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Class	Sub.	Exam	Date	Marks	Time	Total No. of Printed sides
10	Chemistry	Prelim	11.01.2019	80	2 hrs	6

SECTION 1 (40 MARKS)

Attempt all questions from this section.

Question 1

(a) Choose the correct answer from the options given below: [5]

i. The aim of the Fountain experiment is to prove that:

(A) HCl turns blue litmus red (B) HCl is denser than air

(C) HCl is highly soluble in water (D) HCl fumes in moist air

ii. Heating sodium acetate with soda lime produces:

(A) Methane (B) Ethane (C) Ethene (D) Ethyne

iii. A nitrate which decrepitates and produces a yellow residue which fuses with the test tube

(A) Lead nitrate (B) Silver nitrate (C) Zinc nitrate (D) Mercuric nitrate

iv. Which of the following combination is true for carrying out electroplating of an object?

(A) Direct and large current (B) Alternating and small current

(C) Alternating and large current (D) Direct and small current

v. If the empirical formula of the compound is CH_2O, then its molecular formula can be

(A) $C_2H_2O_2$ (B) C_2H_4O (C) C_3H_6O (D) $C_6H_{12}O_6$

(b) Complete the following statements by choosing the appropriate term given within the brackets: [5]

i. The catalyst used to convert ethene to ethane is _____ [iron, cobalt, nickel]

ii. An insoluble salt prepared by *Synthesis* is _____ [$FeCl_3$, FeS, $FeSO_4$]

iii. The metallic electrode which takes part in electrolytic reaction is _____ [Cu, Fe, Pt]

iv. The metal other than aluminium present both in Magnalium and Duralumin [Cu, Mn, Mg]

v. The hydroxide which is soluble in excess of NaOH is _____ [$Cu(OH)_2$, $Zn(OH)_2$, $Fe(OH)_2$]

[5]

(c) Name the gas evolved in each of the following cases:

i. The gas which turns acidified potassium dichromate solution clear green.

ii. The gas used for welding purpose.

iii. The gas evolved at anode when aqueous Copper sulphate is electrolysed using inert electrode.

iv. The gas produced when excess ammonia is treated with chlorine.

v. The gas produced when potassium chloride reacts with conc. Sulphuric acid.

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

i. Aqueous barium chloride solution is added to sodium sulphate solution.

ii. Few drops of water accidentally fall into a beaker containing conc Sulphuric acid.

iii. Aluminium metal is boiled with potassium hydroxide solution.

iv. Methyl orange indicator is added to NaOH.

v. Nitric acid is kept open in a reagent bottle for a long time.

(e) i. Give IUPAC names for the following structures: [3]

1. $CH_3-C\equiv C-CH_3$ (Cl, Cl)

2. $CH_3-CH_2-CH_2-C(=O)-H$

3. $CH_3-C(Cl)(Cl)-C(Cl)(Cl)-CH_3$

ii. Draw the structural formula for each of the following: [2]

1. 2-bromo-2-methyl butane

2. 4-chloro pentan-1-ol

(f) Solve:

i. Calculate the percentage of aluminium in Sodium Aluminium Flouride correct to the nearest whole number. [F=19, Na=23, Al=27] 13 [2]

ii. If 8.2g of calcium nitrate is heated, calculate the volume of nitrogen dioxide obtained at S.T.P and the mass of calcium oxide obtained at the same time. 2.24 [3]

$2Ca(NO_3)_2 \xrightarrow{\Delta} 2CaO + 4NO_2 + O_2$ (Ca=40, N=14, O=16)

(g) Complete and balance the following chemical equations:- [5]

i) $C_2H_5OH + CH_3COOH \rightleftharpoons$

ii) $C + HNO_3$ (hot,conc) $\longrightarrow$

iii) $CaC_2 + H_2O \longrightarrow$

iv) $(NH_4)_2SO_4 + Ca(OH)_2 \longrightarrow$

v) $Ca(HCO_3)_2$ + dil HCl $\longrightarrow$

(h) Give appropriate scientific reasons for the following statements: [5]

i. Acetic acid is considered as aliphatic monocarboxylic acid.

ii. A decrease in I.P. of an element leads to a decrease in non metallic character of an element.

iii. Ethanol can be converted to ethene using conc. Sulphuric acid.

iv. Covalent compounds undergo slow speed molecular reactions.

v. Concentrated hydrochloric acid is a weaker acid compared to dilute hydrochloric acid.

Section II [40 marks]

Solve any four questions

Question 2 Study the following periodic table and answer the questions given below:

Grp	1	2	13	14	15	16	17	18
Period 2	Li		D	P		O	J	Ne
Period 3	A	Mg	E	Si			H	K
Period 4	B	C		F	G			L

The elements in bold are their own symbols

i) Identify the most metallic element. [1]

ii) State the type of bond formed between B & H [1]

iii) Write the formula between C&J and state the significance of this compound in Hall Heroult's process in extraction of aluminum. [2]

iv) How many valence electrons are present in G? [1]

v) Arrange the elements Li, D,P,O,J in increasing order of electronegativity. [1]

vi) Draw electron –dot diagram for the compound formation between P&H [1]
(no formation only product diagram)

vii) If the compound AH in molten state is electrolyzed using graphite electrode write the electrode reaction taking place at Anode and Cathode after identifying the compound. [3]

Question.3

a) A black oxidizing agent X reacts with conc.HCl to give a greenish yellow gas Y. This gas reacts with metal Z to form a deliquescent substance A. On adding NaOH to the solution A, a reddish brown ppt B appears.

i) Identify X, Y, Z, A [2]
ii) Write balanced chemical equation for the above changes. [3]

b) From the list of substances choose the substances required for preparation of the following salts and write balanced chemical equation for the same. [5]

List: Cu, Pb, Na, Zn, Fe, CuO, $Pb(NO_3)_2$, Na_2CO_3 solution, dil HCl , dil HNO_3, dil H_2SO_4,NaCl,$PbCO_3$

i) $ZnSO_4$, ii) $CuSO_4$, iii) Na_2SO_4, iv)$FeSO_4$, v) $PbCl_2$

Question.4

a) State the conditions required for the following reactions to take place: [3]

i) Catalytic oxidation of ammonia to nitric oxide.

ii) Preparation of ethyne from ethylene dibromide.

iii) Conversion of SO_2 to SO_3 in contact process.

b) State the composition of the following alloys: [2]

i) Bronze.

ii) Stainless Steel.

c) Draw the structure of the stable positive ion formed when an acid is dissolved in water [2]

d) Analysis of a compound Z obtained from the planet Mars showed Z has the following composition:

K= 39.4% , Fe= 28.3% and O =32.3% Calculate the empirical formula of the compound Z. (K =39 , Fe=56 and O =16) K_2FeO_4 [3]

Question 5

a) i) State Avogadro's Law. [1]

ii) A cylinder contains 68 g of NH_3 at STP [N=14,H=1, Avogadro's number is $6x10^{23}$]

1) What is the volume occupied by the gas? 89.6 [1]

2) How many moles of ammonia are present in the cylinder? 4 [1]

3) How many molecules of ammonia are present in the cylinder? $24X10^{23}$ [1]

b) M is the metal above hydrogen in the activity series and its oxide has a formula M_2O. This oxide when dissolved in H_2O forms the corresponding hydroxide which is a good conductor of electricity. In the above content answer the following questions M= Pb [4]

i) How many electrons are there in the outer most shell of M? 2

ii) Name the group to which M belongs? 2

iii) State the reaction taking place in the cathode. $Pb^{2+} + 2e^- \rightarrow Pb$

iv) Name the product at the Anode. O_2

c) Correct the following statements: [2]

i) Haematite is the chief ore of aluminium. iron

ii) Constant boiling mixture of HNO_3 contains 80% HNO_3 by weight. 58%

Question 6

a) i) Name the solution used to react with bauxite as a first step in obtaining pure aluminum oxide, in Baeyer's process. [4]

ii) Write the equation for the reaction where aluminum oxide for electrolytic extraction of aluminum is obtained by heating aluminum hydroxide.

iii) Name the compound added to pure alumina to lower the fusion temperature during the electrolytic reduction of alumina.

iv) Explain why it is preferred to use a number of graphite electrodes as anode instead of a single electrode during the above electrolysis.

b) Copy and complete the table given below [4]

Electrolysis	Reaction at anode	Product at cathode
Electro refining of impure copper		
Molten $PbBr_2$ using graphite electrodes		

c) Select the correct answer from the choice given in the bracket. [2]

i) The functional group of product formed on hydrolysis of bromoethane with aqueous caustic potash. (carboxylic, hydroxyl ,aldehydic)

ii) The solution which contains both molecules and ions on dissociation of the same.

($NaNO_3$, Na_2CO_3 , N_2OH)

Question.7

a) i) Write one relevant chemical test to distinguish between the given pairs of compound [2]

1) FeS and $FeSO_4$

2) Dil HCl and Dil H_2SO_4

b) ii) 750 ml of carbon monoxide is mixed with 700 ml of oxygen and ignited. Calculate the volume of O_2 used in the reaction. [1]

$2CO(g) + O_2(g) \longrightarrow 2CO_2(g)$

c) Give balanced chemical equation to prepare following salts. [3]

i) Lead sulphate from Lead carbonate

ii) Copper chloride using copper carbonate

d) Give one equation to show the following properties of compounds. [2]

i) Acidic nature of HNO_3

ii) Reducing nature of NH_3 on reaction with CuO

e) Solution P has pH=13 , Solution Q has pH= 1 and Solution C has pH= 7 [2]

i) Which solution on reaction with bicarbonate will produce a gas which turns limewater milky?

ii) Which solution above on heating with NH_4Cl produces an alkaline gas?