

**General Chem. 101**  
**First Exam**

16

16

Date: 3/7/2012

Time: 70 min.

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Instructor Name: ..... Section 4 ..... Seat No.: ..... 66 .....

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

$N = 6.022 \times 10^{23}$ , Atomic masses: H = 1.00 , N = 14.0 , O = 16.0 ,  
C = 12.0 , F = 19.00 , Fe = 55.85 , B = 10.81 , Mn = 54.94 , Cl = 35.45 ,  
Ag = 107.9 , Ca = 40.08



**ANSWER SHEET**

- |    |   |   |   |   |   |     |   |   |   |   |   |
|----|---|---|---|---|---|-----|---|---|---|---|---|
| 1. | a | b | c | d | e | 9.  | a | b | c | d | e |
| 2. | a | b | c | d | e | 10. | a | b | c | d | e |
| 3. | a | b | c | d | e | 11. | a | b | c | d | e |
| 4. | a | b | c | d | e | 12. | a | b | c | d | e |
| 5. | a | b | c | d | e | 13. | a | b | c | d | e |
| 6. | a | b | c | d | e | 14. | a | b | c | d | e |
| 7. | a | b | c | d | e | 15. | a | b | c | d | e |
| 8. | a | b | c | d | e | 16. | a | b | c | d | e |

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1. Perform the following arithmetic and give the answer rounded to the correct number of significant figures.

$$0.0085 \\ 0.00016 \times 53.25 + 1.002$$

- a) 1.010    b) 1.011    c) 1.0    d) 1.01010    e) 1.0101

2. A cylindrical tank containing a liquid of a mass of 2500 gram, the height of the tank is 15.00 in, the area of its base is 12.00 in<sup>2</sup>. Calculate the density of the liquid in SI Units Kg/m<sup>3</sup>? ( $V_{cylinder} = \text{area of the base} \times \text{height}$ , (1 in = 2.54 cm by definition))

- a) 0.546    b) 13.88    c) 546.8    d) 847.6    e)  $5.46 \times 10^{-3}$

$$g = 25\ 009 \quad L = 15 \text{ in} \quad A = 12 \text{ in}^2$$

$$V = 12 \text{ in}^2 \left( \frac{2.54 \text{ cm}}{1 \text{ in}} \right)^2 \times 15 \text{ in} = \left( \frac{1 \text{ m}}{100 \text{ cm}} \right)^2 \left( 15 \right) \left( \frac{2.54 \text{ cm}}{1 \text{ in}} \right)$$

3. The melting point of mercury (Hg) is equal to -38.83 °F, it boils at  $\left( \frac{1 \text{ m}}{100 \text{ cm}} \right)$  674.11 °F, what is its boiling point in °C. [ ${}^\circ\text{C} = \frac{5}{9}({}^\circ\text{F} - 32)$ ]

- a) 356.7    b) 1345.3    c) 1245.3    d) 256.7    e) 0.546

4. The reaction:  $2 \text{ KClO}_3 \rightarrow 2 \text{ KCl} + 3 \text{ O}_2$  is an example of

- a) Double exchange reaction.    b) Red-ox metal replacement reaction.  
d) Red-ox combination reaction.    d) Red-ox decomposition reaction.  
e) Red-ox combustion reaction.

5. The correct name of Cl<sub>2</sub>O<sub>7</sub> is

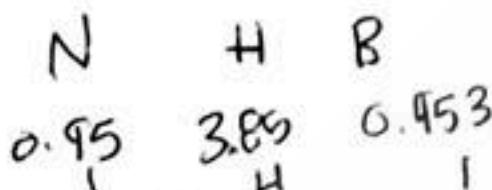
- a) Chlorine (VII) oxide.    b) Dichlorideheptoxide.  
c) Chlorine pentoxide.    d) Dichlorine heptoxide  
e) Chlorine heptoxide

6. The chemical formula of iron(III) sulfate is

- a)  $\text{Fe}_2\text{SO}_4$       b)  $\text{Fe}(\text{CO}_3)_3$       c)  $\text{Fe}_2(\text{SO}_4)_3$   
d)  $\text{FeSO}_4$       e)  $\text{Fe}(\text{SO}_4)_2$

7. A new compound contains nitrogen, hydrogen, boron & fluorine. The assay values are: N = 13.36%, H = 3.850%, B = 10.310%. Determine its empirical formula.

- a)  $\text{NH}_3\text{BF}_3$       b)  $\text{NiH}_3\text{BF}_3$       c)  $\text{NH}_3\text{BF}_3$       d)  $\text{NH}_2\text{B}_2\text{F}_3$       e)  $\text{N}_4\text{HB}_3\text{F}$



8. A sample of sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ , contains 0.4562 moles of carbon atoms. How many moles of hydrogen atoms (H) are there in the sample?

- a) 0.2543 moles      b) 0.9324 moles      c) 0.962 moles  
d) 0.8547 moles      e) 0.26 moles

9. In a quantitative analysis, 4.624 grams of a hydrocarbon (which contains C & H only) yielded 13.84 g of  $\text{CO}_2$  and 7.556 g of  $\text{H}_2\text{O}$  upon burning in excess  $\text{O}_2$ . The empirical formula of the hydrocarbon is

- a)  $\text{C}_4\text{H}_{10}$       b)  $\text{C}_5\text{H}_9$       c)  $\text{CH}_4$       d)  $\text{C}_2\text{H}_6$       e)  $\text{C}_3\text{H}_8$

10. When  $\text{BaCl}_{2(aq)}$  reacted with  $\text{Na}_3\text{PO}_{4(aq)}$ ,  $\text{NaCl}_{(aq)}$  and  $\text{Ba}_3(\text{PO}_4)_{2(s)}$  are formed. How many moles of  $\text{Ba}_3(\text{PO}_4)_2$  are formed for each mole of  $\text{BaCl}_2$  consumed?

- a) 1.0      b) 0.50      c) 3.0      d) 0.33      e) 2.33

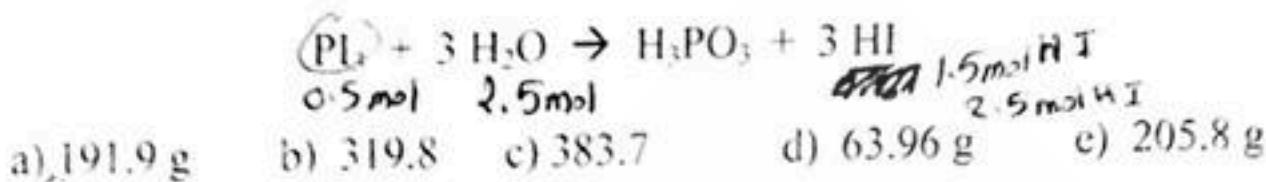


BaCl<sub>2</sub>

Bas3P04

1 mole Ba3P04  $\frac{1}{2}$

11.  $\text{PI}_3$  ( $\text{MM} = 411.69 \text{ g mol}^{-1}$ ) and water ( $\text{MM} = 18.015 \text{ g mol}^{-1}$ ) reacted to form  $\text{H}_3\text{PO}_3$  ( $\text{MM} = 81.99 \text{ g mol}^{-1}$ ) and  $\text{HI}$  ( $\text{MM} = 127.91 \text{ g mol}^{-1}$ ) if 0.5000 moles of phosphorus triiodide and 2.500 moles of water are used, what is the theoretical yield of hydrogen iodide?



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12. Which of the following compounds is soluble in water.

- a)  $\text{BaSO}_4$     b)  $\text{PbCl}_2$     c)  $\text{CoCO}_3$     d)  $\text{Ni(OH)}_2$     e)  $\text{K}_3\text{PO}_4$

13. In which of the following does nitrogen have an oxidation state of -3?

- a)  $\text{NH}_4\text{Cl}$     b)  $\text{NaNO}_2$     c)  $\text{HNO}_3$     d)  $\text{NO}_2$     e)  $\text{N}_2\text{O}$
- $\checkmark + 4 - 1 = 0$      $\checkmark + x + (2)(-1) = \delta$      $1 + x + 3(-2) = 0$   
 $\checkmark + x + -6$

14. Which of the following is a strong acid?

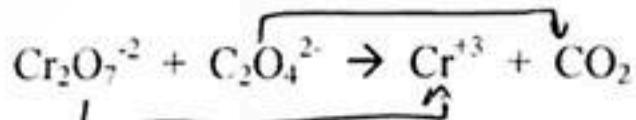
- a)  $\text{CH}_3\text{COOH}$     b)  $\text{HClO}$     c)  $\text{HF}$     d)  $\text{KOH}$     e)  $\text{HClO}_4$

15. A 68.8 g sample of  $\text{SrCl}_2$  ( $\text{MM} = 158.5$ ) is dissolved in 112.5 mL of solution. Calculate the molarity of this solution.

- a) 96.9 M    b) 2.30 M    c) 1.34 M    d) 3.86 M    e) 2.54 M

$$\begin{array}{c} \text{Sr Cl}_2 \\ 68.8 \end{array}$$

16. When balancing the following equation in acidic medium.



Then the coefficient of  $\text{Cr}^{+3}$  is

- a) 3    b) 6    c) 14    d) 1    e) 2