FWC

G.C.E. A/L Examination July - 2015

Conducted by Field Work Centre, Thondaimanaru

In Collaboration with

Zonal Department of Education Jaffna.

Grade :- 12 (2016) **CHEMISTRY**

Part – II (B)

Essay Questions.

❖ **Answer any two questions only.**

(05) a) 13.9 g of a solid mixture X which contains FeC_2O_4 and $Na_2C_2O_4$ only was dissolved in distilled water. $200cm^3$ of a $0.5moldm^{-3}$ H_2SO_4 solution was added to the solution and the solution was made up to $250cm^3$ by diluting it with distilled water. A $25cm^3$ portion of the solution was separated out and was titrated against a $KMnO_4$ solution of $0.4moldm^{-3}$ concentration. The burette reading was $12.5cm^3$

(Molar masses of FeC_2O_4 and $Na_2C_2O_4$ are 144 $gmol^{-1}$ and $134gmol^{-1}$ respectively)

i) Write half ionic equation for the oxidation – reduction reactions involved in the above experiment

ii) Calculate the mole ratio FeC_2O_4 : $Na_2C_2O_4$ in the given mixture

b) Explain the following

i) Although Br_2 and ICl have almost the same molecular mass, their boiling points are different.

ii) Ionic character of AgF $AgCl$ and $AgBr$ decreases in the above order.

c) $14.12g$ of a solid mixture which contains only $Na_2CO_3 . xH_2O$ and $NaHCO_3$ was heated strongly until a constant mass was obtained. During this, $6.7g$ of mass loss was observed of which $2.2g$ was the mass of dry CO_2 gas. Find the value of x

$(Na = 23,\ C = 12, O = 16,\ H = 1)$

d) Calculate the mole fraction of the solute in each of the following solutions.

i) 2 mol dm^{-3} aqueous solution of glucose with a density of 1.44gcm^{-3}

ii) A methanol solution of 64% by mass

(Relative molar masses of glucose and methanol are 180 and 32 respectively)

(06) a) i) Draw the structure of 2 – Methylpropene

ii) Draw the structure of the major product formed when HBr is added to 2 – methylpropene under polar conditions.

iii) "Another product may also be formed in the above reaction but only in small amount".

Explain the above statement by proposing a mechanism for the addition of HBr to 2 – methyl propene.

b) Draw the possible structural isomers with open chain structures (non cyclic) for the molecular formula $C_3H_4Cl_2$

Among the above structures, which will exhibit stereoisomerism?

c) Give two structures for each of the following isomerism satisfying the molecular formula given against them.

a) Position isomers, $C_4\ H_9\ OH$

b) Functional group isomerism,, $C_3\ H_6\ O_2$

c) Diastereo (Geometrical) isomerism,, $C_4\ H_8$

(07) a) An unknown solid mixture contains one or two of the following :

$CaCO_3$, $BaC\ell_2$, $AgNO_3$, Na_2SO_4, $ZnSO_4$ and $NaOH$ The mixture is completely soluble in water and the solution gives pink colour with phendphthalein. When dilute HCl is gradually added to the above solution, a precipitate is formed which dissolves on further addition of the acid What is / are present in the solid?

Give equations to explain the appearance of the precipitate and its dissolution.

b) Complete the following reactions and balance the equations.

i) $LiNO_{3(s)} \xrightarrow[\Delta]{}$

ii) $NO_{2(g)} + Ba(OH)_{2(aq)} \longrightarrow$

iii) $B_{(s)} + (conc)\ HNO_3 \longrightarrow$

iv) $H_2O_2 + Ag_2O \longrightarrow$

v) $KBr + MnO_2 + (conc)\ H_2SO_4 \longrightarrow$

c) A solution S contains only two cations of 3d – transition metals.

Some tests performed with this solution and the relevant observations are given below.

	Test	Observation
A)	To a portion of the solution S, $NaOH_{(aq)}$ was added	A persistent green coloured precipitate was observed.
B)	The solution S was warmed with $NaOH_{(aq)}$ and H_2O_2 and then filtered	Precipitate and a yellow coloured filtrate were obtained
C)	Conc. HCl was added to the precipitate obtained in (B) above	A Yellow – brown solution was obtained
D)	The solution obtained in (c) above was diluted with water and after making it alkaline H_2S gas was passed into it.	A blak precipitate obtained

i) Identify the cations present in the solution

ii) Write the formulae of the ions which are responsible for the yellow colour formed in test (B) and the Yellow – brown colour in test (C)

iii) Write the balance ionic equation of the reaction for the formation of yellow coloured filtrate in (B)

iv) What would you observe when the filtrate in (B) is acidified?

Write the balanced chemical equation for it.