C) 1 molality KNO_3
D) 1 molality $C_6H_{12}O_6$ (fructose)
E) All of these solutions would freeze at the same temperature.

18) What is the new boiling point of a 0.544 molality solution of glucose ($C_6H_{12}O_6$) in water? The density of water is 1.00 g/mL and K_b = 0.512°C/m. 18) _____

A) 100.0418°C
B) 100.279°C
C) 5.22°C
D) 50.502°C
E) none of the above

19) What are the ion concentrations in a 0.12 M solution of $AlCl_3$? 19) _____

A) 0.12 M Al^{3+} ions and 0.36 M Cl^- ions
B) 0.040 M Al^{3+} ions and 0.040 M Cl^- ions
C) 0.12 M Al^{3+} ions and 0.040 M Cl^- ions
D) 0.36 M Al^{3+} ions and 0.12 M Cl^- ions
E) none of the above

20) A student mixes two chemicals in lab. The chemical reaction causes the water/surroundings to increase in temerature. The chemical reaction was _____. 20) _____

A) endothermic B) exothermic C) Not Enough Infomation

21) Which of the following are basic assumptions of kinetic molecular theory. (Why the ideal gas law works.) 21) _____

A) Gas molecules are very far apart and have virtually no attractions between them.
B) Gas molecules are very large and close together.
C) Gas molecules move slow and have strong attractions between them.
D) When gas molecules collide, they stick together strongly.

22) Based on the solubility rules, which one of these compounds is *insoluble* in water? 22) _____

A) $Mg(NO_3)_2$
B) K_2SO_4
C) NH_4Cl
D) NaCl
E) $AlPO_4$

23) What mass of LiOH is required to prepare 0.250 L of a 3.55 *M* solution? 23) _____

A) 0.0371 g B) 340. g C) 21.3 g D) 0.888 g E) 250. g

1) C
2) D
3) A
4) D
5) A
6) E
7) C
8) C
9) C
10) D
11) E
12) E
13) E
14) D
15) D
16) D
17) B
18) B
19) A
20) B
21) A
22) E
23) C