ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 8: Study of Compounds – Hydrogen Chloride

Maximum Marks: 40 ***Time allowed: One hour***

1. Answers to this Paper must be written on the paper provided separately.
*2. You will not be allowed to write during the first **10** minutes. This time is to be spent in reading the question paper.*
*3. **The time given at the head of this Paper is the time allowed for writing the answers.***
*4. **Section A** is compulsory. Attempt **any two** questions from **Section B**.*
5. The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A (20 Marks)

*(Attempt **all** questions from this Section.)*

Question 1

Choose the correct answers to the questions from the given options. [8]
(Do not copy the question, write the correct answers only.)

(i) Which of the following is used to dry hydrogen chloride gas?

(a) Concentrated sulphuric acid
(b) Phosphorus pentoxide
(c) Quicklime
(d) Anhydrous sodium sulphate solution

(ii) A glass rod dipped in ammonium hydroxide is brought near the mouth of a gas jar full of hydrogen chloride. What is observed?

(a) Greenish-yellow fumes
(b) Dense white fumes
(c) Reddish brown fumes
(d) No change

(iii) Dilute hydrochloric acid is added to silver nitrate solution. The precipitate formed is:

(a) Yellow and soluble in nitric acid
(b) White and soluble in dilute nitric acid
(c) White and soluble in ammonium hydroxide
(d) Black and insoluble in ammonium hydroxide

(iv) Which of the following metals does **not** react with dilute hydrochloric acid?

(a) Zinc
(b) Magnesium
(c) Iron
(d) Copper

(v) Aqua regia is a mixture of:

(a) 3 parts conc. HCl and 1 part conc. HNO_3

(b) 1 part conc. HCl and 3 parts conc. HNO_3

(c) 3 parts conc. HCl and 1 part conc. H_2SO_4

(d) 1 part conc. HCl and 1 part conc. HNO_3

(vi) **Assertion (A):** Hydrogen chloride gas is not collected over water.
Reason (R): Hydrogen chloride is highly soluble in water.

(a) (A) is true but (R) is false.

(b) (A) is false but (R) is true.

(c) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(vii) Dilute hydrochloric acid is added to sodium sulphite. The gas evolved is:

(a) Hydrogen sulphide

(b) Carbon dioxide

(c) Sulphur dioxide

(d) Chlorine

(viii) When concentrated hydrochloric acid is warmed with manganese dioxide, the gas evolved is:

(a) Hydrogen

(b) Chlorine

(c) Oxygen

(d) Hydrogen chloride

Question 2

(i) Complete the following sentences by choosing the correct option from the brackets: [3]

(a) In the laboratory preparation of hydrogen chloride, the mixture of sodium chloride and conc. sulphuric acid is heated to a temperature not exceeding _____. (200 °C / 500 °C)

(b) Dry hydrogen chloride gas _____ turn dry blue litmus paper red. (does / does not)

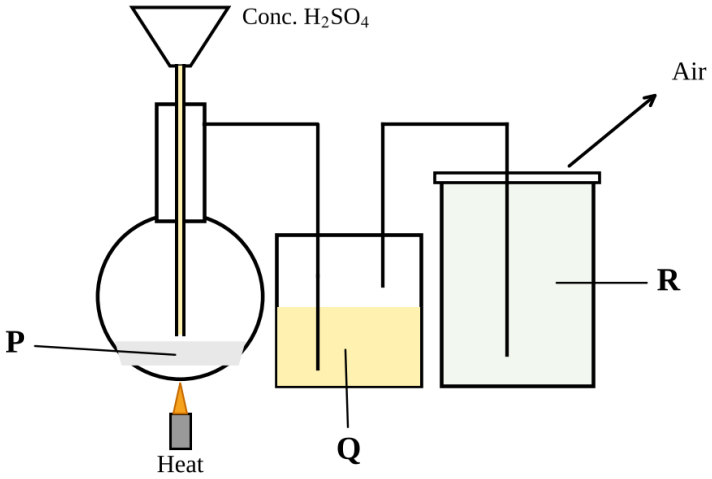
(c) By boiling, dilute hydrochloric acid cannot be concentrated beyond _____ HCl by mass. (22.2% / 36%)

(ii) Match Column A with Column B. (Write the answers as (a)–(number), and so on.) [3]

Column A	**Column B**
(a) The fountain experiment	1. Pale yellow precipitate of sulphur and a pungent gas
(b) Silver nitrate solution added to dilute hydrochloric acid	2. Shows the very high solubility of hydrogen chloride
(c) Dilute hydrochloric acid added to sodium thiosulphate	3. Curdy white precipitate
	4. Greenish-yellow gas

Question 3

(i) The diagram below shows the laboratory preparation of hydrogen chloride gas from sodium chloride. [3]



(a) Name the substance P in the flask. Write the equation for its reaction with the acid in the funnel when heated below 200 °C.

(b) Name the liquid Q in the wash bottle and state its function.

(c) Name the method of collection shown for gas jar R. Why is the gas not collected over water?

(ii) Give reasons for the following: [3]

(a) Anhydrous hydrogen chloride is a poor conductor of electricity, but its aqueous solution is an excellent conductor.

(b) Concentrated nitric acid is not used in place of concentrated sulphuric acid for preparing hydrogen chloride.

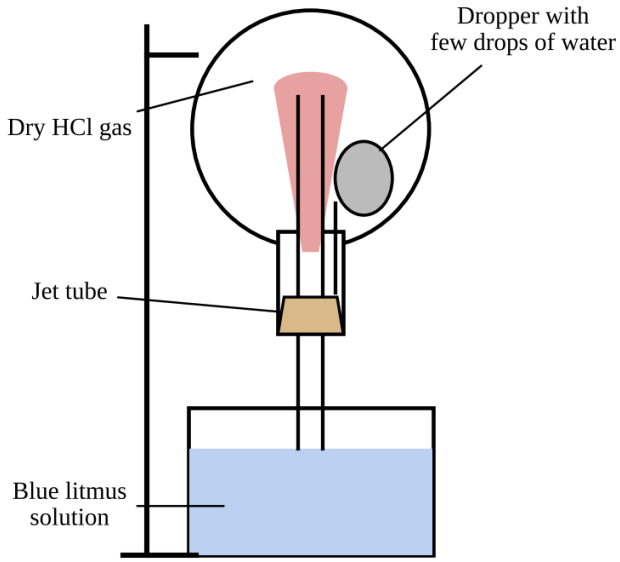
(c) Phosphorus pentoxide and quicklime cannot be used to dry hydrogen chloride gas.

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 4

The diagram below shows an experiment set up with a round-bottom flask completely filled with dry hydrogen chloride gas.



(i) Answer the following questions based on the diagram: [4]

(a) Name the experiment. What do you observe when the dropper is pressed?

(b) State the colour of the fountain and give a reason.

(c) Explain why the liquid rises through the jet tube.

(d) Name the property of hydrogen chloride demonstrated by this experiment.

(ii) Hydrochloric acid is prepared in the laboratory by dissolving hydrogen chloride gas in water using an inverted funnel. [3]

(a) Why is an inverted funnel used instead of a narrow delivery tube dipping into water?

(b) Name the phenomenon that is avoided by this arrangement.

(c) What extra safety device is placed between the generating flask and the trough?

(iii) Hydrogen chloride is dissolved separately in water and in toluene. [3]

(a) What is the effect of each solution on blue litmus?

(b) Which of the two solutions conducts electricity?

(c) What does the behaviour in toluene show about the nature of hydrogen chloride?

Question 5

The table below gives the gases evolved when different substances are added to dilute hydrochloric acid.

	Substance added to dilute hydrochloric acid	Gas evolved	Odour of the gas
1	Zinc granules	(a)	Odourless
2	Sodium hydrogencarbonate	(b)	Odourless
3	Sodium sulphite	(c)	Pungent, suffocating
4	Iron(II) sulphide	(d)	Rotten eggs

(i) Complete the table by naming the gases (a), (b), (c) and (d): [4]

(ii) Write balanced equations for the reactions of dilute hydrochloric acid with: [3]

(a) magnesium oxide.

(b) zinc hydroxide.

(c) iron(III) oxide.

(iii) Concentrated hydrochloric acid acts as a reducing agent. [3]

(a) Write the equation for its reaction with manganese dioxide on warming.

(b) How will you identify the gas evolved?

(c) Name the components of aqua regia and name one metal that dissolves in it.

Question 6

The table below describes some tests carried out with hydrogen chloride and its solution.

	Test performed	Observation
1	Hydrogen chloride gas is passed into silver nitrate solution	(a) .....
2	Dilute nitric acid is added to the product of test 1	(b) .....
3	Ammonium hydroxide solution is added to the product of test 1	(c) .....
4	Dry hydrogen chloride gas is tested with dry blue litmus paper	(d) .....

(i) Complete the table by writing the observations (a), (b), (c) and (d): [4]

(ii) Write balanced equations for: [3]

(a) the reaction of dilute hydrochloric acid with silver nitrate solution.

(b) the reaction between ammonia gas and hydrogen chloride gas.

(c) the reaction of dilute hydrochloric acid with lead(II) nitrate solution.

(iii) Answer the following questions: [3]

(a) Why does a bottle of hydrogen chloride gas give white fumes when opened in air?

(b) Name the process in which hydrochloric acid is used to remove the oxide coating from steel before galvanising.

(c) State one use of dilute hydrochloric acid in medicine.

****** END OF PAPER ******