



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 $0.5mol\ dm^{-3}$ 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 $0.4mol\ dm^{-3}$ concentration. The burette reading was $12.5cm^3$

(Molar masses of FeC_2O_4 and $Na_2C_2O_4$ are $144\ gmol^{-1}$ and $134\ gmol^{-1}$ 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 $Na_2CO_3 \cdot xH_2O$ 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 $1.44\ gm\ cm^{-3}$

ii) A methanol solution of 64% by mass

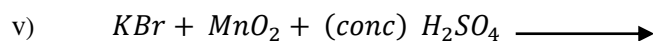
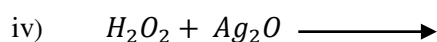
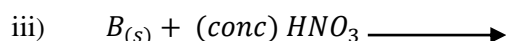
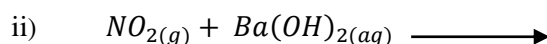
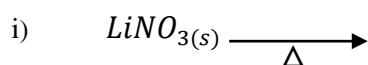
(Relative molar masses of glucose and methanol are 180 and 32 respectively)

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- (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.
- Position isomers, C_4H_9OH
 - Functional group isomerism,, $C_3H_6O_2$
 - Diastereo (Geometrical) isomerism,, C_4H_8

- (07) a) An unknown solid mixture contains one or two of the following :
 $CaCO_3$, $BaCl_2$, $AgNO_3$, Na_2SO_4 , $ZnSO_4$ and $NaOH$ The mixture is completely soluble in water and the solution gives pink colour with phenolphthalein. 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.



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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 black 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.

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