Chem 101 General Chemistry
Fall 2011-2012 Quiz I
21/10/2011  16.30 - 17.00

Student No: Q1
Name-Surname: Q2
Group: Q3
Signature: Q4

Instructors: Prof. Dr. Huriye Icil (Gr. 1, 4)
Assist. Prof. Dr. Mehmet U. Garip (Gr. 2)

## INSTRUCTIONS:
1. Write your name, surname and group no. on the question booklet.
2. Students who do not write their group number or those who write their group number wrong will lose 1 point.
3. The exam consists of 4 classical type of questions. In order to get full marks you must answer all questions. Show your steps in answering the classical type of questions.
4. The following information and Periodic Table provided may be necessary to answer some of the questions.
5. Use of mobile phones, exchange of calculators or rubbers is not allowed.
6. You can see your papers in the first 7 days after the announcement of the results.

### Periodic Table of Elements

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### Lanthanides
- La (138.91)
- Ce (140.12)
- Pr (140.91)
- Nd (144.24)
- Sm (150.36)
- Eu (151.97)
- Gd (157.25)
- Tb (158.93)
- Dy (162.50)
- Ho (164.93)
- Er (167.26)
- Tm (168.93)
- Yb (173.04)

### Actinides
- Ac (227.03)
- Th (232.04)
- Pa (231.04)
- U (238.03)
- Np (237.05)
- Pu (244.08)
- Am (243.06)
- Cm (247.07)
- Bk (251.08)
- Cf (252.08)
- Es (257.10)
- Fm (258.10)
- Md (259.10)

### Constants:
- \( N_A = 6.022 \times 10^{23} \) items/mol
Q1. (1 Pt.)
The density of water at 4 °C is 62.43 lb/ft³. Convert this density to the SI units of kg/m³.
(1 m = 3.281 ft and 1 lb = 0.4536 kg)

\[ 62.43 \text{ lb/ft}^3 \times \left( \frac{3.281 \text{ ft}}{1 \text{ m}} \right)^3 \times \frac{0.4536 \text{ kg}}{1 \text{ lb}} = 1000 \text{ kg/m}^3 \]

Q2. (3 Pts.)
Consider the nuclear symbol representing an isotope of a particular element; \( ^{80}_{35} X \)

a) How many protons does X have: \( 35 \)

b) How many neutrons does this isotope have: \( 45 \)

c) Write the symbol of the element X: \( Br \)

d) Write the name of the element X: Bromine

e) State whether element X is a metal, non-metal or metalloid: Nonmetal

f) Predict the formula of the compound formed between X and Na: \( NaBr \)

Q3. (2 Pts.)

a) Predict the formula of the ionic compound containing an alkaline in period 5 and nitrogen

\[ Rb^+ \rightarrow Rb_3N \]

b) Write the formula for hydrochloric acid

\[ HCl (aq) \]

c) Name the following compounds

(i) Sr(OH)_2 : Strontium hydroxide

(ii) SF_6 : Sulfur hexafluoride
Q4.
   a) Copper gets its name from the Latin word cuprum, meaning from the island of Cyprus. The atomic masses of its two stable isotopes $^{63}{\text{Cu}}$ (69.09%) and $^{65}{\text{Cu}}$ (30.91%), are 62.93 amu and 64.93 amu, respectively. Calculate the average atomic mass of copper (the percentage in parentheses denote the relative abundances). (2 Pts.)

   $\text{Average Atomic mass} = \frac{62.93\text{amu} \times 69.09 + 64.93\text{amu} \times 30.91}{100}$

   $= 63.50\text{amu}$

b) Sulfur (S) is a non-metallic element. Its presence in coal gives rise to the acid rain phenomenon.

   i) How many atoms are in 16.3 g of sulfur? (1 Pt.)

   \[ \frac{32.07\text{g S}}{16.3\text{g S}} \times 6.022 \times 10^{23} \text{ S atoms present} \]

   \[ = 3.06 \times 10^{23} \text{ S atoms} \]

   ii) Calculate the mass of a sulfur atom? (1 Pt.)

   \[ \frac{6.022 \times 10^{23} \text{ S atoms}}{32.07\text{g S}} \times 1 \text{ S atom} \]

   \[ = 5.32 \times 10^{-23} \text{ g} \]