30/1/18

VILLA THERESA HIGH SCHOOL

Std: 10 | Prelim (January- 2018) | Date: 5 /1/2018

Time: 2Hrs | Subject : **Chemistry** | Marks:80

SECTION I: All question in this section are compulsory.

Q.1.

a) Choose the correct alternative from those given below: (6)

i) Which of the following is a weak electrolyte?

1. Aq. Sodium chloride
2. Benzene
3. Aq. Sodium acetate
4. Aq. Ammonium acetate

ii) A black colour solid which on reaction with dil. Sulphuric acid forms a blue coloured solid:

1. Carbon
2. Lead (II) oxide
3. Manganese (IV) oxide
4. Copper (II) oxide

iii) A metal other than mercury present in liquid amalgam is:

1. Sodium 2. Potassium 3. Zinc 4. Copper

iv) The indicator which does not change colour on passage of Hydrogen chloride gas.

1. Moist blue litmus
2. Phenolphthalein
3. Methyl orange
4. Alk. Phenolphthalein

v) The molecule that does not have a lone pair of electrons:

1. water 2. Nitrogen 3. Ammonia 4. Methane

vi) The number of molecules in 192g of sulphur (S=32) are

1) $0.75\times6\times10^{23}$ 2) $6\times6\times10^{23}$ 3) $3\times6\times10^{23}$ 4) $3.5\times6\times10^{23}$

b) From the list of compounds given below, choose the most appropriate compound in each case. (Choice of compound should not be repeated) (4)

$Pb(NO_3)_2$, $AgCl$, NH_4Cl, $CuCO_3$, $CuSO_4.5H_2O$, KNO_3, NaCl, $ZnCO_3$

1. A salt whose solution has a pH less than 7.
2. An insoluble chloride.
3. A compound which changes from green to black on heating.
4. A compound which produces nitrogen dioxide on heating.

c) What do you observe when: (5)

1. Acetylene reacts with ammoniacal cuprous chloride.
2. H_2S is passed through acidified $K_2Cr_2O_7$ solution.
3. Barium chloride is mixed with Sodium sulphate solution.
4. Conc. HNO_3 is added to zinc granules.
5. Zinc is heated in air.

d) Convert the following: (5)

1. Sulphur to sulphuric acid.
2. Red lead to litharge
3. Iron sulphide to Iron (II) chloride
4. Ethyl alcohol to ethene.
5. Ethyne to ethane (one step only)

Contd.2...

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... in oxygen in the presence of a catalyst as follows: (3)

$$NH_3 + O_2 \longrightarrow NO + H_2O$$

1. Balance the above equation.
2. What mass of steam is produced when 1.5g of NO is formed?
3. What volume of oxygen at STP is required to form 10 moles of the gaseous products?

ii) Calculate the percentage of phosphorus in the fertilizer Superphosphate- $Ca(H_2PO_4)_2$
(H=1, Ca=40, P=32, O=16) (2)

f) Give one chemical test to distinguish between the following pairs of compounds: (5)

1. Ethene gas and ethyne gas.
2. Black carbon powder and black copper oxide powder.
3. Carbon dioxide gas and sulphur dioxide gas.
4. Potassium chloride solution and potassium sulphate solution
5. Sodium sulphate and potassium sulphate.

g) Give the structural formula of the following compounds: (5)

i) 1, 2 Dichloropropane ii) 2- ethyl pentanoic acid iii) 4-methyl hexane
iv) 3- methyl pent-2-ene v) 2-butyne

h) i) State Avogadro's Law. (5)

ii) Calculate the number of moles of X atoms in 93g of X. (X=31)

iii) A gas cylinder holds 85g of gas X. The same cylinder when filled with hydrogen holds 8.5g of hydrogen under the same conditions of temperature and pressure. Calculate the molecular weight of X.

iv) Draw the electron dot diagram to show the formation of ammonium ion.

SECTION II: Answer any four questions from this section.

Q2.

a) Give balanced equations for the conversion A to D (4)

$ZnCO_3$
A ↓
$Zn(NO_3)_2$
B ↓
$Zn(OH)_2$
C ↓ D ↓
ZnO Na_2ZnO_2

b) State which of the following are oxidised or reduced giving reasons: (2)

i) $N \longrightarrow N^{-3}$

ii) $Cl^- \longrightarrow Cl$

c) Define: i) Ionization potential ii) Electronegativity (2)

Contd.3...

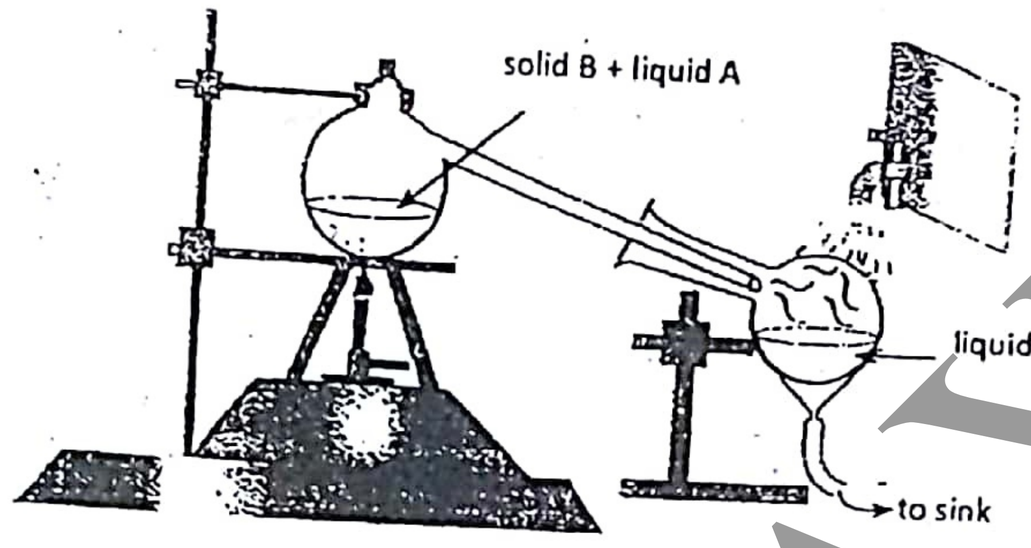
d) Explain the following:

i) Pure acetic acid is called glacial acetic acid.

ii) It is dangerous to burn methane in insufficient air. (2)

Q3.

a) The figure given below shows the laboratory preparation of an acid. (3)



i) Name liquid A, solid B, liquid C. (Do not write the formula).

ii) What is the kind of apparatus used? Why?

iii) Give a balanced chemical equation for the reaction taking place.

b) Calculate V.D of CO_2 if 200 ml of the gas at STP weighs 0.40g. (2)

c) Write balanced chemical equations for: (3)

i) Action of warm water on magnesium nitride.

ii) Excess of ammonia with chlorine.

iii) Action of conc. Sulphuric acid on carbon.

d) Name the following: (2)

i) The catalyst used for the oxidation of a hydrocarbon.

ii) An ester with a fruity smell.

iii) A substance that reacts with sodium acetate to give a saturated hydrocarbon.

iv) A salt formed by mixing saturated solutions of two simple salts.

Q4.

a) Give the IUPAC names for: (4)

i) $CH_3—CH_2—CHO$ ii) $CH_3—O—CH_3$ iii) C_2HCl_5

iv) $H_3C-C\equiv C—CH_2—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CH_3$

b) Arrange the elements of 7A according to : (3)

i) Increasing ionization potential

ii) Increasing electron affinity

iii) Decreasing electronegativity.

c) Define: Coordinate bond (1)

d) 80cc of methane is mixed with 200cc of pure oxygen at the same temperature and pressure. The mixture is then ignited. Calculate the composition of the resulting mixture if it is cooled to initial room temperature and pressure. (2)

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

Q5.

a) Zinc is extracted from zinc blende. The zinc blende is roasted. The solid product is mixed with an excess of coke powder. (5)

i) Give the formula of zinc blende.

ii) Write the equation for the roasting of zinc blende.

iii) What is the purpose of using coke?

iv) Zn is used to coat iron sheets to prevent it from rusting. Why?

v) Give the equation showing the reaction of zinc with boiling NaOH.

b) Give scientific reasons: (5)

i) A cation is always smaller than the parent atom.

ii) HCl can be termed as a polar covalent compound.

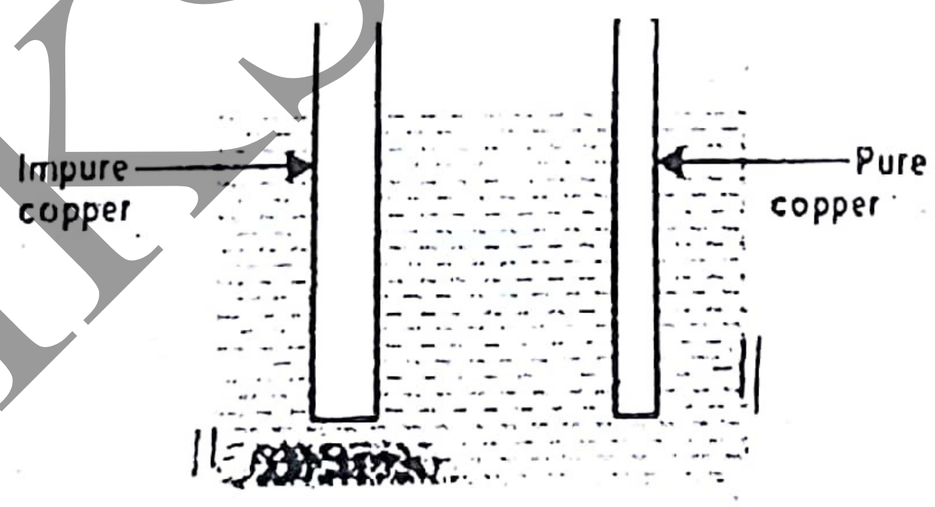
iii) Even though SO_3 is an acid anhydride obtained during the contact process, it cannot be directly absorbed in water.

iv) Lead bromide is maintained in the molten state during electrolysis.

v) Atomic size of group 18 elements is more than the atomic size of group 17 elements.

Q6.

a) Answer the following questions with respect to the diagram given below.



i) Which process does the above diagram represent? Define. (2)

ii) Redraw the complete diagram by labelling the anode, cathode, electrolyte used etc. (2)

iii) What is anode mud? (1)

b) Underline the odd one giving reason for it being odd as compared to the rest.

i) $Al(OH)_3$, $Pb(OH)_2$, $Mg(OH)_2$, $Zn(OH)_2$

ii) HNO_3, HCl, H_2SO_4, HCOOH

iii) H_2O, CO, H_2, CO_2

iv) K_2O, NA_2O, CaO, CsO_2 (4)

Contd.5...

c) Give the electron dot structure of Carbon tetrachloride. (1)

Q7.

a) Complete (with conditions if necessary) and balance the following organic equations and match each reaction to the words given below: (6)

i) $C_2H_5 + KOH_{(aq)} \longrightarrow$ _____

ii) $HC \equiv CH + Cl_2 \longrightarrow$ _____

iii) $CH_3OH + O_2 \longrightarrow$ _____ + _____

A. Halogenation B. Catalytic oxidation C. Dehydrohalogenation

b) What is added to steel to make it stainless steel? (2)

c) Give the special property of duralumin and type metal which make them particularly useful. (2)

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