ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 3: Acids, Bases and Salts

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) Acetic acid (CH_3COOH) contains four hydrogen atoms in its molecule, but it is a monobasic acid. Which of the following acids is also **monobasic**?

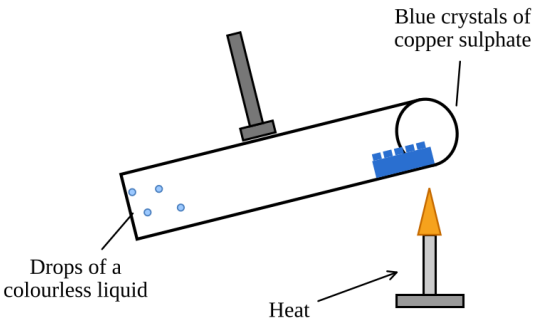
(a) Sulphuric acid
(b) Nitric acid
(c) Phosphoric acid
(d) Carbonic acid

(ii) The pH values of four aqueous solutions P, Q, R and S are given in the table below. Which solution will turn colourless phenolphthalein pink?

Solution	**P**	**Q**	**R**	**S**
pH	2	6	7	12

(a) P
(b) Q
(c) R
(d) S

(iii) A student heats blue crystals of copper sulphate in a dry test tube, as shown below. A colourless liquid collects on the cooler part of the tube. Which test will prove that this liquid is water?



(a) It turns blue litmus paper red.

(b) It turns lime water milky.

(c) It turns white anhydrous copper sulphate blue.

(d) It turns red litmus paper blue.

(iv) Which one of the following is an **acid salt**?

(a) $NaHSO_4$

(b) Na_2SO_4

(c) KNO_3

(d) NH_4Cl

(v) Which of the following is the most suitable method of preparing lead sulphate in the laboratory?

(a) Adding dilute sulphuric acid to lead carbonate

(b) Adding dilute sulphuric acid to lead metal

(c) Adding dilute sulphuric acid to lead oxide

(d) Adding dilute sulphuric acid to a solution of lead nitrate

(vi) **Assertion (A):** Anhydrous iron(III) chloride cannot be prepared by heating hydrated iron(III) chloride.
Reason (R): On heating, hydrated iron(III) chloride gives iron(III) oxide and hydrogen chloride gas.

(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) Which of the following substances, when exposed to the atmosphere, absorbs moisture and finally dissolves in the water absorbed?

(a) Sodium carbonate decahydrate

(b) Fused calcium chloride

(c) Silica gel

(d) Copper(II) sulphate pentahydrate

(viii) Solution X has a pH of 3 and solution Y has a pH of 5. How does the concentration of hydronium ions in X compare with that in Y?

(a) 100 times greater

(b) 100 times smaller

(c) 2 times greater

(d) Both are equal

Question 2

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

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

(b) Crystals of washing soda become powdery when left in dry air. This property is called _____. (efflorescence / deliquescence)

(c) When one mole of sodium hydroxide reacts with one mole of sulphuric acid, the salt formed is _____. (normal salt / acid salt)

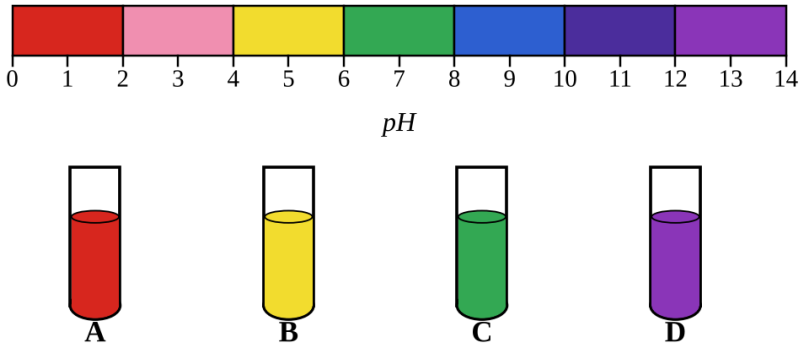
(ii) Match Column A with Column B. (Write the answers as (a)–(number), and so on.) [3]

Column A (Salt)	Column B (Method of preparation)
(a) Sodium sulphate	1. Action of a dilute acid on an active metal
(b) Lead chloride	2. Direct combination of the elements
(c) Anhydrous iron(III) chloride	3. Neutralisation of an alkali by an acid (titration)
	4. Precipitation (double decomposition)

Question 3

(i) A student adds universal indicator to four colourless solutions A, B, C and D. The colours obtained are shown below, along with the colour key for pH values. Study the diagram and answer the questions. [3]

Colour of universal indicator at different pH values



(a) State the approximate pH range of solution A and of solution D.

(b) Which solution is neutral? What will be the effect of this solution on litmus paper?

(c) Which solution, on warming with ammonium chloride, will liberate ammonia gas? Give a reason.

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

(a) While diluting concentrated sulphuric acid, the acid is added to water slowly and never the other way round.

(b) Fused calcium chloride is used in the preparation of anhydrous iron(III) chloride.

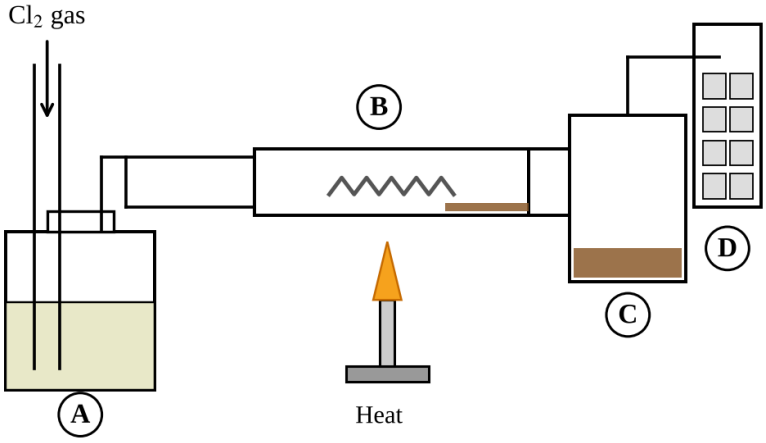
(c) Dilute hydrochloric acid is a stronger acid than concentrated acetic acid.

SECTION B (20 Marks)

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

Question 4

The diagram below shows the laboratory preparation of anhydrous iron(III) chloride. Dry chlorine gas is passed over heated iron wire kept in the hard glass tube B. The solid product collects in the receiver C. Tube D contains fused calcium chloride.



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

(a) Name the substance placed in bottle A. State its purpose.

(b) Why is tube D connected to the receiver C?

(c) Write a balanced equation for the reaction taking place in tube B.

(d) Why is the external heating stopped once the iron wire becomes red hot?

(ii) Answer the following questions: [3]

(a) Why can anhydrous iron(III) chloride **not** be obtained by heating hydrated iron(III) chloride, $FeCl_3 \cdot 6H_2O$?

(b) Write a balanced equation for the action of heat on $FeCl_3 \cdot 6H_2O$.

(c) State one use of anhydrous iron(III) chloride.

(iii) Iron(II) sulphate is prepared by the action of dilute sulphuric acid on iron. [3]

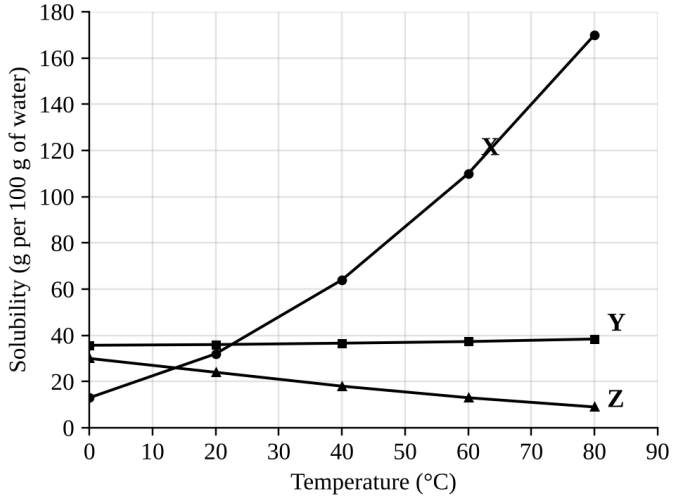
(a) Write a balanced equation for the reaction.

(b) Give the formula and colour of the hydrated crystals obtained.

(c) Why can dilute nitric acid not be used in place of dilute sulphuric acid to liberate hydrogen from a metal like iron?

Question 5

The graph shows how the solubility of three salts X, Y and Z in water varies with temperature. Study the graph and answer the questions that follow.



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

(a) Which salt shows almost no change in solubility with temperature? Name a common salt that behaves in this way.

(b) What is the solubility of salt X at 40 °C?

(c) What mass of salt X will crystallise out if a saturated solution of X made with 100 g of water at 40 °C is cooled to 20 °C?

(d) Which salt becomes less soluble as the temperature rises?

(ii) Lead sulphate is an insoluble salt. It is prepared from lead carbonate in two stages. [3]

(a) Why is dilute sulphuric acid **not** added directly to lead carbonate?

(b) Write the equation for the first stage, using dilute nitric acid.

(c) Write the equation for the second stage, using sodium sulphate solution.

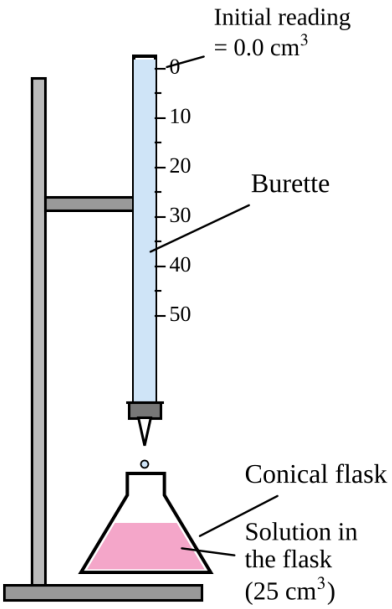
(iii) Answer the following questions: [3]

(a) Name the phenomenon in which crystals of washing soda, $Na_2CO_3 \cdot 10H_2O$, lose water on exposure to dry air. Write the equation for the change that takes place.

(b) Name one deliquescent substance.

Question 6

The diagram below shows the set-up used to prepare sodium sulphate crystals. The conical flask contains 25 cm^3 of sodium hydroxide solution with two drops of phenolphthalein. Dilute sulphuric acid is added from the burette.



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

(a) What is the colour of the solution in the flask at the start and at the end point?

(b) Why is it necessary to find the volume of acid required by this method rather than simply filtering off the excess of a reactant?

(c) Write the balanced equation for the reaction.

(d) Give the formula of the crystals obtained on evaporating and cooling the final solution.

(ii) The acid salt sodium hydrogen sulphate is prepared using the same reagents. [3]

(a) How should the volume of acid used differ from that needed for sodium sulphate?

(b) Write the equation for the formation of sodium hydrogen sulphate.

(c) Why does sodium hydrogen sulphate show the properties of an acid?

(iii) Write balanced equations for the following: [3]

(a) Action of dilute sulphuric acid on zinc.

(b) Action of dilute hydrochloric acid on sodium carbonate.

(c) Action of heat on a mixture of ammonium chloride and sodium hydroxide.

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