



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  $134gmol^{-1}$  respectively)

- Write half ionic equation for the oxidation – reduction reactions involved in the above experiment
  - Calculate the mole ratio  $FeC_2O_4 : Na_2C_2O_4$  in the given mixture
- b) Explain the following
- Although  $Br_2$  and  $ICl$  have almost the same molecular mass, their boiling points are different.
  - 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.
- $2\,mol\,dm^{-3}$  aqueous solution of glucose with a density of  $1.44g\,cm^{-3}$
  - 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.

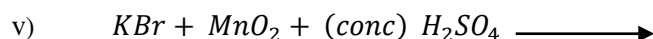
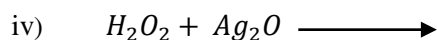
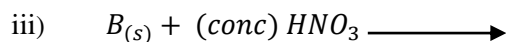
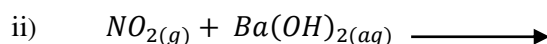
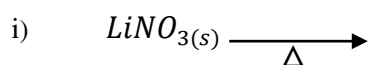
- a) Position isomers,  $C_4H_9OH$   
 b) Functional group isomerism,,  $C_3H_6O_2$   
 c) Diastereo (Geometrical) isomerism,,  $C_4H_8$

- (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.



- 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

- Identify the cations present in the solution
- 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)
- Write the balance ionic equation of the reaction for the formation of yellow coloured filtrate in (B)
- What would you observe when the filtrate in (B) is acidified?  
Write the balanced chemical equation for it.