

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X EXAMINATION

MAY 2015

Chemistry Paper II

Time: 2 hours 25 minutes Marks: 40

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

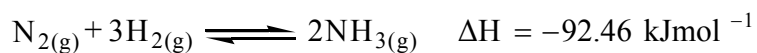
**I agree that this is my name and school.
Candidate's signature**

2. RUBRIC. There are TEN questions. Answer ALL questions. Questions 9 & 10 each offer TWO choices. Attempt any ONE choice from each.
3. When answering the questions:

Read each question carefully.
Use a black pencil for diagrams. DO NOT use coloured pencils.
DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
Complete your answer in the allocated space only. DO NOT write outside the answer box.
4. The marks for the questions are shown in brackets ().
5. You may use a simple calculator if you wish.

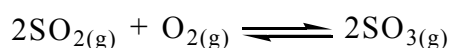
Q.1. (Total 3 Marks)

- a. Consider the following reversible reaction at equilibrium.



Describe, with a suitable reason, the effect of lowering the temperature on the concentration of ammonia in the above reaction. (2 Marks)

- b. The chemical equation below shows the formation of sulphur trioxide through a reversible, exothermic reaction.



Write an equilibrium constant expression for this reaction. (1 Mark)

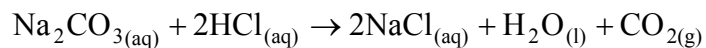
Q.2. (Total 3 Marks)

State any THREE characteristics of dynamic equilibrium.

Q.3.

(Total 3 Marks)

10 cm³ of sodium carbonate solution was neutralized by 15 cm³ of 0.2 M hydrochloric acid. The reaction is shown below.



Calculate the concentration (molarity) of the sodium carbonate solution.

Q.4.

(Total 3 Marks)

Show the formation of the following alkyl radicals from the alkane C₄H₁₀.

- a. isobutyl
- b. t-butyl

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Q.5. (Total 3 Marks)

Monosaccharide and disaccharide are both carbohydrates yet they are different from each other. Mention any TWO differences between them and give ONE example of a disaccharide.

S. No.	Monosaccharide	Disaccharide
1.		
2.		
Example		

Q.6. (Total 3 Marks)

A specific enzyme assists in making bread. The main ingredients found in bread dough are yeast, flour and sugar. Both yeast and flour are enzyme producing agents. When the dough is left to stand in a warm place for a few hours, it rises. Once baked and out from the oven, it doesn't rise any further.

- a. Briefly describe the role of enzymes in the making of bread, highlighting the cause of increase in the size of the dough. (2 Marks)

- b. Why doesn't the bread rise any further after being baked? (1 Mark)

Q.7.

(Total 3 Marks)

15 cm³ of three different types of water samples (X, Y and Z) were taken in the following states.

- i. Untreated
- ii. Boiled
- iii. After passing through an ion exchanger

All three states of each water sample are separately treated with varying volumes of a soap solution. The minimum volume of soap solution that each state used to produce a lather which remained for more than 10 min is recorded in the following table.

Water Sample / State	Volume of Soap Solution Used (cm ³)		
	Untreated	Boiled	Passed through an Ion Exchanger
X	13	2	2
Y	1.5	1.5	1.5
Z	14	14	1.5

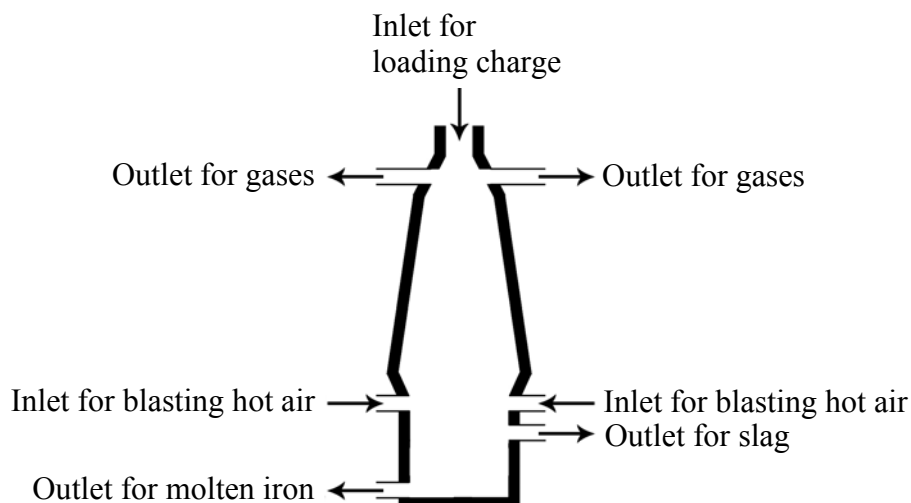
Based on the given data, identify samples X, Y and Z. Record your answer in the table below.

Soft Water	Permanent Hard Water	Temporary Hard Water

Q.8.

(Total 4 Marks)

The diagram below shows a blast furnace used for the extraction of iron. Several reactions take place inside the blast furnace once the charge is loaded. This leads to the production of liquid iron.



- a. Charge is a mixture of three raw materials; two of which are iron ore and limestone. Name the third raw material. (1 Mark)

- b. During the extraction of iron, one of the reactions produces carbon monoxide. Write a balanced chemical equation for this reaction. (1 Mark)

- c. A molten slag floats on top of the molten iron at the bottom of the furnace. How is this slag formed and what are its constituents? (2 Marks)

Q.9.

(Total 8 Marks)

EITHER

- a. State the type of chemical reaction that takes place between each of the following reactants in order to prepare a soluble sodium salt. Illustrate each reaction using a balanced chemical equation.
- Nitric acid and sodium hydroxide
 - Sulphuric acid and sodium metal
 - Hydrochloric acid and sodium oxide
 - Copper sulphate and sodium carbonate

OR

- b. Using chemical equations, describe halogenation of each of the following hydrocarbons.
- Methane in the presence of bright sunlight
 - Methane in the presence of diffused sunlight
 - 1-propene in the presence of an inert solvent, CCl_4
 - 2-butyne in the presence of an inert solvent, CCl_4

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Q.10.

(Total 7 Marks)

EITHER

- a. Describe the formation of acid rain with the help of any TWO chemical equations and state THREE ways in which acid rain harms the natural environment.

OR

- b. Pure copper is extracted by passing its ore through several metallurgical steps, one of which is refining. Describe the electrolytic refining of blistered copper illustrating the construction and working of the electrolytic cell. Using chemical equations, show the reactions that take place at the anode and the cathode.

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