

GREENLAWNS SCHOOL, WORLI
TERMINAL EXAMINATION: 2017-18
CHEMISTRY

Std: X

Marks: 80

Date: / /2017

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)

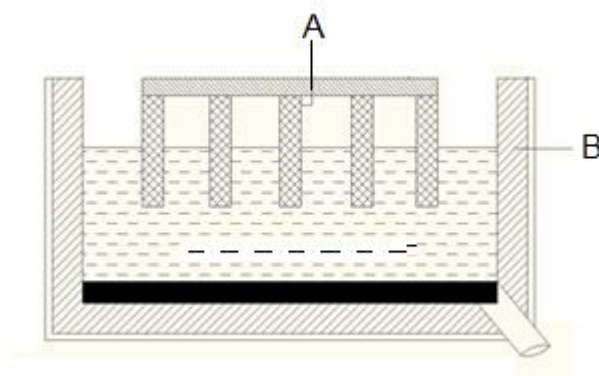
*Attempt **all** questions from this Section*

Question 1

- (a) Name the following: [5]
- i. The compound that makes laboratory nitric acid yellow.
 - ii. A suitable cathode used in the electrorefining of copper.
 - iii. The process of removal of gangue from ore.
 - iv. The element with the least ionisation potential in the third period.
 - v. A compound which is manufactured by the oxidation of ammonia.
- (b) What do you observe when: [5]
- i. Magnesium strip is dropped in dil. HCl.
 - ii. Ammonia is passed through excess chlorine.
 - iii. Copper turnings are heated with conc. nitric acid.
 - iv. Molten lead bromide is electrolysed.
 - v. Excess ammonium hydroxide is added to zinc sulphate.
- (c) Give balanced equations for the following reactions: [5]
- i. Heating of aluminium hydroxide in Baeyer's process.
 - ii. Reaction of conc. HCl with manganese dioxide.
 - iii. Action of conc. nitric acid on carbon.
 - iv. Catalytic oxidation of ammonia.
 - v. Action of heat on ammonium nitrate.
- (d) Rewrite each incorrect statement in the correct form using appropriate word / words: [5]
- i. In brass, copper imparts hardness to base metal zinc.
 - ii. Hydronium ion formed from a water molecule and a hydrogen atom contains two lone pairs of electrons.
 - iii. Haematite is the chief ore of aluminium.
 - iv. Anions migrate during electrolysis.
 - v. Particles in weak electrolytes are molecules.

- (e) 4.5 moles of calcium carbonate are reacted with dilute hydrochloric acid. [5]
- Write the equation for the reaction.
 - What is the mass of 4.5 moles of calcium carbonate? (Relative molecular mass of calcium carbonate is 100).
 - What is the volume of carbon dioxide liberated at stp?
 - What mass of calcium chloride is formed? (Relative molecular mass of calcium chloride is 111).
 - How many moles of HCl are used in this reaction?
- (f) Draw the electron dot diagram of the following: [4]
- Formation of water molecule
 - Formation of ammonium ion from ammonia molecule.
- (g) Arrange the elements F, Cl, Br and I as per the instructions given below: [4]
- Increasing order of atomic size.
 - Increasing electron affinity.
 - Increasing ionisation potential.
 - Decreasing electronegativity.

(h) The figure below represents electrolytic reduction of aluminium.



- Identify the process. [½]
- Name the three components of the electrolyte. [1½]
- Mention any two difficulties faced during the process. [2]
- How are the above difficulties overcome? [2]
- Why is the electrolyte covered with coke? [½]
- Write the electrolytic reaction taking place at cathode. [½]

SECTION II (40 Marks)

Attempt **any four** questions from this Section

Question 2

- (a) The following questions are based on the preparation of ammonia gas in the laboratory.
- Explain why ammonium nitrate is not used in the preparation of ammonia. [½]

- ii. Name the compound normally used as a drying agent during the process. [½]
 - iii. How is ammonia gas collected? [½]
 - iv. What is the vapour density of ammonia? [½]
 - v. Give a balanced equation for laboratory preparation of ammonia. [1]
 - vi. Give a balanced equation for industrial preparation of ammonia. [1]
- (b) The compound A has the following percentage composition by mass. [4]
 Carbon = 26.7%, Oxygen = 71.1%, Hydrogen = 2.2%. Determine the Empirical Formula of compound A. (H = 1, C = 12, O = 16).
 If the relative molecular mass of A is 90, what is the molecular formula of A?
 The compound A is weak acid. What is meant by this statement?
- (c) Why do electrovalent compounds usually dissolve in water and molecular compounds dissolve in organic solvents? [2]

Question 3

- (a) When the electrolysis of acidified water is carried out:
- i. What is the ratio of the volume of hydrogen produced to the volume of oxygen? [½]
 - ii. Give the equation for the discharge of ions at the cathode. [1]
 - iii. Why is the electrolysis of acidified water considered to be an example of catalysis? [1]
 - iv. What will you observe at anode? [½]
- (b) Give a chemical test for (equations necessary): [3]
- i. Hydrochloric acid
 - ii. Ammonia
 - iii. Nitric acid
- (c) How many molecules are present in: [3]
- i. 2.2 gms of carbon dioxide
 - ii. 16 gms of sulphur dioxide
 - iii. 58.5 gms of sodium chloride (Avogadro's no can be used as 6×10^{23})
- (d) State Gay Lussac's law. [1]

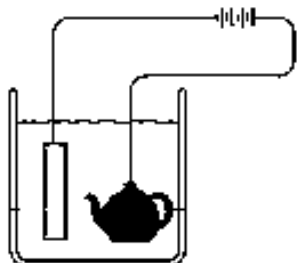
Question 4

- (a) Give reasons for the following pertaining to the laboratory preparation of nitric acid. [3]
- i. Conc. HCl is not used.
 - ii. The complete apparatus is made of glass.
 - iii. The reaction temperature is maintained below 200°C.
- (b) What is roasting? Give an equation to represent roasting. [2]
- (c) Calculate the number of gram atoms in 4.6 grams of sodium. (Na = 23) [2]
- (d) Define: Ionisation Potential and Atomic size. [2]
- (e) Select the ion in each case that would get selectively discharged from the aqueous mixture of the ions listed below: [1]

- i. Pb^{2+} , Cu^{2+} , Ag^+
- ii. SO_4^{2-} , NO_3^- , OH^-

Question 5

(a) The figure below represents electroplating of silver.



- i. Name the cathode and anode used during electroplating of silver. [1]
- ii. Name the electrolyte used in this process. [1]
- iii. Give the reactions occurring at cathode and anode. [2]
- iv. The overall strength of silver ions remains constant in the reaction. Why? [1]

(b) A gas cylinder can hold 1 kg of hydrogen at room temperature and pressure. [3]

Calculate:

- i. The weight of CO_2 it can hold under similar conditions of temperature and pressure.
- ii. If the number of molecules of hydrogen in the cylinder is X. State the number of molecules of CO_2 in the cylinder. [C = 12, O = 16, H = 1]
- iii. Give a reason for your above answer.

(c) Carry out the following conversions: [2]

- i. Ammonia to hydrogen chloride.
- ii. Chile salt petre to nitric acid.

Question 6

(a) Give balanced equations for the following: [3]

- i. Action of sodium hydroxide on zinc.
- ii. Reduction of ferric oxide by aluminium powder.
- iii. Reduction of zinc oxide by coke.

(b) Action of heat on lead nitrate gives yellow lead [II] oxide, nitrogen dioxide and oxygen. Calculate the total volume of NO_2 and O_2 produced on heating 8.5 g of lead nitrate. [3]

(c) Describe the role played by sodium hydroxide in the extraction of aluminium. [2]

(d) Elements W, X, Y and Z have electronic configurations: [2]

W=2,8,1 ; X=2,8,7 ; Y=2,5 ; Z=1

- i. What type of bond is formed between W & X ; Y & Z
- ii. What is the formula of the compound formed between X & Z ; W & X.
