GREENWOOD HIGH
TERM EXAMINATION - I
SEPTEMBER - 2019
SUBJECT – CHEMISTRY

Grade: 10
Date: 24.09.19

Time: 2 Hrs
Max. Mark: 80

Answers to this paper must be written on the paper provided separately
*You will **not** be allowed to write during the first 15 minutes.*
This time is to be spent in reading the question paper
The time given at the head of this paper is the time allowed for writing the answers.

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*Attempt **all** questions from **Section I** and any **four questions** from **Section II***
The intended marks for questions are given in brackets [ ]

Section A
(Attempt all questions)

Question 1:

(a) Choose the correct answer: **[10]**

1) The salt solution which does not react with ammonium hydroxide is:
a. Calcium Nitrate
b. Zinc Nitrate
c. Lead Nitrate
d. Copper Nitrate

2) Which of the following pair of metals are extracted only by electrolysis:
a. Na, Pb
b. Ca, Cu
c. Na, Ca
d. Ag, Cu

3) The catalyst used in the Haber's Process is:
a. Copper
b. Iron
c. Vanadium Pentoxide
d. Manganese dioxide

4) The colour of Copper carbonate:
a. Light green
b. Yellow
c. Deep blue
d. Orange

5) An electrolyte which completely dissociates into ions is:
a. Alcohol
b. Carbonic acid
c. Sucrose
d. Sodium hydroxide

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6) The most electro negative element from the following elements is:

a. Magnesium
b. Chlorine
c. Aluminum
d. Sulphur

7) The reason for using aluminum in the alloy duralumin:

a. Aluminum is brittle
b. Aluminum gives strength
c. Aluminum is light
d. Aluminum lowers melting point

8) The drying agent used to dry HCl gas is:

a. Conc. H_2SO_4
b. ZnO
c. Al_2O_3
d. CaO

9) To increase the pH value of a neutral solution we should add:

a. H_2CO_3
b. $NaHCO_3$
c. NaOH
d. Na_2CO3

10) Which of the following is a common characteristic of a covalent compound:

a. High melting point
b. Consist of molecules
c. Always soluble in water
d. Conducts electricity when it is in molten state

(b) <u>Fill in the blanks with the choices given in brackets</u>: [5]

1) When sodium chloride is heated with conc. Sulphur acid below 200° C, one of the product forms is …… (Sodium hydrogen sulphate/ Sodium sulphate/ Chlorine)
2) Ammonia reacts with excess chlorine to form …… (Nitrogen/ Nitrogen trichloride/ ammonium chloride)
3) …… ($AgCl$/ $PbCl_2$), a white precipitate is soluble in excess NH_4OH.
4) The metal whose oxide, which is amphoteric is reduced to metal by carbon reduction …… (Fe/ Mg/ Pb/ Al)
5) Potassium sulphite on reacting with Hydrochloric acid releases …… gas (Cl_2, SO_2, H_2S).

(c) <u>Write a balanced chemical equation for each of the following reactions</u>: [5]

1) Action of sodium hydroxide on ammonium sulphate.
2) Reaction of sodium hydroxide solution with Iron (III) chloride solution.
3) Action of heat on Aluminium hydroxide.
4) Reaction of Zinc with Potassium hydroxide solution.
5) Action of dilute hydrochloric acid on magnesium sulphite.

(d) **State relevant observation for each of the following reactions:** [5]

1) Conc. Nitric acid is reacted with Carbon.
2) Ammonia gas is passed over heated copper (II) oxide.
3) A small piece of zinc is added dilute hydrochloric acid.
4) Lead nitrate solution is treated with Sodium hydroxide solution dropwise till it is in excess.
5) Action of dilute hydrochloric acid on Iron (II) sulphide.

(e) **Arrange the following according to the instruction given in brackets:** [5]

1) K, Pb, Ca, Zn. (in the increasing order of the reactivity)
2) Mg^{2+}, Cu^{2+}, Na^{+}, H^{+} (in the order of preferential discharge at the cathode)
3) Li, K, Na, H (in the decreasing order of their ionization potential).
4) F, B, N, O (in the increasing order of electron affinity).
5) CO_2, NH_3, NO_2, SO_2 (in increasing order of molecular weight).
(H= 1, C= 12, N= 14, S= 32, O= 16)

(f) **Do as Directed:**

1) Calculate: [5]

i. The number of moles in 12g of oxygen gas. [O=16]
ii. The weight of 10^{22} atoms of carbon. [C= 12, Avogadro's No = 6×10^{23}]
iii. Molecular formula of a compound is $C_6H_{18}O_3$. Find its empirical formula.

2) Identify the substance underlined

i. The <u>dilute acid</u> which is an oxidizing agent.
ii. The <u>most common ore</u> of iron.

(g) **Give one word or phrase for the following statements:** [5]

1) The substance that releases hydronium ion as the only positive ion when dissolve in water.
2) The tendency of an atom to attract electrons towards itself when combined in a covalent compound.
3) The process by which certain ores, specially carbonates are converted to oxide in the absence of air.
4) The covalent bond in which the electrons are shared equally between the combining atoms.
5) The impurities present in copper anode during the process of extraction.

Section B
(Answer any four)

Question 2:

a) Copper Sulphate solution reacts with sodium hydroxide solution to form a precipitate of copper hydroxide according to the equation: [4]

$$2NaOH + CuSO_4 \longrightarrow Na_2SO_4 + Cu(OH)_2\downarrow$$

i. What mass of copper hydroxide is precipitated by using 200 gm of sodium hydroxide? [H=1, O=16, Na=23, S=32, Cu=64]

ii. What is the colour of the precipitate formed.

iii. What happens when excess of NH_4OH solution is added to $Cu(OH)_2$ precipitate.

iv. Give balanced equation for action of dilute hydrochloric acid on $Cu(OH)_2$

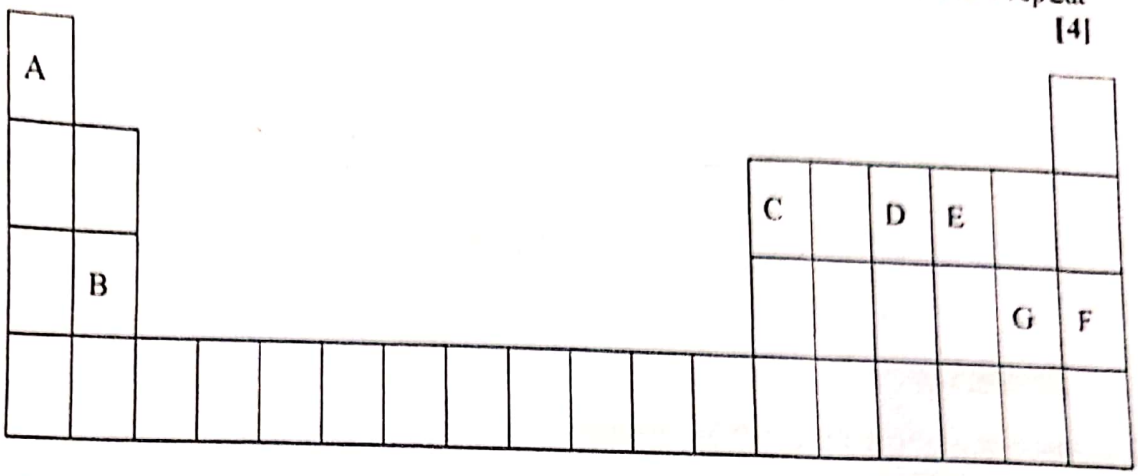
b) Find the empirical formula and the molecular formula of an organic compound from the date given below: [3]
C = 75.92%, H = 6.32% and N = 17.76%.
The vapour density of the compound is 39.5
[C =12, H = 1, N =14]

Study the flow chart given and give balanced equations to represent the reaction A, B and C: [3]

$$Mg_3N_2 \xrightarrow{A} NH_3 \xrightarrow[C]{B} NH_4Cl$$

Question 3:

a) Study the extract of the periodic table given below and answer the question that follow. Give the alphabet corresponding to the elements in question. DO NOT repeat an element. [4]



i. Which element forms electrovalent compound with G?
ii. The ion of which element will migrate towards the cathode during electrolysis.
iii. Which non-metalic element has the valency of 2?
iv. Which is an inert gas?

b) Answer the below questions: [3]
i. Write the balanced chemical equation to prepare ammonia gas in the laboratory by using an alkali.
ii. State why concentrated sulphuric acid is not used for drying ammonia gas?
iii. How is ammonia gas collected?

c) For the preparation of hydrochloric acid in the laboratory: [3]
i. Why is direct absorption of hydrogen chloride gas in water not feasible?
ii. What arrangement is done to dissolve hydrogen chloride gas in water?
iii. Write balanced chemical equation for action of concentrated hydrochloric acid on manganese dioxide.

Question 4:

a) Name the following: [5]
i. The substance which turns black on coming in contact with H_2S.
ii. The radical which answers brown ring test.
iii. The relative molecular mass of a substance expressed in grams.
iv. The energy released when an atom in the gaseous state accepts an electron to become an anion.
v. Electrolytic deposition of a superior metal on a baser metal.

b) Loss of electron from an element 'X' is represented by: $X - 3e^- \longrightarrow X^{3+}$ [3]

i. If X^{3+} combines with oxygen formula of the product is ..... [X_2O_3/ XO/ X_3O_2]

ii. If the above product in the ..... [solid/ molten] state is electrolysed the ion X^{3+} will get discharged at the ..... [anode/ cathode].

iii. The ion X^{3+} ..... [accepts/ loses] electrons and gets ..... [oxidised/ reduced] to neutral atom.

c) Give the reasons for following – pertaining to Hall Herault's process: [2]

i. The fusion temperature of the electrolytes has to be lowered before conducting the electrolytic reduction.

ii. A layer of powdered coke sprinkled over the electrolytic mixture in the process of extraction.

Question 5:

a) A metal article is to be electroplated with silver: [4]

i. Name the electrolyte used.

ii. Why is this electrolyte selected over silver nitrate?

iii. State one condition to ensure that the deposit is smooth, firm and long lasting.

iv. Write the reaction taking place at the cathode.

b) State the colour of: [3]

i. Phenolphthalein solution after passage of ammonia through it.

ii. The flame obtained on burning dry ammonia in oxygen.

iii. The vapours obtained when ammonia oxygen gas mixture is passed over heated platinum.

c) Explain the statement ;
Liquid ammonia is used as a refrigerant in ice plant. [1]

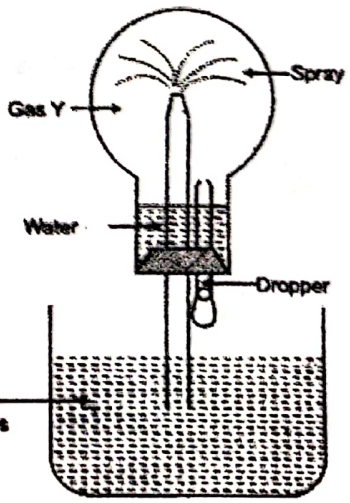
d) A cylinder contains 68 gm of ammonia gas at S.T.P. [2]

i. What is the volume occupied by this gas?

ii. How many moles of ammonia are present in the cylinder?[N=14,H=1]

Question 6: [3+2+3+2]

a) Study the figure given aside and answer the question that follow:



i. Identify the gas Y.

ii. What property of gas Y does this experiment demonstrate.

iii. Name another gas which has the same property and can be demonstrated through this experiment.

b) Write balanced chemical equation for,

i. Action of concentrated nitric acid on sulphur.

ii. Laboratory preparation of nitric acid.

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c) Give reason for the following:

i. The yellow colour of nitric acid obtained in the laboratory is removed by bubbling air through it.

ii. A higher ratio of air is used in the manufacture of nitric acid.

iii. In the laboratory preparation of HCl acid from NaCl and concentrated H_2SO_4, the temperature should be maintained below 200°C.

d) The relevant observations for the following are given:

i. The flame test with the salt P gives a lilac flame. Identify the cation P.

ii. Gas Q turns acidified potassium dichromate paper orange to green. Identify Q.

Question7:

a) Match each of the following A to E listed below with the appropiate description in parts (i) to (v). [5]

(A) Sulphur (B) lead chloride (C) Hydrogen chloride (D) Copper(II) sulphate (E) Graphite

i. A non-metal which is a good conductor of electricity.

ii. A covalent compound which behaves like an ionic compound in aqueous solution

iii. A compound which is soluble in hot water.

iv. The electrolysis of this compound results in the deposition of a pink metal at the cathode.

v. A non-metal which reacts with concentrated nitric acid to form its own acid as one of the product.

b) The following question refer to the Periodic Table: [5]

i. Name the **first** and the **last** element in period 2.

ii. What happens to the atomic size of elements moving from top to bottom of a group?

iii. What is the common feature of the electronic configurations of the elements in group(VIIA).

iv. Which element has the highest electronegativity among the halogens

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