ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 11: Sulphuric Acid

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) The catalyst used in the Contact process for the manufacture of sulphuric acid is:
- (a) Finely divided iron
- (b) Vanadium pentoxide
- (c) Manganese dioxide
- (d) Nickel

(ii) Dilute sulphuric acid is prepared by:
- (a) Adding water quickly to the acid
- (b) Adding the acid slowly to water with constant stirring
- (c) Adding the acid quickly to water
- (d) Heating the acid with water

(iii) Dilute sulphuric acid reacts with iron(II) sulphide to give:
- (a) Sulphur dioxide
- (b) Hydrogen
- (c) Hydrogen sulphide
- (d) Sulphur trioxide

(iv) In the Contact process, sulphur trioxide is absorbed in:
- (a) Water
- (b) Concentrated sulphuric acid
- (c) Dilute sulphuric acid
- (d) Sodium hydroxide solution

(v) Which of the following shows the **dehydrating** property of concentrated sulphuric acid?

(a) Zinc reacting to give hydrogen

(b) Carbon reacting to give carbon dioxide

(c) Blue copper(II) sulphate crystals turning white

(d) Sodium chloride giving hydrogen chloride

(vi) **Assertion (A):** Concentrated sulphuric acid is used to prepare hydrogen chloride from sodium chloride.
Reason (R): Concentrated sulphuric acid is a non-volatile acid.

(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) Barium chloride solution is added to dilute sulphuric acid. The white precipitate formed is:

(a) Barium sulphate, insoluble in dilute hydrochloric acid

(b) Barium sulphate, soluble in dilute hydrochloric acid

(c) Barium sulphite, insoluble in dilute hydrochloric acid

(d) Barium chloride, soluble in water

(viii) When copper is heated with concentrated sulphuric acid, the gas evolved is:

(a) Hydrogen

(b) Sulphur dioxide

(c) Sulphur trioxide

(d) Hydrogen sulphide

Question 2

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

(a) While diluting sulphuric acid, _____ is added slowly to _____ with constant stirring. (acid, water / water, acid)

(b) Sulphur dioxide turns acidified potassium dichromate solution from orange to _____. (green / blue)

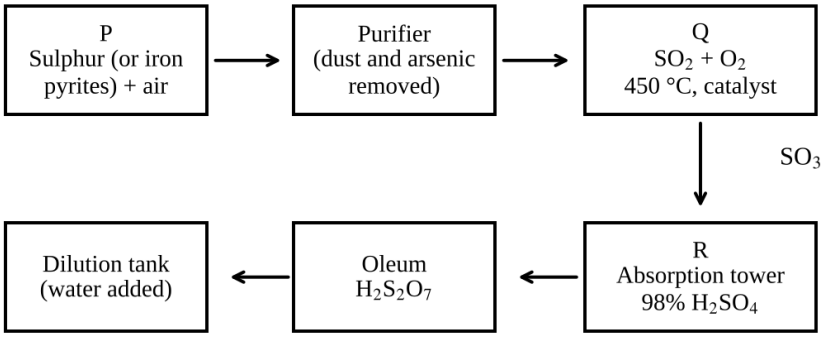
(c) Sulphuric acid is a _____ acid. (monobasic / dibasic)

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

Column A	**Column B**
(a) Concentrated sulphuric acid added to sugar	1. Black spongy mass of carbon
(b) Concentrated sulphuric acid added to blue copper(II) sulphate crystals	2. Crystals turn white
(c) Barium chloride solution added to dilute sulphuric acid	3. White precipitate insoluble in dilute hydrochloric acid
	4. Reddish brown fumes

Question 3

(i) The block diagram below shows the steps in the manufacture of sulphuric acid by the Contact process. [3]



(a) Write the equation for the formation of sulphur dioxide in P when sulphur is used.

(b) Name the catalyst used in Q and write the equation for the reaction.

(c) Why is sulphur trioxide not dissolved directly in water in R?

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

(a) Water is never added to concentrated sulphuric acid for dilution.

(b) Concentrated sulphuric acid is kept in air-tight bottles.

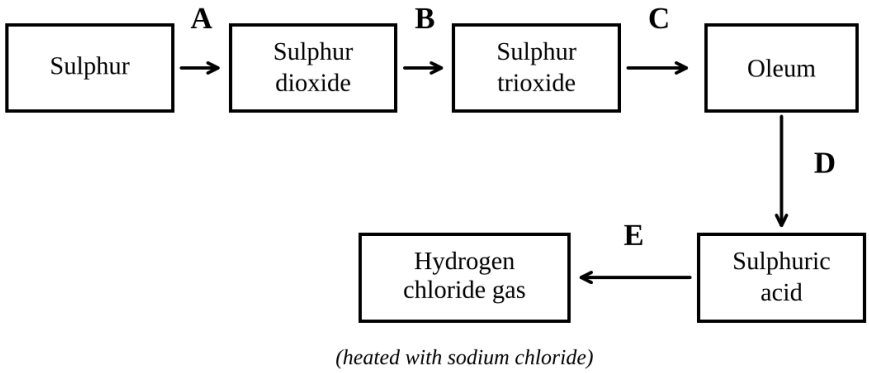
(c) Concentrated sulphuric acid is not used to dry hydrogen sulphide gas.

SECTION B (20 Marks)

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

Question 4

The flow chart below shows the conversion of sulphur into sulphuric acid and some of its uses.



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

(a) Name the process and state what is done in step A.

(b) Name the catalyst and the temperature used in step B.

(c) Name the substance used in step C and write the formula of oleum.

(d) What is added in step D?

(ii) Answer the following questions on the conversion of SO_2 to SO_3 (step B): [3]

(a) Why is a very low temperature not used although the reaction is exothermic?

(b) Why is a pressure of only 1–2 atmospheres used?

(c) Why is the catalyst heated only at the beginning of the process?

(iii) Concentrated sulphuric acid acts as an oxidising agent. Write balanced equations for its reaction with: [3]

(a) carbon.

(b) sulphur.

(c) copper.

Question 5

The table below gives the action of sulphuric acid on some substances.

	Substance	Acid added	Gas evolved
1	Magnesium ribbon	Dilute sulphuric acid	(a) .....
2	Sodium hydrogencarbonate	Dilute sulphuric acid	(b) .....
3	Iron(II) sulphide	Dilute sulphuric acid	(c) .....
4	Copper turnings	Concentrated sulphuric acid, heated	(d) .....

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

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

(a) sodium hydroxide solution (to form the normal salt).

(b) copper(II) oxide.

(c) sodium sulphite.

(iii) Barium chloride solution is used to test for sulphates. [3]

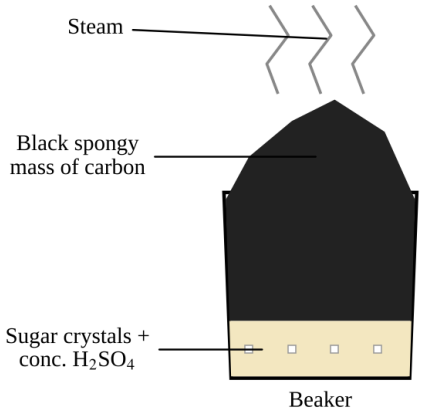
(a) State the observation when barium chloride solution is added to dilute sulphuric acid.

(b) Write the equation for the reaction.

(c) How does this test help to distinguish a sulphate from a sulphite?

Question 6

The diagram below shows what happens when concentrated sulphuric acid is added to sugar crystals in a beaker.



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

(a) Name the property of sulphuric acid shown in this experiment.

(b) Name the black substance formed and explain why steam is seen.

(c) Write the equation for the reaction (sugar is $C_{12}H_{22}O_{11}$).

(d) What would you observe if the sugar were replaced by a piece of wood?

(ii) Concentrated sulphuric acid is also used to dehydrate other substances. [3]

(a) State what happens when it is added to blue crystals of $CuSO_4 \cdot 5H_2O$. Write the equation.

(b) Write the equation for the dehydration of formic acid, HCOOH, to give carbon monoxide.

(c) Why does concentrated sulphuric acid cause blisters on the skin?

(iii) Concentrated sulphuric acid is a non-volatile acid. [3]

(a) Write the equation for its reaction with sodium chloride at a temperature below 200 °C.

(b) Write the equation for its reaction with potassium nitrate.

(c) What does the non-volatile nature allow it to do to salts of volatile acids?

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