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General Chem. 101
First Exam

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$N = 6.022 \times 10^{23}$,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)

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^2. Calculate the density of the liquid in SI Units Kg/m^3? ($V_{cylinder}$ = area of the base x height), (1 in = 2.54 cm by definition)

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

$\rho = \frac{m}{V}$

$g = 2500g \quad L = 15in \quad A_B = 12\ in^2$

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

3. The melting point of mercury (Hg) is equal to -38.83 °F, it boils at 674.11 °F, what is its boiling point in °C. [°C = 5/9 (°F -32)]

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

4. The reaction: $2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$ 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_2O_7 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) $FeSO_4$ b) $Fe(CO_3)_3$ c) $Fe_2(SO_4)_2$
d) $FeSO_4$ e) $Fe_2(SO_4)_3$

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) NH_4BF_4 b) NH_4BF_4 c) NH_4BF_4 d) NH_4B_4F e) N_4HB_4F

N H B
0.95 3.85 0.953
1 4 1

8. A sample of sucrose, $C_{12}H_{22}O_{11}$, contains 0.4662 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) 10.26 moles

9. In a quantitative analysis, 4.624 grams of a hydrocarbon (which contains C & H only) yielded 13.84 g of CO_2 and 7.556 g of H_2O upon burning in excess O_2. The empirical formula of the hydrocarbon is

a) C_4H_{10} b) C_5H_9 c) CH_4 d) C_2H_6 e) C_3H_8

10. When $BaCl_{2(aq)}$ reacted with $Na_3PO_{4(aq)}$, $NaCl_{(aq)}$ and $Ba_3(PO_4)_{2(s)}$ are formed. How many moles of $Ba_3(PO_4)_2$ are formed for each mole of $BaCl_2$ consumed?

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

$3BaCl_2 + 2Na_3PO_4 \rightarrow 6NaCl + Ba_3(PO_4)_2$

11. PI_3 (MM = 411.69 g mol^{-1}) and water (MM = 18.015 g mol^{-1}) reacted to form H_3PO_3 (MM = 81.99 g mol^{-1}) and HI (MM = 127.91 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?

$$PI_3 + 3\,H_2O \rightarrow H_3PO_3 + 3\,HI$$

0.5 mol 2.5 mol 1.5 mol HI 2.5 mol HI

a) 191.9 g b) 319.8 c) 383.7 d) 63.96 g e) 205.8 g

B

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

a) $BaSO_4$ b) $PbCl_2$ c) $CoCO_3$ d) $Ni(OH)_2$ e) K_3PO_4

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

a) NH_4Cl b) $NaNO_2$ c) HNO_3 d) NO_2 e) N_2O

$x+4-1=0$ $1+x+(2)(-2)=0$ $1+x+3(-2)=0$

$1+x-6$

14. Which of the following is a strong acid?

a) CH_3COOH b) HClO c) HF d) KOH e) $HClO_4$

15. A 68.8 g sample of $SrCl_2$ (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

$SrCl_2$

68.89

16. When balancing the following equation in acidic medium.

$$Cr_2O_7^{-2} + C_2O_4^{2-} \rightarrow Cr^{+3} + CO_2$$

Then the coefficient of Cr^{+3} is

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