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Using Calculator (Yes)

University of Palestine

Midterm Exam
First term 2012/2013
Total Grade: 40

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Using Dictionary (No)

Q. 1) Indicate if the following statements are true (√) or false (X) :- **(12 Marks)**

1) ( ) Because atom has definite boundary, atomic size is difficult to measure.
2) ( ) Rutherford led the way to determining the size of the atom with his gold foil experiment.
3) ( ) The number 0.000001830100 has five significant figures.
4) ( ) 0.0962 km/min is faster than1.60 m/s.
5) ( ) Molten KCl conduct electricity.
6) ( ) The yield obtained when all limiting reagent used is the % yield.
7) ( ) **Mn^{4+}** is tetratomic ion.
8) ( ) Conductivity is an intensive property.
9) ( ) Yellow sulphur powder, heated, melts and evolves a colourless gas which is suffocating. This is considered to be a physical change.
10) ( ) Almost all of the mass of the atom is concentrated in the nucleus.
11) ( ) When atom loses electron its ion will be smaller than the atom.
12) ( ) Blood is a homogeneous mixture

Q. 2) Choose the correct answer of each of the following: - **(15 Marks)**

The Stock system name for Hg_2SO_4 is **a)** Mercury(I) sulphate **b)** Mercury(I) sulphite **c)** Mercury(II) sulphate **d)** Mercury(IV) sulphide	**Which of the following chemical formula is incorrect:** **a)** HIO_4 for Periodic acid **b)** CS_2 for Carbon disulphide **c)** $CuNO_3.6H_2O$ Copper(I) nitrite hexahydrate **d)** Na_3PO_4 for Sodium Phosphate
Which of the following sets of readings correspond to the same temperature **a)** 100 °C, 212 °F, 273.15 K **b)** 0 °C, 32 °F, 0 K **c)** -273.15 °C, 0°F, 0 K **d)** 100°C, 212°F, 373.15 K	**Which element has the highest first ionization energy?** **a)** Br **b)** O **c)** C **d)** P
A species that has 94 protons, 150 neutrons, 91 electrons is : **a)** Pu^{+2} **b)** Pu^{+3} **c)** Np^{+3} **d)** Np^{+1}	**Which of the following is Not pure substance?** **a)** helium **b)** copper wire **c)** air **d)** sucrose

Which of the following atoms has both a high ionization energy and a large electron affinity

a) K
b) Ne
c) Br
d) N

Carbon reacts with Oxygen gas to give CO_2 gas. How many molecules of CO_2 are made by reacting 2.41×10^{23} atoms of C?

a) 2.41×10^{23} molecules CO_2
b) 14.5×10^{23} molecule of CO_2
c) 14.5×10^{46} molecule of CO_2
d) 1.20×10^{23} molecule of CO_2

A white compound that is used to absorb water contains 43.64% P and 56.36%oxygen. What is the empirical formula of the compound?

a) P_2O_5
b) P_4O_{10}
c) P_2O_6
d) P_3O_7

The result of this mathematical operation (690.4 ÷ 12) to the correct no. of S.F is:

a) 57.5
b) 57.53
c) 58
d) 58.0

The sum of the coefficients in the following balanced equation is:

$CuSO_4 + NH_3 + H_2O \longrightarrow (NH_4)_2SO_4 + Cu(NH_3)_4(OH)_2$

a) 8
b) 9
c) 11
d) 12

Which of the following correctly lists the five atoms in order of increasing size (smallest to largest)?

a) F < K < Ge < Br < Rb
b) F < Ge < Br < K < Rb
c) F < K < Br < Ge < Rb
d) F < Br < Ge < K < Rb

Which of the following is not electrolyte?

a) KOH
b) CH_3OH
c) HCl
d) Na_2CO_3

Which of the following statements are true:

a) The elements at the far right of the periodic table, except the noble gases, have the greatest tendency to form anions.
b) The elements with the least tendency to form ions are those at the far left of the periodic table.
c) Bonds in compounds consisting of two adjacent elements in the periodic table are likely to be covalent.
d) Answer a and c

Which of the following is the correct net ionic equation for the reaction that occurs when solutions of $Pb(NO_3)_2$ and NH_4Cl are mixed?

a) $Pb(NO_3)_{2(aq)} + 2NH_4Cl_{(aq)} \longrightarrow NH_4NO_{3(aq)} + PbCl_{2(s)}$
b) $Pb^{2+} + 2Cl^- \longrightarrow PbCl_{2(s)}$
c) $Pb^{2+}_{(aq)} + 2NO_3^-{}_{(aq)} + 2NH_4^+{}_{(aq)} + 2Cl^-_{(aq)} \longrightarrow 2NH_4^+{}_{(aq)} + 2NO_3^-{}_{(aq)} + PbCl_{2(s)}$
d) None of the above

Q. 3) Solve the following problems:- **(Total = 13 marks)**

a) Consider the following reaction:

$4Al(s) + 3PbO_2(s) \longrightarrow 2Al_2O_3(s) + 3Pb(s)$

In one experiment, 200 g of Al(s) and 400 g of PbO_2(s) are mixed and allowed to react by ignition to from the above products

i) **How many grams of lead can be produced by this reaction? (2 Marks)**

ii) **Calculate the maximum number of atoms of solid lead, formed by the above reaction(2 Marks)**

b) **What volume of 2.00 M HCl is needed to react completely with 5.65 g of $Ca(OH)_2$? The reaction is: (2 marks)**

$$Ca(OH)_2 + 2HCl \longrightarrow CaCl_2 + 2H_2O$$

c) What mass of precipitate should result when 0.550 L of 0.500 mol/L aluminum nitrate solution is mixed with 0.240 L of 1.50 mol/L sodium hydroxide solution according to the following equation? (4 Marks)

$$Al(NO_3)_3(aq) + 3NaOH(aq) \rightarrow Al(OH)_3(s) + 3NaNO_3(aq)$$

d) The decomposition of potassium chlorate yields oxygen gas. If the yield is 95%, how many grams of $KClO_3$ are needed to produce 10.0 L of O_2? (Density of O_2 is 1.43 g/L) (3 Marks)

$$2KClO_3(s) \longrightarrow 2KCl(s) + 3O_2(g)$$

Have Fun

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