



SIR ARTHUR LEWIS COMMUNITY COLLEGE  
DIVISION OF AGRICULTURE

#CL13

ASSOCIATE DEGREE IN GENERAL AGRICULTURE  
2010/2011 ACADEMIC YEAR  
END OF FIRST SEMESTER EXAMS

- Instructions:**
- This paper consists of four (4) questions **answer any four (4) questions.**
  - Collaboration will result in zero for this exam
  - All communication devices should be off.
  - Answer all questions and show ALL working clearly.

1. a) Write the names of the following compounds:
- |                              |                            |      |
|------------------------------|----------------------------|------|
| I. $\text{KHCO}_3$           | IV. $\text{P}_2\text{O}_5$ |      |
| II. $\text{Na}_2\text{SO}_4$ | V. $\text{CO}_2$           |      |
| III. $\text{N}_2\text{O}$    |                            | [10] |

- b) Write the correct chemical formula for the following compounds:
- |                        |                          |      |
|------------------------|--------------------------|------|
| I. Sodium Carbonate    | IV. Carbon tetrachloride |      |
| II. Boron trifluoride  | V. Sulphur trioxide      |      |
| III. Potassium nitrate |                          | [10] |

2. The reaction of powdered aluminum  $\text{Al}_{(s)}$  and iron (II) oxide,  $\text{Fe}_2\text{O}_{3(s)}$  produces Aluminum oxide  $\text{Al}_2\text{O}_{3(s)}$  and iron  $\text{Fe}_{(l)}$ . This reaction releases so much heat the iron that the elemental iron is in the molten form. Because of this, railroads use this reaction to provide molten steel to weld steel rails together when laying track. Suppose that in one batch of reactants 4.20mol Al was mixed with 1.75mol  $\text{Fe}_2\text{O}_3$ .

Assuming that the relative atomic masses (R.A.M.) of the following elements are:

Fe – 56    O – 16    Al – 27

- Write a balanced equation for the reaction. [2]
  - Which is the limiting reactant? [8]
  - How many moles of the excess reactant are left over? [6]
  - Calculate the mass of iron (in grams) that can be formed from this mixture of reactants. [2]
- 3). In a titration  $30.0\text{cm}^3$  of a solution of Sulphuric acid are required for neutralization of  $35.0\text{cm}^3$  of  $0.045\text{ mol/dm}^3$  Sodium hydroxide.
- Write a balanced equation for the reaction including state symbols. [4]
  - Find the concentration of sulphuric acid in  $\text{mol/dm}^3$ . [6]



c) Calculate the mass of sodium sulphate formed. [4]

d) Determine the number of molecules of water formed. [4]

Assume the R.A.Ms to be:

H ---- 1            O --- 16            S -- 32            Na --- 23

Avogadro's constant is  $6.022 \times 10^{23}$

4.

a) In your own word explain what a reversible reaction is. [2]

b) List the factors which affect the position of equilibrium of reversible react. [4]

c) For this reaction endothermic reaction:



$K_c = 0.016$  at  $520^\circ\text{C}$ .

Calculate the concentration of all species at equilibrium in a  $6\text{dm}^3$  container starting with:

i. 0.4 moles of HI

ii. 0.2 moles  $\text{H}_2$ , 0.2 moles  $\text{I}_2$

iii. 0.4 moles  $\text{H}_2$ , 0.4 moles  $\text{I}_2$  [9]

d) What is meant the term "endothermic reaction" [1]

e) Make reasonable prediction about the position of equilibrium:

i. If the temperature is increased [2]

ii. If the temperature is decreased. [2]

Total 20 marks

