Chemistry 101

Second Exam 020

Done by:

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1.Based on the solubility rules, which one of these compounds should be soluble in water?

a. FeS

b. $Pb(NO_3)_2$

c. $PbCl_2$

d. Ag_2SO_4

e. $CaCO_3$

2. Given the data in the table below calculate $\triangle H^o f$ (KJ) for the reaction:
$2CH_3OH(l) + 3O_2(g) \rightarrow 2CO(g) + 4H_2O(l)$

Substance	*$\triangle H^o f$(KJ/mol)*
CH_3OH	*-249*
CO_2	*-393*
$H_2O(l)$	*-286*

a. -1432

b. -1412

c. -1452

d. -1392

e. -1372

3. Given the following thermochemical equation:

$2S(s) + 3O_2(g) \rightarrow 2SO_3(g) \quad \triangle H = -792$ KJ

$S(s) + O_2(g) \rightarrow SO_2(g) \quad \triangle H = -297$ KJ

Calculate $\triangle H$(in KJ) for the reaction:

$SO_2(g) + ½\ O_2(g) \rightarrow SO_3(g)$

a. -139

b. -99

c. -119

d. -109

e. -129

4. Use the kinetic molecular theory of gases to predict what would happen to a closed sample of a gas whose temperature decreased while its volume increased?

a. Its pressure would hold constant

b. Its pressure would increase

c. Its pressure would decrease

d. The average kinetic energy of the molecules of the gas would increase

e. The number of moles of the gas would decrease

5. Calculate the density of hydrogen at STP.

a. 0.810 g/L

b. 0.0613 g/L

c. 0.0761 g/L

d. 1.54 g/L

e. 0.0893 g/L

6. Which one of these equations a redox reaction?

a. $CaBr(aq) + H_2SO_4(aq) \rightarrow CaSO_4(s) + 3HBr(g)$

b. $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$

c. $CO_3^{2-} + HSO_4^-(aq) \rightarrow HCO_3^-(aq) + SO_4^{2-}(aq)$

d. $Cu(s) + 3AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2Ag(s)$

e. $2KBr(aq) + Pb(NO_3)_2(aq) \rightarrow 2KNO_3(aq) + PbBr_2(s)$

7. Gaseous C_2H_4 reacts with O_2 according to the following equation:

$C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(g)$

What volume of oxygen at STP is needed to react with 1.50 mol of C_2H_4?

a. 67.2 L

b. 22.1 L

c. 33.6 L

d. 101 L

e. 4.50 L

8. Oxygen gas, generated by the reaction $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2$, is collected over water at 27 ^oC in a 1.40 L vessel at a total pressure of 760 torr. (The vapor pressure of H_2O at 27 ^oC in 26.0 torr). How many moles of $KClO_3$ were consumed in the reaction?

$R = 0.0821\ L\ atm\ mol^{-1}\ K^{-1}$

a.0.0841 moles

b. 0.0265 moles

c. 0.0366 moles

d. 0.0703 moles

e. 0.0169 moles

9. The oxidation number of Mn in $KMnO_4$ is:

a. 2+

b. 7+

c. 1+

d. 4+

e. 5+

10. A sample of N_2 gas is mixed with a gas (A) of unknown molar mass. The partial pressure of each gas is known to be 200 torr at 25 ^oC. The gases are allowed to effuse through a pinhole, and it is found that gas A escapes at 1.2 times the rate of N_2. The molar mass of gas A is:

a. 252

b. 9.33

c. 23.2

d. 19.4

e. 84.0

11.How much heat (in KJ) is produced when 85.0 g of $NH_3(g)$,(Molar mass= 17.0 g/mol), are oxidized according to:

$4NH_3(g) + 7O_2(g) \rightarrow 4NO_2(g) + 6H_2O(g)$ $\triangle H$= -1396 KJ

a. 698

b. 1745

c. 1047

d. 1396

e. 2094

12. A 4.50 g sample of sugar $C_5H_{10}O_5$ (molar mass= 150.0 g/mol) was burned in excess oxygen in a bomb calorimeter according to:

$C_5H_{10}O_5(s) + 5O_2(g) \rightarrow 5CO_2(g) + 5H_2O(l)$

If the heat capacity of the calorimeter and its contents was 16.0 KJ/ ^oC, and the temperature rose from 25.0 ^oC to 26.5 ^oC, calculate $\triangle H$ in K/mol for the combustion reaction.

a. -1600

b. -960

c. -800

d. -2400

e. -1200

13. A solution contains 0.600% (by mass) or (mass/mass) NaBr (sodium bromide) (molar mass= 102.89 g/mol). The density of the solution is 1.046 g/cm^3. What is the molarity of the NaBr solution?

a. 0.0610

b. 0.0583

c. 0.583

d. 0.0280

e. 0.610

14. Which of the following is included as postulate in the kinetic molecular theory of an ideal gas?

a. The distance between gas molecules is small compared with the size of the molecule

b. In an average collision between molecules, both molecules have the same kinetic energy.

c. Collision between molecules is all elastic

d. All molecules move randomly in zigzag direction

e. All the molecules have the same velocity

15. The oxidation number of P in $Ba_3(PO_3)_2$ is:

a. +2

b. +1

c. +4

d. +5

e. +3

16. A stock solution of potassium dichromate, $K_2Cr_2O_7$ (Molar mass= 294.185 g/mol) is made by dissolving 84.50 g of the compound in 1L of solution. How many milliliters of this solution are required to prepare 1 dm^3 of 0.0600 M $K_2Cr_2O_7$?

a. 430

b. 52.2

c. 261

d. 522

e. 209

17. In a process 455 KJ of heat were evolved and 656 KJ of work were done on the system. Calculated △U (KJ) for the system.

a. 201

b. 601

c. 401

d. 501

e. 301

ANSWERS

1	B	**10**	D
2	A	**11**	B
3	B	**12**	C
4	A	**13**	A
5	E	**14**	C
6	D	**15**	E
7	D	**16**	E
8	C	**17**	A
9	B		

GOOD LUCK 💚