ARAB REPUBLIC OF EGYPT
Ministry of Education General Secondary
Education Certificate
Sudan Examination
First Session 2014

Chemistry **Time: 3 hours**

Answer four questions only

Question one :

Firstly choose the correct answer:

1 - Given the following reaction at (stp)

$N_{2(g)} + 3H_{2\,(g)} \rightleftharpoons 2NH_{3(g)}$

The total number of liters of NH_3 formed when 10 liters of N_2 is reacted completely is:

(a) 10 L (b) 20 L (c) 2L (d) 1 L

2-The density of oxygen gas ($O_{2(g)}$)) at (stp) equals.....

(a)32g/22.4L (b) 16 g 722.4 L

(c) 1.43 g/L (d) Both answers (a) and (c) are right

3-The density of oxygen gas ($O_{2(g)}$)) at (stp) equals.....

(a)32g/22.4L (b) 16 g 722.4 L

(c) 1.43 g/L (d) Both answers (a) and (c) are right

4-The increase of temperature increases the rate of reaction as it

(a) increases the proportion of activated molecules.

(b) the kinetic energy of the activated molecules is high enough to break the bonds within the molecules.

(c) supply the energy needed for endothermic reactions.

(d) all the previous answers are right.

5-In nickel cadmium battery the cathode is made of.....

8- nickel b- cadmium c- lead d- copper

6- The scientist who deduced the relationship between quantity of electricity and mass of matter precipitated at electrodes is…..

a- Dalton b- Galvani c- Volta m- Faraday

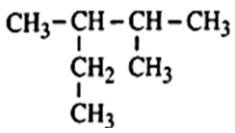
Secondly

1) Draw the apparatus used to detect carbon and hydrogen elements in the organic compounds. Write the balanced chemical equations, observations and conclusions.

2) Write the IUPAC name for the following compounds

a) CH_2=CH - CH_2 - CH_2-Cl

b)



c) CH_3 - C≡ C - CH_2- CCH_2- Cl

3) The detergent industries depend mainly on the aromatic sulphonic acid compounds. Write the chemical equation to obtain the water soluble sodium salt then explain the composition of detergent and how detergent removes the spots and dirties?

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Question two:

Firstly: write scientific term for the following:

1-Equal volumes of gases under the same pressure and temperature contain equal numbers of molecules

2-Reactions which are used for determination of substances that form sparingly soluble products.

3- Indicator gives yellow color in acidic medium and blue in basic one.

4- It is apparently a stationary system but in reality dynamic.

5- At a constant temperature, the rate of a chemical reaction is directly proportional to the product of multiplication of the reactant concentrations; each is raised to the power of the number of molecules or ions in the balanced chemical equation.

6) Process of dissolving salt in water to acid and base which formed the salt

Secondly

1) Write steps to plating a jug by a layer of silver, draw the cell?

2) What is meant by isomerism? give example for one molecular formula and two structure formula

3) Starting with methane, write the chemical equation to show how you can obtain the following:

a) Divided carbon b) water gas (write two uses for each one)

4) What is meant by complete and weak ionization?

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Question three:

First: give reason for the following:

1- Solution of sodium carbonate is alkaline and turned litmus blue

2- No free hydrogen ion in aqueous solution

3- Alkaline solution not used to differentiate between bromothymol blue and litmus

4- Ash less filter paper used in chemical analysis (precipitation method)

5- The vital force theory was destroyed by Wöhler

Secondly

1-The electrolysis process of sodium chloride solution was carried out by passing an electric current, its intensity is 2 amperes, for half hour.

a- Calculate the volume of chlorine gas evolved (Cl = 35.45)

***b*- If 20 ml of 0.2 M HC1 solution is required to neutralize 10 ml of the solution after electrolysis process. What is the mass of sodium hydroxide produce if the volume of the solution is 1/2 liter.**

2) What is the role of the following scientist in chemistry:

Le Chatelier - Guy- Lussac – Brezelius

3) Compare between organic and inorganic compounds according to (structure- solubility – boiling point – melting point – electrical conductivity and inflammability)

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Question four:

Firstly: what is meant by of the following? Withdrawing

1- Stander hydrogen electrode

2- Electrochemical cell for extraction of aluminum from bauxite

Secondly

1) what are methods used for preparation of ethanol in industry Write the chemical equations and its conditions?

2) Draw the apparatus used in the preparation of acetylene gas in lab , write the chemical equation, explain why the gas was pass through acidic solution of copper sulphate before collecting?

3) Find the pH value of the following solutions, their $[H^+]$ are a- 10^{-5} b- 10^{-12} c- 10^{-7} and indicate whether each of these solutions is acidic, alkaline or neutral.

4) Calculate the value of the equilibrium constantKp for the following reversible reaction

$$N_2(g) + 2O_2(g) \rightleftharpoons 2NO_2(g)$$

If the partial pressure of N_2 (g) = 0.2 atm, O_2 (g) = 1 atm, NO_2 (g) = 2 atm

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Question five

Firstly:

1)2.6903 grams of hydrated barium chloride salt ($BaCl_2 . xH_2O$) was strongly heated until a constant mass of 2.2923 grams. Calculate the % water of crystallization of the hydrated barium chloride. Find out the number of water molecules of crystallization and write the molecular formula of the salt. [O=16, H=l, Cl =35.5, Ba=137).

2) Write the charging equation of car battery, what is the anode and cathode?

Secondly

1) Two experiments for reaction of hydrochloric acid with 2 g of magnesium were made by student, the consumption rate of magnesium in the first was 2 min while the rat of second was 3.5 min. what happened for increasing the rate in the first experiment

2)Calculate the degree of dissociation in 0.1 molar hydrocyanic acid (HCN) solution at 25°C , providing that the equilibrium constant of the acid $K_a = 7.2xl0^{-10}$

3) Write the chemical name , common name or commercial name of the following compounds:

1- The ugliest compound in the history of chemistry

2- It is prepare by reaction of toluene with nitration mixture(conc. Nitric and sulphouric acid 1:1)

3- It is used as a starting material for many industrial products e.g polymers, dyes, disinfectants, salicylic acid derivatives.

4-it is used in the manufacture of creams and cosmetics as a moisturizer of skin. is used in the manufacture of textiles, since it renders them soft and flexible.

5-Insectside formed from reaction of benzene with chlorine in direct sun light

6- It is Resist heat, Resist adhesion, Electrical insulator and Innert which used for cooking utensils

7- Acid has a chemical formula C_3H_7 –COOH

GOOD LUCK

DOCTOR GENDY