Quarterly Examination 2017-2018

Std. : X **Full Marks : 80**

Subject : Chemistry **Time : 2hrs.+15 min.**

Section-A [40 marks]

(Answer all questions)

Q1. (a) Give suitable chemical teams for the following :— **(5)**

(i) A bond formed by a shared pair of electrons with both electrons coming from same atom.

(ii) The property of self-linking of atoms through covalent bond to form long chain.

(iii) The tendency of an atom to attract shared pair of electrons towards itself.

(iv) A pair of electrons which is not shared with any other atom.

(v) Compounds having same molecular formula but different structural formula.

(b) Write balanced chemical equations for the following reactions : **[5]**

(i) An active metal reacts with dilute sulphuric acid.

(ii) Potassium bicarbonate is reacted with dilute sulphuric acid.

(iii) Sulphuric acid acts as dehydrating agent.

(iv) When barium chloride solution is added to sulphuric acid.

(v) When cupric oxide is reacted with dilute sulphuric acid.

(c) Name the gas : **[5]**

(i) Which turns acidified potassium dichromate green.

(ii) Produced on reaction of dilute sulphuric acid with metallic sulphide.

(iii) Which produces dense white fumes when a rod dipped in ammonia brought near it.

(iv) Which has greenish yellow colour and turns moist starch iodide paper blue-black.

(v) Which turns colourless alkaline pyrograllol solution dark brown.

(d) (a) (i) Calculate the percentage of sodium in $Na_2CO_3.10H_2O$. [Na=23, C=12, O=16, H=1].[2]

(ii) From the equation : $C+2H_2SO_4 \longrightarrow CO_2 + 2H_2O + 2SO_2$

Calculate : (a) mass of CO_2 produced by 49g of sulphuric acid.

(b) The volume of sulphur dioxide measured at STP liberated at the same time.

(c) Number of molecules of water produced. [3]

(e) There are three elements E, F, G with atomic number 19, 8 and 17 respectively. [5]

(i) Give the molecular formula of the compound formed between E and G.

(ii) State the type of chemical bond in this compound.

(iii) Write the equation for formation of the compound between E and F.

(iv) Write the electronic configuration of G. State the group number and period number of G.

(f) Draw the structural formula of the following compounds :- [5]

(i) Butan - 2- OL (ii) 2,3 dimethyl pentene.

(iii) 2-chloro-4-methyl hexane (iv) Pentyne

(v) Propanoic acid

(g) The following questions refer to the periodic table : [5]

(i) Name the first and last element of period 3

(ii) What is the common feature of the electronic configuration of the elements of group 17 ?

(iii) What happens to ionisation potential of an atom down the group ?

(iv) Place the three elements nitrogen, fluorine and carbon in the order of increasing electronegativity.

(h) Choose the most appropriate answer : [5]

(i) Which of the following is a common characteristic of a covalent compound ?

(a) High melting point (b) consists of molecules

(c) Always soluble in water (d) Conducts electricity in molten state

(ii) The gas law which relates the volume of a gas to moles of the gas is

(a) Avogadro's law (b) Gay-Lussac's law

(c) Boyle's law (d) Charle's law

(iii) The element having highest ionisation potential in the periodic table is

(a) H e (b) N e (c) Ar (d) Xe.

(iv) Which of the following will weigh the least ?

(a) 1 mole of silver (b) $6x10^{23}$ atoms of carbon

(c) 2 gm of nitrogen (d) 22.4 L of O_2 gas at STP.
[Ag = 108, N = 14, O = 16, C = 12]

(v) In a periodic table, alkali metals are placed in the group.

(a) 17 (b) 18 (c) 1 (d) 11

Section-B [40 marks]
(Answer any four questions)

Q2. (a) From the list of compounds — (4)

Ethane, ethene, ethanoic, acid, ethyne ethanol, — answer the questions :—

(i) Which one is saturated hydrocarbon ?

(ii) Which one is having $-\overset{\overset{O}{\|}}{C}-OH$ group ?

(iii) Which one shows properties of alcohol ?

(iv) Which one has triple covalent bond between two carbon atoms ? [4]

(b) Draw the isomers of the compound C_4H_{10} and name them. [4]

(c) Find the odd one out and explain your answer [Valency is not a criterion]
C_3H_8, C_5H_{10}, C_2H_6, CH_4. [2]

Q3. (a) Draw electron dot diagram for the following compounds :— [4]
(i) Methane (ii) Calcium chloride

(b) Match the atomic number 2,4,8,15 and 19 with each of the following :— [5]

(i) A solid non metal belonging to third period.

(ii) a metal of valency one.

(iii) A gas of valency two

(iv) A rare gas

(v) An element belonging to group 2.

(c) Explain why carbon tetrachloride does not dissolve in water. [1]

Q4. (a) $MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$ 0.02 moles of pure MnO_2 is heated strongly with conc. HCl. Calculate :

(a) Mass of MnO_2 used

(b) Moles of salt formed.

(c) Volume of chlorine gas formed at STP.

(d) Number of molecules of HCL required. [4]

(b) Oxygen oxidises ethyne according to the equation $2C_2H_2 + 5O_2 \longrightarrow 4CO_2 + 2H_2O$. What volume of ethyne gas at STP is required to produce 8.4 dm_3 of carbondioxide at STP ? [2]

(c) Write your observations for the following reactions : [4]

(i) Ammonium dichromate $[(NH_4)_2\ Cr_2O_7]$ is heated.

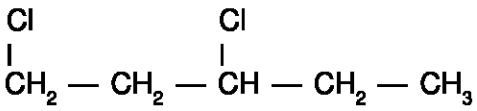
(ii) Copper carbonate is heated.

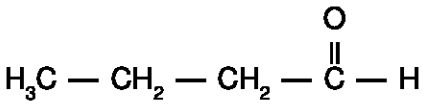
(iii) A metal sulphide is reacted with dilute hydrochloric acid.

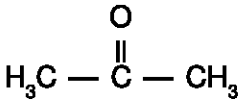
(iv) Flame test is performed with a potassium salt.

Q5. (a) Give the IUPAC names of the following compounds : [5]

(i) $CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH_2}}$

(ii)  [5]

(iii) 

(iv) 

(v) $H_3C - C \equiv C - CH_3$.

(b) What property of concentrated sulphuric acid is made use of in each of the following cases ?

(a) When it reacts with a chloride and forms HCl gas.

(b) In the preparation of CO from HCOOH.

(c) As a source of hydrogen by diluting it and adding a strip of magnesium.

(d) Hydrogen sulphide gas is passed through concentrated sulphuric acid.

(e) In the preparation of sulphur dioxide by warming a mixture of conc. H_2SO_4 and copper turnings?[5]

Q6. (a) Write the molecular formula of lower and higher homologous of an alkane containing four carbon atoms.[2]

(b) Name the alkyl radical and the functional group of the following organic compounds :—

(a) C_2H_5OH (b) CH_3CHO (c) C_3H_7COOH. [3]

(c) State Avogadro's Law. [1]

(d) An organic compound whose vapour density is 45, has the following percentage composition. H = 2.22%, O=71.19% and rest in carbon. Calculate its (i) empirical formula and (ii) molecular formula. [4]

Q7. (a) In the manufacture of sulphuric acid :—

(i) Name the process.

(ii) Write the reaction for catalytic oxidation of sulphur dioxide.

(iii) Why H_2SO_4 is not obtained by directly reacting with water ? [3]

(b) Name the anion present in each of the following compounds. [3]

(i) Compound A when warmed with conc. H_2SO_4 gives a gas which gives dense white fumes with ammonia.

(ii) When $BaCl_2$ solution is added to a solution of compound B, a white precipitate insoluble in dilute hydrochloric acid is formed.

(iii) The action of heat on insoluble compound C produces a gas which turns lime water milky.

(c) Arrange the following as per the instruction given in the brackets :

(i) H e, Ar, N e (increasing order of number of electron shells) [4]

(ii) Na, Li, K (increasing ionisation energy)

(iii) F, Cl, Br (increasing electronegativity)

(iv) Na, K, Li (increasing atomic size)