GREENLAWNS SCHOOL, WORLI

TERMINAL EXAMINATION: 2019-20

*CHEMISTRY*

Std: X Marks: 80

Date: 23/09/2019 Time: 2 hrs

Answers to this paper must be written on the paper provided separately. You will **not** be allowed to write during the first **10** minutes. This time is to be spent in reading the Question paper. **Section I** is compulsory. Attempt **any four** questions from **Section II**.

**SECTION I (40 Marks)**

*Attempt* ***all*** *questions from this Section*

**Question 1**

(a) Name the following (formula not acceptable): [5]

1. A white solid used for drying ammonia.
2. An element in period 3 whose electron affinity is zero.
3. A chloride which gives reddish brown precipitate with sodium hydroxide.
4. A nitrate which leaves no residue on heating.
5. The electrolyte used for electroplating an article with silver.

(b) State your observations: [5]

1. Sugar crystals are added to a hard glass test tube containing concentrated sulphuric acid.
2. Dry ammonia is passed over heated copper oxide.
3. Ammonium hydroxide is first added drop by drop and then in excess to zinc sulphate solution.
4. Electrolysis of copper sulphate using carbon anode.
5. Lead nitrate crystals are strongly heated.

(c) Define the following terms: [5]

1. Avogadro’s law iv. Isomerism
2. Electroplating v. Catenation
3. Electron affinity

(d) Give reasons for the following: [5]

1. Alkali metals are good reducing agents.
2. Solid sodium chloride is a non-electrolyte.
3. Ammonia gas is not collected over water.
4. In the laboratory preparation of nitric acid, the reaction temperature is maintained below 2000C.
5. In the electrolysis of alumina using the Hall Heroult’s process the electrolyte is covered with powdered coke.

(e) Give balanced equations for the following: [5]

1. Zinc hydroxide is reacted with caustic soda solution.
2. Dilute sulphuric acid reacts with ammonium hydroxide solution.
3. Carbon is oxidised by hot concentrated nitric acid.
4. Catalytic oxidation of ammonia to nitric oxide.
5. Reduction of iron [III] oxide by carbon monoxide.

(f) Arrange the following as per the instructions given in brackets: [5]

1. P, S, Mg, Cl, Al (decreasing metallic character)
2. C, B, N, Li, F (increasing ionisation potential)
3. I, F, Cl, At, Br (decreasing atomic size)
4. Ca, Be, Mg, Ra, Ba (increasing electron affinity)
5. Rb, Li, Fr, Na, Cs (increasing electropositivity)

(g) Solve the following numericals:

1. What volume of ethyne gas at s.t.p is required to produce 8.4 dm3 of carbon dioxide at s.t.p. 2C2H2 + 5O2 → 4CO2 + 2H2O [1]
2. Calculate the percentage of water of crystallisation in CuSO4. 5H2O. [1]

[H=1, O=16, S=32, Cu=64]

1. An organic compound has vapour density 94. It contains C=12.67%, H=2.13% and [3] Br=85.11%. Find the molecular formula of the organic compound. [C=12, H=1, Br=80]

(h) Draw the structural formula of the following: [5]

1. 2-chloro-3-methyl-but-2-ene
2. 2-pentyne
3. 1,1,2-trichloro ethane
4. Propanoic acid
5. 2-methyl butan-2-ol

**SECTION II (40 Marks)**

*Attempt* ***any four*** *questions from this section*

**Question 2**

(a) Give an equation to show the following properties of sulphuric acid: [3]

1. Dehydrating property
2. As a non-volatile acid
3. Acidic nature

(b) Write balanced equations for the Baeyer’s process. Also, state the conditions to be [3]

 maintained for each of the reactions.

(c) With the help of electron dot structure show the formation of hydronium ion. State the type [2]

 of bond formed.

(d) State Gay-Lussac’s law. [1]

(c) Write the constituents of Duralumin. [1]

**Question 3**

(a) Answer the following questions with respect to the electrolytic process in the extraction of

 aluminium.

1. Identify the components of the electrolyte other than pure alumina and the role played [2]

by each.

1. Give an equation for the formation of aluminium at cathode. [1]

(b) Calculate the weight of ammonia gas obtained when 32.6 g of ammonium chloride reacts [2]

 with calcium hydroxide during the laboratory preparation of ammonia. [N=14, H=1, Cl=35.5]

(c) Give the structural formula of the isomers of butane and name them. [2]

(d) Write a balanced equation for the formation of ammonia from magnesium nitride. [1]

(e) Define Ionisation Potential. [1]

(f) How will you distinguish between dilute nitric acid and dilute sulphuric acid using barium [1]

 chloride solution?

**Question 4**

(a) An element A is present in period 3 and group 2 of the periodic table: [5]

1. Give reason why element A is less reactive than the element B with electronic configuration 2,8,1.
2. State which one of the two A or A2+ has a longer atomic size, giving a reason for the same.
3. Give a reason why ionisation potential of A is higher than that of B.
4. State if the element below A in group 2 will be more metallic or less metallic than A, giving a reason for the same.
5. Give the formula of the compound formed on reaction of A with nitrogen.

(b) Write equations for the reactions taking place at the two electrodes during the electrolysis [4]

 of:

1. Acidified copper sulphate solution with copper electrodes.
2. Molten lead bromide with inert electrodes. [mention clearly the name of the electrode in each case]

(c) A gas cylinder holds 85 g of a gas ‘X’. The same cylinder when filled with hydrogen holds [1]

 8.5 g of hydrogen under the same conditions of temperature and pressure. Calculate the

 molecular weight of ‘X’.

**Question 5**

(a) With respect to the ring test for nitrates explain: [3]

1. Freshly prepared ferrous sulphate is used.
2. The brown ring disappears if the test tube is disturbed.
3. Give the name and formula of brown ring.

(b) State the difference between polar and non-polar covalent compound with reference to: [2]

1. Shared pair of electron
2. Charge separation between the atoms.

(c) Give two points of difference between roasting and calcination. [2]

(d) Give an equation to illustrate: [2]

1. Reducing nature of ammonia gas.
2. Burning of ammonia in oxygen

(e) Give a reason why concentrated sulphuric acid is kept in air tight bottles. [1]

**Question 6**

(a) 4 g of a metallic chloride contains 1.89 g of the metal ‘X’. Calculate the empirical formula [3]

 of the metallic chloride. [X=64, Cl=35.5]

(b) A and B are two electrolytic cells connected in different circuits. Cell A contains KCl [2]

 solution and the bulb in the circuit glows brightly, when the circuit is completed; whereas

 Cell B contains CCl4 liquid and the bulb in the circuit does not glow at all, when the circuit is

 completed. Give reasons.

(c) During the contact process for the manufacture of Sulphuric acid give balanced equations [2]

 to show the conversion of sulphur trioxide to sulphuric acid.

(d) Give a chemical equation to show: [2]

1. Action of heat on nitre.
2. Acidic nature of nitric acid

(e) Why is ammonium nitrate not used as a reactant during the laboratory preparation of [1]

 ammonia?

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