ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 6: Electrolysis

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 one of the following is a **non-electrolyte**?

(a) Dilute sulphuric acid

(b) Sodium chloride solution

(c) Sugar solution

(d) Copper(II) sulphate solution

(ii) Four solutions P, Q, R and S of equal concentration are tested in a conductivity apparatus. The observations are given in the table below. Which solution is most likely to be a **weak electrolyte** such as acetic acid?

Solution	P	Q	R	S
Brightness of the bulb	Glows brightly	Glows dimly	Does not glow	Glows brightly

(a) P

(b) Q

(c) R

(d) S

(iii) Which of the following represents a **reduction** reaction?

(a) $Zn \rightarrow Zn^{2+} + 2e^-$

(b) $2Cl^- \rightarrow Cl_2 + 2e^-$

(c) $Fe^{2+} \rightarrow Fe^{3+} + e^-$

(d) $Cu^{2+} + 2e^- \rightarrow Cu$

(iv) Aqueous copper(II) sulphate is electrolysed using copper electrodes. What happens to the blue colour of the solution?

(a) It remains unchanged.

(b) It fades gradually.

(c) It becomes deeper.

(d) It changes to green.

(v) Which ion is discharged at the cathode when dilute sodium chloride solution is electrolysed using platinum electrodes?

(a) Chloride ion

(b) Hydroxide ion

(c) Hydrogen ion

(d) Sodium ion

(vi) **Assertion (A):** Solid sodium chloride does not conduct electricity.
Reason (R): In solid sodium chloride the ions are held in fixed positions by strong electrostatic forces and are not free to move.

(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) In electroplating an iron article with nickel, which of the following is used as the **anode**?

(a) Pure nickel

(b) Copper

(c) Platinum

(d) Graphite

(viii) What is the ratio of the volumes of hydrogen to oxygen obtained in the electrolysis of acidified water?

(a) 1 : 1

(b) 1 : 2

(c) 3 : 1

(d) 2 : 1

Question 2

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

(a) During electrolysis, oxidation takes place at the _____. (anode / cathode)

(b) The process in which a polar covalent compound such as hydrogen chloride forms ions in water is called _____. (ionisation / dissociation)

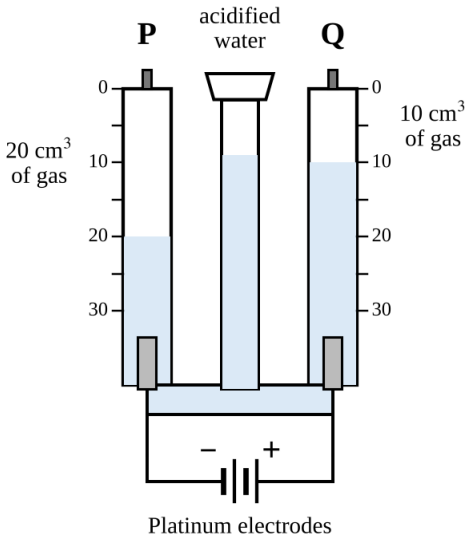
(c) A metal lower in the electrochemical series is _____ readily discharged at the cathode. (more / less)

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

Column A	Column B
(a) Electrolyte used for electroplating with silver	1. Impure copper
(b) Anode in the electrolytic refining of copper	2. Sodium argentocyanide solution
(c) Electrolyte in Hoffman's voltameter	3. Acidified water
	4. Pure silver

Question 3

(i) The diagram below shows the electrolysis of acidified water using platinum electrodes. The volumes of the gases collected in the tubes P and Q are shown. [3]



(a) Name the gas collected in tube P. At which electrode (anode or cathode) is it formed?

(b) Write the equation for the reaction taking place at the electrode in tube Q.

(c) Why is dilute sulphuric acid added to water in this experiment?

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

(a) Solid sodium chloride does not conduct electricity, but molten sodium chloride does.

(b) Graphite is preferred as the anode in the electrolysis of molten lead bromide.

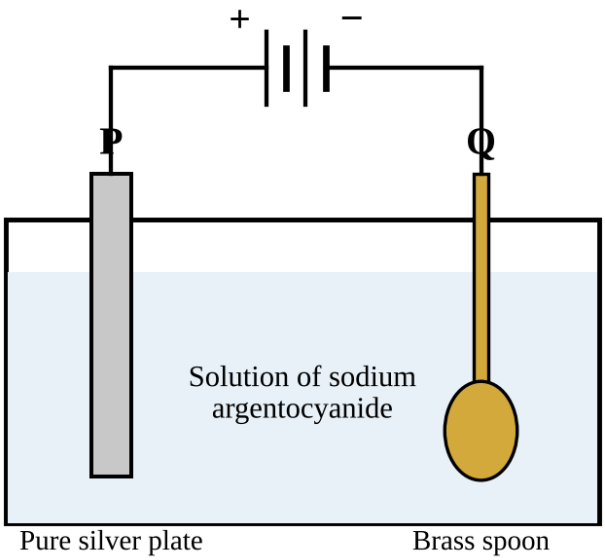
(c) The blue colour of copper(II) sulphate solution does not fade when it is electrolysed using copper electrodes.

SECTION B (20 Marks)

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

Question 4

The diagram below shows the set-up used to electroplate a brass spoon with silver. The electrolyte is a solution of sodium argentocyanide, $Na[Ag(CN)_2]$.



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

(a) Name the electrodes P and Q.

(b) Write the equation for the reaction at Q.

(c) Write the equation for the reaction at P.

(d) Why is sodium argentocyanide solution used instead of silver nitrate solution?

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

(a) The article to be plated is always made the cathode.

(b) A low current is passed for a longer time.

(c) Direct current and not alternating current is used.

(iii) An iron article is to be electroplated with nickel. [3]

(a) Name the electrolyte used.

(b) Name the anode and write the reaction taking place at it.

(c) State one reason for electroplating iron articles with nickel.

Question 5

The table below shows the products of electrolysis of some electrolytes using different electrodes.

	Electrolyte	Electrodes	Product at the cathode	Product at the anode
1	Dilute sulphuric acid	Platinum	(a)	Oxygen
2	Aqueous copper(II) sulphate	Platinum	Copper	(b) .....
3	Aqueous copper(II) sulphate	Copper	Copper	(c) .....
4	Molten lead(II) bromide	Graphite	Lead	(d) .....

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

(ii) Answer the following questions on selective discharge of ions: [3]

(a) In the electrolysis of dilute sodium chloride solution, why is hydrogen and not sodium liberated at the cathode?

(b) In the electrolysis of concentrated sodium chloride solution, why is chlorine discharged at the anode although hydroxide ions are lower than chloride ions in the electrochemical series?

(c) In the electrolysis of aqueous copper(II) sulphate using copper electrodes, why is no oxygen liberated at the anode?

(iii) Answer the following questions: [3]

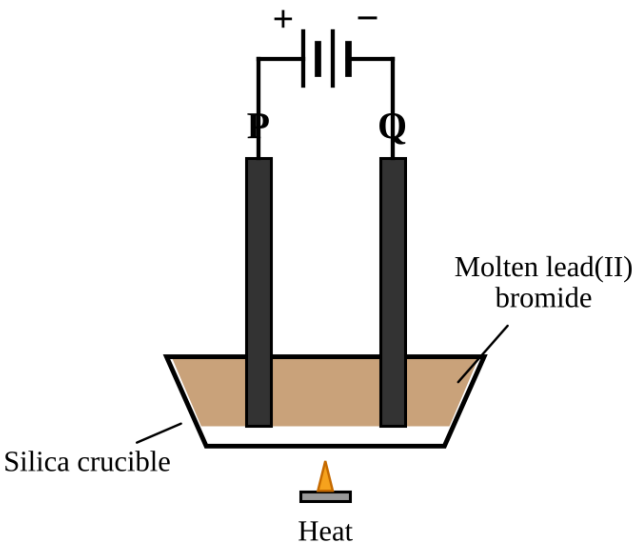
(a) Define oxidation in terms of electrons.

(b) Define reduction in terms of electrons.

(c) Write the half equation for the reaction at the cathode in electrolysis of molten lead(II) bromide, and state whether it is oxidation or reduction.

Question 6

The diagram below shows the electrolysis of molten lead(II) bromide using graphite electrodes P and Q.



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

(a) Which of the electrodes P and Q is the anode? Give a reason.

(b) State what you would observe at each electrode.

(c) Write the equation for the reaction at the cathode.

(d) Write the equation for the reaction at the anode.

(ii) Give reasons: [3]

(a) Solid lead(II) bromide does not conduct electricity.

(b) The crucible is heated continuously during the electrolysis.

(c) The cell is made of silica.

(iii) Impure copper is refined by electrolysis. [3]

(a) Name the electrolyte used.

(b) Name the anode and the cathode, and write the reactions at them.

(c) What is anode mud?

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