



ARAB REPUBLIC OF EGYPT [٨٠] ث.ع / أول / ج

Ministry of Education

General Secondary Education Certificate Examination, 2011

[First Session]

CHEMISTRY (For the First and Second Stages) Time: 3 Hours

الكيمياء [باللغة الإنجليزية]

تنبيه هام : يسلم الطالب ورقة امتحانية باللغة العربية مع الورقة المترجمة [الأسئلة في أربع صفحات]

Answer FIVE questions only from the following:

(Write all the chemical equations balanced, mention the conditions of the reaction)

Question One:

A) Choose the correct answer for each of the following:-

- The maximum number of electrons that occupy a given energy level (n) equals...
a) 2n
b) $2n^2$
c) $(2n)^2$
d) n^2
- The biggest atom in size in a given period in the periodic table is that of the
a) group IA
b) group IB
c) group IIB
d) halogens group
- When calcium cyanamide reacts with water, the evolved gas is
a) Hydrogen
b) Nitrogen
c) Nitrogen dioxide
d) Ammonia
- The number of atoms in one mole of phosphorus in its vapour state equals....
a) 4 atoms
b) $2 \times 6.02 \times 10^{23}$ atoms
c) $4 \times 6.02 \times 10^{23}$ atoms
d) 6.02×10^{23} atoms
- When iron reacts with dilute Hydrochloric acid then adding ammonium hydroxide to the product, the colour of the precipitated substance is
a) brick red
b) reddish brown
c) greenish white
d) gelatinous white
- (SP) hybridized orbitals are characterized by
a) three orbitals
b) linear in shape
c) two orbitals
d) two orbitals and linear in shape

B) Write the balanced chemical equations which illustrate the following:

- Heating chlorobenzene with sodium hydroxide under high pressure and temperature and then nitrating the produced organic compound.
- Hydrolysis of ethyl iodide in alkaline medium and then reacting the produced organic compound with concentrated hydrochloric acid in the presence of $(ZnCl_2)$.

[بقية الأسئلة في الصفحة الثانية]

[2]

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Question Two:

A) Write the scientific term for each of the following statements:

- A number that indicates the number of energy sublevels in each principal energy level.
- A chemical bond formed when phosphine combines with the proton.
- The phenomenon of losing electrons from the outer surface of the metals when exposed to light.
- A process in which small iron ore particles are collected to obtain large particles suitable for the reduction process.
- A chemical analysis is used to identify the constituents of the substance.

B) Calculate the solubility product (K_{sp}) of calcium phosphate $Ca_3(PO_4)_2$ which is sparingly soluble in water, given that the concentration of calcium ions is (1×10^{-8}) mole/litre and the concentration of phosphate ions is (0.5×10^{-3}) mole/litre.

C) How can you obtain T.N.T from sodium benzoate?

Question Three:

A) Ammonium chloride (NH_4Cl) is considered as one of the important nitrogenous compounds which are used in preparation of many gases and compounds of important applications.

- What are the types and numbers of bonds in ammonium chloride molecule?
- What is the reason: the radius of chloride anion (Cl^-) is larger than the radius of chlorine atom?
- Starting with ammonium chloride: show by chemical equations how can you prepare one of the most important fertilizers which provides the soil with nitrogen and phosphorus elements.
- Why does the colour of ammonium chloride solution change into red on adding drops of methyl orange solution to it?

B) Calculate the mass of sodium hydroxide dissolved in (25) ml water which was consumed when titrated with (15) ml of (0.1) molar hydrochloric acid.

(Na = 23 , H = 1 , O = 16)

C) Show how Ethyne gas (acetylene) can be prepared in laboratory. Write the balanced equation and draw the used apparatus.

[بقية الأسئلة في الصفحة الثالثة]

[3]

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Question Four:**A) Write the scientific explanation for each of the following:**

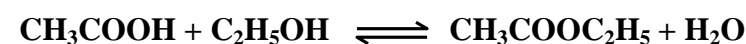
1. The matter wave associated with movement of electrons differs from electromagnetic waves.
2. The rate of reaction of hydrochloric acid with iron filings is faster than that with an equal mass of iron block.
3. Cementite alloy is considered as one of the inter-metallic alloys.
4. The density of carbon dioxide is greater than the density of oxygen at (stp).

(O = 16 , C = 12)

B) 1. What is meant by?

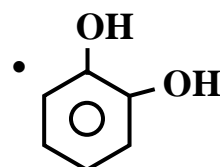
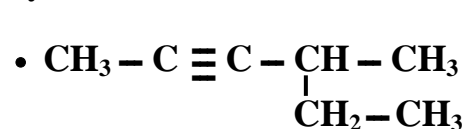
(Allotropy – Roasting)

2. If the bond length in nitric oxide molecule is (1.36 Å) and the bond length in oxygen molecule is (1.32 Å). Calculate the atomic radius of nitrogen atom and the bond length in nitrogen molecule.

C) 1. In the balanced reaction

What happens to the equilibrium of this reaction in the following cases?

- Adding excess of water.
- Adding drops of conc sulphuric acid.

2. Write the name of each of the following compounds according to IUPAC system:**Question Five:****A) What is the role of each of the following scientists in the development of chemistry?**

1. Hund
2. Lewis and Kosel
3. Wöhler

[بقية الأسئلة في الصفحة الرابعة]

[4]

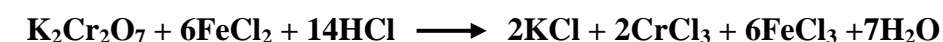
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B) Compare between each of the following:

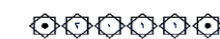
1. Blast furnace and Midrex furnace according to :
 - a) The used reducing agent.
 - b) The type of produced iron.
2. Complete reactions and reversible reactions.
(Illustrate your answer with chemical equations)

C) Show by balanced chemical equations how to obtain ethylene glycol from acetic acid (Mention the conditions of the reactions).**Question Six:****A) How can you differentiate practically between each of the following?**

1. Aluminum sulphate solution and copper sulphate solution.
2. Sodium chloride salt and potassium chloride salt.
3. Carboic acid and ethanoic acid.
4. Ethyne and ethane.

B) Explain the type of change (oxidation or reduction) that occurred to chromium and iron in the following reaction:**C) Correct the underlined words**

1. In the lanthanide series the sublevel (5f) is filled successively with electrons and it consists of (15) elements which are all radioactive.
2. The subsidiary quantum number indicates the number of orbitals in a certain energy sublevel while the magnetic quantum number define the type of motion of the electron around its own axis.
3. Metalloids are characterized by their nearly filled valence shells with electrons and their electronegativity is greater than that of metals and non metals.
4. The neutralization reactions are used for determination of substances that can form sparingly soluble products in water, while Ostwald's Law explain the relationship between the degree of ionization and temperature.



[انتهت الأسئلة]