General Chemistry 101 **First Semester 2011/2012** ***First Exam.***

Date: 30/10/2011 **Time: 60 min.**

Student Name: ..... Reg. No.: .....

Instructor's Name: ...محمد الكيلاني...Section: ...44..... Seat No.: ...25....

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

14. Balance the following redox reaction in acidic solution:

$$a\ H_2C_2O_4 + b\ MnO_4^- \rightarrow c\ CO_2 + d\ Mn^{2+}$$

The ratio of coefficients d / a in the balanced equation is:

a) 10 / 2 b) 7 / 3 c) 2 / 10 d) 2 / 5 e) 5 / 2

15. What is the volume of 0.810 M $Ba(OH)_2$ solution needed to titrate 25.0 mL of 1.500M H_3PO_4 to produce $Ba_3(PO_4)_2$?

a) 79.2 mL b) 92.2mL c) 52.0mL d) 61.8mL e) 69.4mL

$(V)(0.810\ 2) = (25)(1.500\ 3)$

1.62

$V = 69.4$

0.021

16. When excess Na_2SO_4 solution was added to 20.0 mL of an unknown solution containing Ca^{2+} ion, 0.0372 g of $CaSO_4$ precipitated. What is the molar concentration of Ca^{2+} in the unknown solution?

(Molar mass of $CaSO_4$ = 136.14 g/mol) Ca = 40.08

a) 1.36×10^{-2} b) 1.73×10^{-2} c) 2.10×10^{-2} d) 2.47×10^{-2} e) 3.83×10^{-2}

$Na_2SO_4 + Ca^{2+} \rightarrow CaSO_4(s)$

$V = 20.0 = 0.02$

$n = 2.73 \times 10^{-4}$

$M = \frac{n}{V}$

$M = 0.0137$

$m = 0.0372$

$n = 2.73 \times 10^{-4}$

$M = 0.0137$

$V = 0.0199$

$m_{Ca} = \frac{(1)(40.08)(0.0372)}{136.14}$

$m = 0.010951$

$M = 0.0137$

$n = 2.73 \times 10^{-4}$

$M = \frac{n}{V} = \frac{\quad}{0.02}$

كمية n من الكالسيوم

$n_{CaSO_4} = \frac{m}{M_r} = 2.73 \times 10^{-4} = n_{Ca^{2+}}$

$\therefore M = \frac{2.73 \times 10^{-4}}{0.02} = 1.36 \times 10^{-2}$

6. The correct name of the compound N_2O_5 is:

a) Nitrogen(V) oxide.

b) Dinitrogen(V) pentoxide.

c) Nitrogen pentoxide.

d) Dinitrogen pentoxide.

e) Nitrogen(V) pentoxide.

$m = M_m \left(\frac{n_o}{A_v}\right) = \frac{(32.06)(1)}{6.022 \times 10^{23}} = 5.324$

7. What is the mass of one sulfur atom ?

(Atomic mass of sulfur = 32.06, Avogadro's number = 6.022×10^{23})

a) 9.274×10^{-23} g

b) 6.656×10^{-23} g

c) 5.324×10^{-23} g

d) 4.037×10^{-23} g

e) 3.346×10^{-22} g

$m = \frac{(n_o)(M_m)}{(M_{mc})} (M_1) = \frac{(2)(35.45)(16.6)}{110.98}$

$= 10.6$ g

8. What is the mass of chlorine in 16.6 g $CaCl_2$?

(atomic masses: Cl = 35.45 and Ca = 40.08)

a) 9.33 g

b) 6.77g

c) 4.24 g

d) 8.05 g

e) 10.6 g

9. What is the empirical formula of a compound with the following composition by mass: C: 52.2% ; H: 13.0% and O: 34.8% ?

Atomic masses : C = 12.01 ; H= 1.008 and O = 16.00.

a) C_2H_3O

b) C_2H_6O

c) $C_3H_5O_2$

d) C_2H_4O

e) C_2H_5O

C = 52.2 H = 13.0 O = 34.8

n = 4.35 n = 12.9 n = 2.18

C_2 H_6 O_1 ⇒ C_2H_6O

10. Balance the following equation:

$$a\ Be_2C + b\ H_2O \rightarrow c\ Be(OH)_2 + d\ CH_4$$

The ratio of coefficients b / d in the balanced equation is:

a) 4/1 b) 2/1 c) 1/4 d) 1/2 e) 3/1

11. 14.8 g of Li(s) was reacted with 16.2 g of $N_2(g)$ according to the equation: $N_2(g) + 6\ Li(s) \rightarrow 2\ Li_3N(s)$

If the actual yield is 16.4 g, what is the percent yield of this reaction ?

Atomic masses: Li = 6.942 and N = 14.01.

a) 51.4 b) 28.6 c) 66.3 d) 41.8 e) 70.2

12. Which of the following compounds is insoluble in water?

a) Na_3PO_4 b) NH_4ClO_4 c) K_2CO_3 d) $AgNO_3$ e) $Al_2(CO_3)_3$

13. Which of the following reactions is an acid-base reaction?

a) $NaCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + NaNO_3(aq)$ prece

b) $Na_2CO_3(s) + 2\ HCl(aq) \rightarrow H_2O(l) + CO_2(g) + 2\ NaCl(aq)$

c) $Ba(OH)_2(aq) + Na_2SO_4\ (aq) \rightarrow BaSO_4\ (s) + 2NaOH(aq)$

d) $CH_4(g) + 2O_2(g) \rightarrow 2H_2O(g) + CO_2(g)$

e) $Cl_2(g) + 2HI(g) \rightarrow 2HCl(g) + I_2(g)$

Answer each of the following questions and put "X" on the correct choice on front page.

1- Which of the following is an intensive property?

a) energy b) weight c) volume d) length e) density

2. Carry out the following operation and report the result to the correct number of significant figures:

$\frac{2.5}{15.0} = 0.17$ $[(1.00 - 0.01) \times 2.500] \div 15.0$

(0.99)

a) 0.165 b) 0.17 c) 0.1650 d) 0.16500 e) 0.2

$46.0 \frac{mile}{hr} \times \frac{hr}{3600 s} \times \frac{1609 m}{mile} = 20.6$

1 = 1609 m

46 mile = x

3. The speed of a car is 46.0 mile/hr. What is its speed in m/s?

(given: 1 mile = 1609 m)

a) 14.3 b) 16.1 c) 18.8 d) 20.6 e) 103

Mn^{3+} PO_4^{3-} = $MnPO_4$

4. The formula of manganese(III) phosphate is:

a) $Mn_2(PO_4)_3$ b) Mn_2PO_4 c) $MnPO_4$ d) $MnPO_3$ e) $Mn_3(PO_4)_3$

p n

5. For the isotope $^{93}_{41}X$. The number of protons and neutrons in that isotope are:

a) 41 and 52 b) 41 and 93 c) 93 and 41 d) 93 and 52 e) 52 and 41

1	2	3	4	5
a	b	d	c	a