Chemistry Exam

By: Mr. Mechail Saleeb
0124064691

Answer FIVE questions only

Question (1):

A) Choose the correct answer :

1- Lack of vitamin (C) causes ……. (Stomach ulcer – cancer of stomach – muscles contraction – Escarpot disease).
2- Three elements (A-B-C) belong to three successive groups in the same period, if element C is a noble gas, the ion of element A will combine with hydrogen to form … (A^{+}- A^{+2} - A^{-} -A^{-2}).
3- On passing atmospheric air through distilled water P^{H} decreases, the gas is (oxygen – carbon dioxide – nitrogen – Argon).
4- The d-sublevel contains …… orbital. (1 - 3 - 5 - 7)
5- The chemical bond formed between two atoms of an element whose atomic number 17 is …….. (polar covalent – pure covalent – metallic – ionic)
6- Sodium metal is extracted by electrolysis of (caustic soda – molten sodium chloride – sodium chloride solution – molten sodium oxide).

B) Acetylene is the first member of alkynes.

1- What is the type of hybridization in acetylene molecule? What is its shape in space?
2- Write down the chemical equation that represents the preparation of acetylene in laboratory. Draw the apparatus used.
3- How can you prepare acetic acid from acetylene?
4- How can you prepare benzene from acetylene? Name this reaction?

Question (2):

A) Give reasons for:

1- Electron has a dual nature.
2- The first ionization energy of Neon is very high.
3- Boiling point of water is high and equals to 100°C.
4- Nitrogen has variable oxidation states.
5- Elements of transition series have variable oxidation states.

B) Write the structural formula of the following compounds:

1- 3-methyle, 1-pentene. 2- Formic acid. 3- 2-2 dibromo, 1-butanol.

C) According to the following chemical equation:

$$CoCl_2.6H_2O \underset{}{\overset{\Delta}{\rightleftharpoons}} CoCl_2 + 6H_2O$$

1- What is the colour of hydrated cobalt (II) chloride? What is its use?
2- What is the effect of heating on this reaction?
3- Calculate the mass of water added to one mole of anhydrous cobalt (II) chloride to get hydrated cobalt (II) chloride.

Question (3):

A) Write down the scientific term:

1- No electron paring takes place in a given sublevel until each orbital contains one electron.
2- The ability of an atom to attract the two electrons of the chemical bond to itself.
3- A bond is produced from the electron cloud of valance electrons of positive metal ions in the crystal lattice.
4- Formation of non-porous layer on the iron surface on adding nitric acid to iron.
5- Equal volumes of gases under the same pressure and temperature contain equal numbers of molecules.

B) Write down the chemical equations that represent:

1- Nitration of phenol 2- catalytic thermal cracking of octane. 3- Sulphonation of benzene.

C) Methane is the simplest member of hydrocarbon however it is colourless and odourless gas.

1- Why it is called swamps gas? What is the type of hybridization in its molecule?
2- Write the equilibrium constant Kp for the reaction:

$$CH_4 + 2O_{2(g)} \rightleftharpoons CO_{2(g)} + 2H_{2(g)}$$

Question (4):

Nitrogen gas reacts with other elements in hard conditions due to the difficulty of bracking down the triple bond between nitrogen atoms in its molecules.

1- Write down the electronic structure of nitrogen atom $_7N$ according to Hund's rule.
2- What is the period and group which nitrogen belongs to?
3- Explain the industrial method in which ammonia gas is prepared from nitrogen gas? Write the conditions and name the scientist who set up this method?
4- What are the type of bonds which formed on passing ammonia gas in water?
5- How can you detect ammonia gas practically?
6- If the reaction of preparing ammonia is reversible reaction, mention the effect of pressure on rate of ammonia production?
7- If the mass of reacted nitrogen gas 56gm, calculate the volume of ammonia gas produced in STP (H=1 , N=14).

Question (5):

A) What is the organic compound which:

1- It is used to prepare iron (II) oxide.
2- It is found in smoke of cigarettes and causes cancer.
3- It is generated in human body as a result of hard effort and produces muscles contraction.
4- It is found in urine of mammalian animals.

B) How can you detect:

1- Taking of drivers for alcoholic liquors through oxidation reaction.
2- An organic compound includes carbon and hydrogen.

C) If you know that hot iron reacts with chlorine gas.

1- Write down the balanced chemical equation that represents this reaction.
2- What is the effect of produced compound on litmus solution? Explain your answer?
3- What would happen on adding phenol on the produced compound?

Question (6):

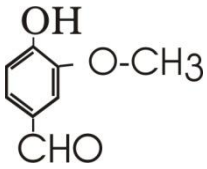
A) If you know that zinc sulphide is sparingly soluble in water.

1- What is its rule in Rutherford experiment?
2- Calculate the solubility product Ksp of zinc sulphide, if you are given the concentraction of zinc ions 0.4×10^{-12} mole/liter

B) Concentrated sulphuric acid is an oily liquid, and it is strong oxidizing agent on heating. It is used in drying some gases.

1- Write the balanced chemical equation on rection hot concentrated sulphuric acid with iron. Explain that hot concentrated sulphuric acid is an strong oxidizing agent.
2- Why hot concentrated sulphuric acid does not use in drying ammonia gas?

C) The opposite chemical formula represents an organic compound used in our life.



1- What are the functional groups in this compound?
2- Write the structural formula of this compound?
3- How many moles of hydrogen requried to convert this compound into saturated compound?

Best wishes