

Course Title: General .Chem.
 Date: 26/11/2018
 No. of Questions: (3)
 Time: 60min
 Using Calculator (yes)

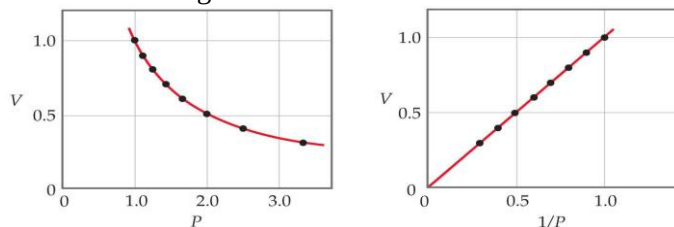
University of Palestine

 Second mid Exam
 2018-2019
 Total Grade: 30

Instructor Name: _____
 Student No.: _____
 Student Name: _____
 College Name: : _____
 Dep. / Specialist: _____

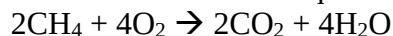
Question one: Multiple choice question (18 points)

1. The below diagram is an illustration of



- a. Charles Law
- b. Boyle's Law
- c. Avogadro's Law
- d. Dalton's Law
- e. Faraday law

2. Consider the balanced equation:



If 2.50 mol of each reactant is mixed together, how many moles of CO_2 will be produced?

- a. 2.50 b. 5.00 c. 1.25 d. 4.00 e. 2.00

3. In the reaction, $\text{K}_2\text{SO}_4(\text{aq}) + \text{Ba}(\text{NO}_3)_2(\text{aq}) \rightarrow \text{BaSO}_4(\text{s}) + 2\text{KNO}_3(\text{aq})$, which ions are the spectator ions?

- a. Ba^{2+} and SO_4^{2-}
- b. Ba^{2+} and K^+
- c. K^+ and NO_3^-
- d. Ba^{2+} and NO_3^-

4. 66.7 mL of 18.0 molar sulfuric acid solution was dissolved in enough water to make 500 mL of solution.

The molarity of the diluted mixture is

- a. 2.40 molar b. 0.135 molar
- c. 36.0 molar d. 9.00 molar
- e. 0.00741 molar

5. Which of these equations does *not* represent an oxidation-reduction reaction?

- a. $3\text{Al} + 6\text{HCl} \rightarrow 3\text{H}_2 + \text{AlCl}_3$
- b. $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
- c. $2\text{NaCl} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbCl}_2 + 3\text{NaNO}_3$
- d. $2\text{NaI} + \text{Br}_2 \rightarrow 2\text{NaBr} + \text{I}_2$
- e. $\text{Cu}(\text{NO}_3)_2 + \text{Zn} \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{Cu}$

6. Avogadro low state.

- a. $V \propto n$
- b. $V \propto P$.
- c. $P \propto n$
- d. $M \propto m$

7. Which of the following is predicted to be *triprotic acid* in water?

- a. HCl b. H_3PO_4
- c. H_2SO_4 d. CH_3COOH

8. Acetic acid (CH_3COOH), formic acid (HCOOH), hydrofluoric acid (HF), and ammonia (NH_3) are commonly classified as:

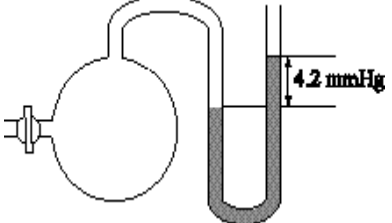
- a. Strong acids. b. Nonelectrolytes.
- c. Strong electrolytes. d. Weak electrolyte

9. Diethyl ether ($\text{C}_2\text{H}_5)_2\text{O}$ ($M = 74$) vaporizes at room temperature. If the vapor exerts a pressure of 233 mm Hg in a flask at 25°C , what is the density of the vapor?

- a. 0.928 b. 0.328 c. 0.528 d. 0.728

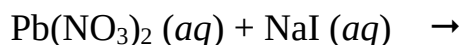
10. A cylinder of compressed gas is labeled (composition mol%) 4.5% H_2S , 3.0% CO_2 , balance N_2 . The pressure gauge attached to the cylinder reads 46.0 atm. The partial pressure of H_2S (in atm).

- a. 2.07 b. 2.97 c. 4.07 d. 1.0

11. According to the Bronsted definition, a acid is a compound that _____ a proton and a base is a compound that _____ a proton. An acid-base reaction involves transfer of a proton from the _____ to the _____. The answers in order are a. donates, accepts, base, acid b. accepts, donates, base, acid c. donates, accepts, acid, base d. accepts, donates, acid, base	12. A gas is collected in the flask shown here. What is the pressure exerted by the gas if the atmospheric pressure is 735 mmHg? a. 42 mmHg b. 693 mmHg c. 735 mmHg d. 777 mmHg 
13. What is the mixing of gases due to molecular motion called a. Diffusion b. Effusion c. Fission d. Fusion	14. What is the oxidation number of phosphorus in KH_2PO_4? a) +3 b) +5 c) +7 d) -5 e) +4
15. The fraction of rate of effusion of iodide atom to oxygen atom a. 0,355 b. 0,335 c. 0,235 d. 0,542	16. What is the oxidation number of phosphorus in KH_2PO_4? f. +3 b) +5 c) +7 a) -5 e) -3
17. This group of elements combines with metal elements to form salts: a) alkali metals b) alkaline earth metals c) noble gases d) halogens	18. Which of the following compounds will not undergo an acid-base (neutralization) reaction with HClO_4? a) NaOH b) $\text{Sr}(\text{OH})_2$ c) NH_3 d) Na_2CO_3 e) H_2SO_4

Question Two: (6 points)

A. Complete and balance the following ionic equation.



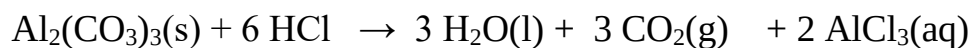
- 1) Complete the ionic equation.
- 2) Balance the chemical reaction
- 3) Write the net ionic equation
- 4) Determine which is spectator ions.

B. Take the following reaction: $\text{NH}_3 + \text{O}_2 \rightarrow \text{NO} + \text{H}_2\text{O}$. In an experiment, 3.25g of NH_3 are allowed to react with 3.50g of O_2 .

- 1) Which was the limiting reactant?
- 2) How many grams of NO formed?
- 3) How much of the excess reactant remains after the reaction?

Question three: (6points)

A. Aluminium carbonate is used to treat the symptoms of increased stomach acid reflux and stomach ulcers since it neutralize stomach acid (essentially hydrochloric acid). Calculate the volume of carbon dioxide gas produced at 25°C and 755mmHg when a soluble capsule containing 0.50g of aluminium carbonate reacts (molar mass=233.9)with excess hydrochloric acid.



B. An experiment is designed to determine the effect of sulfur dioxide, one of the EPA criteria pollutants, on plants. Among the variations used is a mixture that has the mole fractions given in the following table.

Gas	N_2	O_2	H_2O	SO_2
Mole fraction	0.751	0.149	0.080	0.020

If the desired total pressure is 750. torr, what should the partial pressures be? If the gas is to be in a 15.0-L vessel held at 30°C, how many moles of each substance are needed?

TABLE 4.2 Solubility Rules for Common Ionic Compounds in Water at 25°C

Soluble Compounds	Insoluble Exceptions
Compounds containing alkali metal ions (Li^+ , Na^+ , K^+ , Rb^+ , Cs^+) and the ammonium ion (NH_4^+)	
Nitrates (NO_3^-), bicarbonates (HCO_3^-), and chlorates (ClO_3^-)	
Halides (Cl^- , Br^- , I^-)	Halides of Ag^+ , Hg_2^{2+} , and Pb^{2+}
Sulfates (SO_4^{2-})	Sulfates of Ag^+ , Ca^{2+} , Sr^{2+} , Ba^{2+} , Hg_2^{2+} , and Pb^{2+}
Insoluble Compounds	Soluble Exceptions
Carbonates (CO_3^{2-}), phosphates (PO_4^{3-}), chromates (CrO_4^{2-}), sulfides (S^{2-})	Compounds containing alkali metal ions and the ammonium ion
Hydroxides (OH^-)	Compounds containing alkali metal ions and the Ba^{2+} ion

Periodic Table of the Elements																								VIII A 8A														
IA 1A																IIIA 3A		IVA 4A		VA 5A		VIA 6A		VIIA 7A		VIII A 8A												
1	H Hydrogen 1.008															5	B Boron 10.811	6	C Carbon 12.011	7	N Nitrogen 14.007	8	O Oxygen 15.999	9	F Fluorine 18.998	10	Ne Neon 20.180											
3	Li Lithium 6.941	4	Be Beryllium 9.012															13	Al Aluminum 26.982	14	Si Silicon 28.086	15	P Phosphorus 30.974	16	S Sulfur 32.066	17	Cl Chlorine 35.453	18	Ar Argon 39.948									
11	Na Sodium 22.990	12	Mg Magnesium 24.305	3	IIIB 3B	4	IVB 4B	5	VB 5B	6	VIB 6B	7	VIIB 7B	8	VIII 8		9	VIII 8		10	VIII 8		11	IB 1B	12	IIB 2B	13	Al Aluminum 26.982	14	Si Silicon 28.086	15	P Phosphorus 30.974	16	S Sulfur 32.066	17	Cl Chlorine 35.453	18	Ar Argon 39.948
19	K Potassium 39.098	20	Ca Calcium 40.078	21	Sc Scandium 44.956	22	Ti Titanium 47.867	23	V Vanadium 50.942	24	Cr Chromium 51.996	25	Mn Manganese 54.938	26	Fe Iron 55.845	27	Co Cobalt 58.933	28	Ni Nickel 58.693	29	Cu Copper 63.546	30	Zn Zinc 65.38	31	Ga Gallium 69.723	32	Ge Germanium 72.631	33	As Arsenic 74.922	34	Se Selenium 78.971	35	Br Bromine 79.904	36	Kr Krypton 84.798			
37	Rb Rubidium 84.468	38	Sr Strontium 87.62	39	Y Yttrium 88.906	40	Zr Zirconium 91.224	41	Nb Niobium 92.906	42	Mo Molybdenum 95.95	43	Tc Technetium 98.907	44	Ru Ruthenium 101.07	45	Rh Rhodium 102.906	46	Pd Palladium 106.42	47	Ag Silver 107.868	48	Cd Cadmium 112.411	49	In Indium 114.818	50	Sn Tin 118.711	51	Sb Antimony 121.760	52	Te Tellurium 127.6	53	I Iodine 126.904	54	Xe Xenon 131.294			
55	Cs Cesium 132.905	56	Ba Barium 137.328	57-71		72	Hf Hafnium 178.49	73	Ta Tantalum 180.948	74	W Tungsten 183.84	75	Re Rhenium 186.207	76	Os Osmium 190.23	77	Ir Iridium 192.217	78	Pt Platinum 195.085	79	Au Gold 196.967	80	Hg Mercury 200.592	81	Tl Thallium 204.383	82	Pb Lead 207.2	83	Bi Bismuth 208.980	84	Po Polonium [208.982]	85	At Astatine 209.987	86	Rn Radon 222.018			
87	Fr Francium 223.020	88	Ra Radium 226.025	89-103		104	Rf Rutherfordium [261]	105	Db Dubnium [262]	106	Sg Seaborgium [266]	107	Bh Bohrium [264]	108	Hs Hassium [269]	109	Mt Meitnerium [268]	110	Ds Darmstadtium [269]	111	Rg Roentgenium [272]	112	Cn Copernicium [277]	113	Uut Ununtrium unknown	114	Fl Flerovium [289]	115	Uup Ununpentium unknown	116	Lv Livermorium [298]	117	Uus Ununseptium unknown	118	Uuo Ununoctium unknown			

Lanthanide Series	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Actinide Series	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Alkali Metal	Alkaline Earth	Transition Metal	Basic Metal	Semimetal	Nonmetal	Halogen	Noble Gas	Lanthanide	Actinide
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End of Questions
Good Luck