

# DAWOOD PUBLIC SCHOOL

Course out line 2011-2012

Subject Chemistry

Class – X

## Text book:

Harwood, R., Chemistry, edition 2-2003, Cambridge University Press

## Introduction:

This syllabus is designed to place more emphasis on factual material and greater emphasis on the understanding and application of scientific concepts and principles.

## Aims

The aims are to:

### (a) Develop abilities and skills that

- i) Are relevant to the study and practice of science;
- ii) Are useful in everyday life;
- iii) Encourage efficient and safe practice;
- iv) Encourage effective communication.

### (b) Develop attitudes relevant to science such as:

- i) Accuracy and precision;
- ii) Objectivity
- iii) Integrity
- iv) Enquiry:
- v) Initiative;
- vi) Inventiveness

### (c) Stimulate interest in and care for the environment.

### (d) Promote awareness that

- i) The study and practice of science are cooperative and commutative activities, and are subject to social, economic technological, ethical and cultural influences and limitations;
- ii) The applications of science may be both beneficial and detrimental to the individual, the community and the environment.

## ASSESSMENT OBJECTIVES

### 1. Knowledge with understanding

Students should be able to demonstrate knowledge and understanding in relation to:

1. Scientific phenomena, fact, laws, definitions, concepts, theories;
2. Scientific vocabulary, terminology, conventions (including symbols, quantities and units);
3. Scientific instruments and apparatus, including techniques of operation and aspect of safety;
4. Scientific quantities and their determination;
5. Scientific and technological applications with their social, economic and environmental implications.

### 2. Handling information and solving problems

Student should be able--- in words or by using symbolic, graphical and numerical forms of presentation - to:

1. Locate, select organize and present information from a verity of sources;
2. Translate information from one form to another;
3. Manipulate numerical and other data;
4. Use information to identify patterns, report trends and draw inference;
5. Present reasoned explanations for phenomena, pattern and relationships;
6. Make predictions and hypotheses;
7. Solve problems.

### 3. Experimental skills and investigations

Students should be able to:

1. Follow a sequence of instructions:

2. Use techniques, apparatus and materials;
3. Make and record observations, measurements and estimates;
4. Interpret and evaluate observations and experimental results;
5. Plan an investigation, select techniques, apparatus and materials;
6. Evaluate methods and suggest possible improvements.

### SCHEME OF ASSESSMENTS

Students are required to enter:

- (i) In monthly and surprise tests;
- (ii) Take two papers In the Mid-year and Final examinations

**Total marks for both papers are 110**

### PAPER TYPE OF PAPER DURATION MARKS

1	Multiple Choice	1 hour	40
2	Theory 1hour	30 minutes	75

### INSTRUCTIONS

#### Syllabus Content with Time Line

#### FIRST TERM

#### August 2011

#### Chapter 1: Ammonia

#### Learning and Assessment objectives

Students should be able to:

- (i) Describe the use of nitrogen and hydrogen in the manufacture of ammonia;
- (ii) State that some chemical reactions, like the manufacture of ammonia, are reversible;
- (iii) Describe the essential conditions which increase the yield of ammonia in the Haber processes
- (iv) Describe the use of nitrogenous fertilizer in promotion growth and crop yield;
- (v) Calculate the percentage mass of nitrogen in various nitrogenous fertilizers;
- (vi) Describe the eutrophication and water pollution caused by fertilizers;
- (vii) Describe the displacement of ammonia from fertilizers like ammonium nitrate by adding lime.

#### Contents

- 1.1 Reversible Reactions
- 1.2 Manufacturing Ammonia by the Haber process
- 1.3 Displacement of Ammonia from its salt

#### Assignments

Exercise from the book

Search for the use of sulfuric acid in the industries

#### 3rd & 4th week

#### Chapter 2: Sulfuric Acid

#### Learning and Assessment objectives

Students should be able to:

- (i) State the use of sulfuric dioxide as bleach in the manufacture of wood pulp for paper; as a food Preservative.
- (ii) Describe the manufacture of sulfuric acid from sulfur by the contact process.
- (iii) Describe the properties of dilute sulfuric acid as a typical acid.
- (iv) State the use of sulfuric acid as in the manufacture of detergents and in fertilizers.

#### Contents

- 2.1 Extraction of sulfur
- 2.2 Chemistry of oxides of sulfur
- 2.3 Industrial manufacture of sulfuric acid: the contact process
- 2.4 Uses of sulfuric acid

#### Assignments

Exercise from Christopher N Prescott Chemistry, 3rd edition

Exercise from Harwood, R. Chemistry by Cambridge University Press 1998

**September 2011****Chapter 3: Matter****Learning and Assessment objectives**

Students should be able to:

- (i) Describe the general physical properties of metals.
- (ii) Explain why metals are often used in the form of alloys.
- (iii) Identify representations of metals and alloys from diagram of structures.
- (iv) Place calcium copper, hydrogen, iron, magnesium, potassium, silver, sodium, and zinc in order of reactivity.
  - a. The reactions, of metals with water or steam; dilute hydrochloric acid.
  - b. The reduction , of their oxides with carbon and with hydrogen.
- (v) Describe reactivity series as related to the tendency of a metal to form its positive ions, illustrated by its reaction with:
  - a. The aqueous ions of other listed metals.
  - b. The oxides of the other listed metals.
- (vi) Describe the action of heat on the carbonates of the listed metals.
- (vii) Account for the apparent un reactivity of aluminum in terms of the presence of an oxide layer which Adheres to the metal.
- (viii) Deduce an order of reactivity from a given set of experimental results.

**Contents**

- 3.1 Metals in the periodic table
- 3.2 Properties of metals and alloys
- 3.3 The reactivity series of metals
- 3.4 The stability of metal compounds
- 3.5 The displacement power of metals

**Assignments**

Exercise from Christopher N Prescott Chemistry for O level, 3rd edition  
 Exercise from Harwood, R Chemistry

**October 2011****Chapter 4: Extraction of metals****Learning and Assessment objectives**

Students should be able to:

- i) Describe the case of obtaining metals from their ores by relating the elements to the reactivity series.
- ii) Describe the essential reactions in the extraction of iron from haematite in the blast furnace.
- iii) Describe the idea of changing the properties of iron by the controlled use of additives to form alloys called steels.
- iv) State the use of mild steel and stainless steel.
- iv) Describe , in outline , the extraction of aluminium from pure aluminium oxide.
- v) State the use of aluminium; the manufacture of air craft because of its strength and low density; in food containers because of its resistance to corrosion.
- vi) State the use of Zinc for galvanizing and for making brass.
- vii) State the use of copper related to its properties, e.g electrical wiring.

**Contents**

- 4.1 Metals and alloys
- 4.2 The reactivity series
- 4.3 Extraction of metals
- 4.4 The use of Iron &Steel
- 4.5 Rusting
- 4.6 Recycling metals

**Assignments**

Exercise from the book  
 Collect information on importance of recycling

**November 2011****Revision of class ix & x syllabus****December 2011**

**Mid-Year Examinations  
FINAL - TERM  
January 2012**

**Chapter 5: Electrolysis**

**Learning and Assessment objectives:**

Students should be able to:

- (i) Describe the electrode product in the electrolysis of:(a)molten lead(II) bromide, concentrated hydrochloric acid , concentrated aqueous sodium chloride, dilute sulfuric acid between inert electrodes;b)aqueous copper(II)sulfate using carbon electrodes and using copper electrodes.
- (ii) Describe electrolysis in term of the ions present and the reactions on the electrodes as examples given.
- (iii) State the general principle that metals or hydrogen are formed at the negative electrode and that nonmetal are formed at the positive electrode.
- (iv) Predict the likely products of the electrolysis of a specified binary compound in the molten state or in concentrated aqueous solution.
- (v) Describe , in outline the manufacture of :
  - (a) Aluminum from pure aluminum oxide in molten cryolite.
  - (b) Chlorine and sodium hydroxide from concentrated aqueous sodium chloride.
- (vi) Describe the electroplating of metals exemplified by copper plating.
- (vii) State two uses of electroplating.
- (viii) Describe the reasons for the use of copper and aluminum in cables and why plastics and ceramics are used as insulators.

**Contents**

- 5.1 Introducing electrolysis
- 5.2 Explaining Electrolysis
- 5.3 Electrolysis of molten Ionic compounds
- 5.4 Electrolysis of aqueous solution of compounds
- 5.5 Industrial Applications of Electrolysis
- 5.6 Simple cell

**Assignment**

Exercise from the book

**February 2012**

**Chapter 6: Air**

**Learning and Assessment objectives**

Students should be able to:

- (i) Describe idea in simple terms the ideas of respiration,, combustion and rusting
- (ii) Describe the volume composition f clean air in term of 79%nitrogen, 20%oxygen, with the reminder being noble gases, carbon dioxide and variable amounts of water vopour
- (iii) Name common pollutant of air
- (iv) State the source of each pollutant
- (v) State the adverse effect of acidic pollutants on buildings and plants, and of carbon mono oxide and Lead compounds on health
- (vi) Describe the separation of oxygen and nitrogen from liquid air by fractional distillation
- (vii) Name the use of oxygen
- (viii) Describe paint and other coatings, including galvanizing, as a method of rust prevention
- (ix) Describe sacrificial protection in term of the reactivity series of metals

**Contents**

- 6.1 Oxygen
- 6.2 Combustion and Respiration
- 6.3 Composition of Air
- 6.4 Fractional Distillation of Air

**Assignments**

Exercise from the book

**Chapter 7: water**

**Learning and Assessment objectives:**

Students should be able to:

- (i) Describe the formation of hydrogen as product of the reaction between;

- a. Reactive metals and water
- b. Metals and acid
  - (ii) Solutions related to the ions present and their position in the reactivity series
  - (iii) Describe, in outline, the manufacture of hydrogen from the reaction between methane and steam
  - (iv) State the use of hydrogen
  - (v) Describe in outline, the purification of water
  - (vi) State some uses of water in industry and in water
  - (vii) Describe a chemical test for water

### **Contents**

- 7.1 Resources of water
- 7.2 Reactions of water
- 7.3 Production of hydrogen
- 7.4 Uses of water

### **March 2012**

#### **Revision**

#### **April 2011**

#### **Mock Examinations**

#### **Resource List:**

Students may also find references to the following books helpful; these are suitable for use with this syllabus.

Harwood, R Chemistry (edition 2, 2003), Cambridge University Press  
Berry, R IGCSE study guide for chemistry (2005) Hodder Murray  
Clegg, A Chemistry for IGCSE (2006) Heinemann  
Eral, B & Chemistry John Murray, Hodder Murray (2003)  
Wilford, L D R  
Hill, g Chemistry counts Hodder and Stoughton (2003)  
Lewis & Thinking Chemistry (GCSE edition) Oxford University press (2004)  
Waller

Websites for general use:

[http://www.chemsc.org/networks/learnnet/classic\\_exp.htm](http://www.chemsc.org/networks/learnnet/classic_exp.htm)

<http://www.thecatalyst.org/>

<http://www.wpbschoolhouse.btinternet.co.uk/page10.htm>

<http://www.s-cool.co.uk/contents.asp>

<http://www.howstuffworks.com/>

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