ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 7: Metallurgy

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 oxides is **amphoteric**?

(a) Sodium oxide
(b) Zinc oxide
(c) Carbon dioxide
(d) Carbon monoxide

(ii) Which of the following ores is concentrated by **froth flotation**?

(a) Haematite
(b) Zinc blende
(c) Bauxite
(d) Calamine

(iii) The conversion $ZnCO_3 \rightarrow ZnO + CO_2$ is carried out by heating the ore in a limited supply of air. This process is called:

(a) Roasting
(b) Smelting
(c) Calcination
(d) Liquation

(iv) Which of the following metals **cannot** be obtained by reducing its oxide with carbon?

(a) Lead
(b) Iron
(c) Zinc
(d) Aluminium

(v) Cryolite is added to alumina in the extraction of aluminium because it:

(a) is the ore of aluminium.

(b) reduces alumina to aluminium.

(c) lowers the fusion temperature and increases the conductivity of the mixture.

(d) acts as the anode.

(vi) **Assertion (A):** Aluminium utensils do not corrode easily although aluminium is a reactive metal.
Reason (R): A thin, tough layer of aluminium oxide forms on its surface and protects the metal beneath.

(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 is an alloy of copper and zinc?

(a) Bronze

(b) Brass

(c) Duralumin

(d) Solder

(viii) Which gas is evolved when a sulphide ore such as zinc blende is roasted in excess of air?

(a) Carbon dioxide

(b) Hydrogen sulphide

(c) Sulphur dioxide

(d) Sulphur trioxide

Question 2

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

(a) Rusting of iron requires both oxygen and _____. (moisture / carbon dioxide)

(b) Oxides of highly reactive metals such as sodium and calcium are reduced by _____ reduction of their fused salts. (electrolytic / carbon)

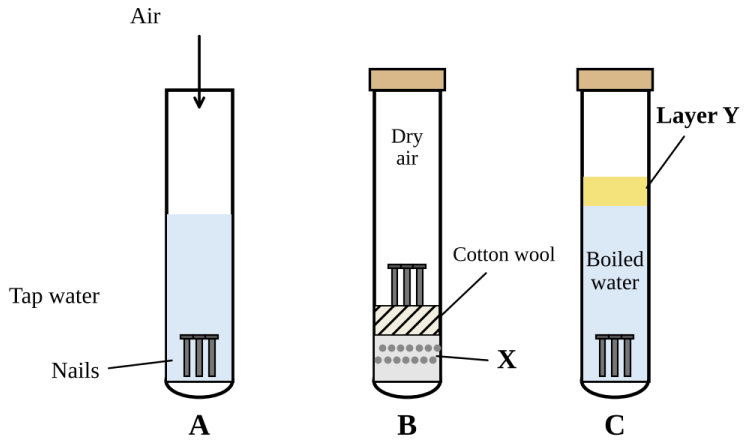
(c) Heating a sulphide ore strongly in excess of air is called _____. (roasting / calcination)

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

Column A	**Column B**
(a) Material of the anode in the extraction of aluminium	1. Duralumin
(b) An alloy of lead and tin used for joining wires	2. Galvanisation
(c) Coating iron with a layer of zinc	3. Graphite
	4. Solder

Question 3

(i) Three test tubes A, B and C, each containing clean, bright iron nails under different conditions, are left for a few days as shown below. [3]



(a) In which tube will the nails rust? Write the chemical name of the main compound present in rust.

(b) Name the substance X used in tube B and state its function.

(c) What is the layer Y in tube C? State why it is used.

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

(a) Sodium and potassium are stored under kerosene.

(b) Aluminium utensils should not be cleaned with washing powders containing alkalis.

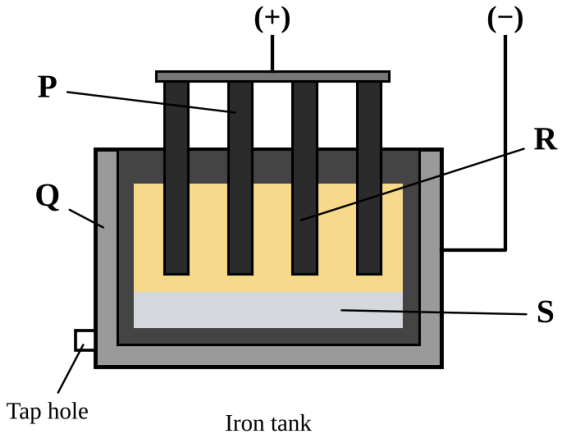
(c) Powdered coke is sprinkled over the electrolyte in the extraction of aluminium.

SECTION B (20 Marks)

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

Question 4

The diagram below shows the electrolytic cell used for the extraction of aluminium from purified alumina.



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

(a) Name the parts P and Q. Which of them acts as the anode?

(b) Name the three substances present in the electrolytic mixture R.

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

(d) Why does the part P have to be replaced from time to time?

(ii) Bauxite is purified before electrolysis. [3]

(a) Name the process used to purify bauxite.

(b) Write the equation for the reaction of bauxite, $Al_2O_3 \cdot 2H_2O$, with concentrated sodium hydroxide solution.

(c) What is red mud? Name one substance present in it.

(iii) Aluminium is a reactive metal. [3]

(a) Write the equation for the reaction of aluminium with hot concentrated sodium hydroxide solution.

(b) Write the equation for the reaction of aluminium with dilute sulphuric acid.

(c) Write the equation for the reaction taking place in the aluminothermic (thermite) process.

Question 5

The table below gives the behaviour of four metals P, Q, R and S. (The letters are **not** the symbols of the metals.)

Metal	With cold water	With dilute HCl	Oxide heated with carbon
P	Reacts vigorously, H_2 evolved	Reacts violently	Oxide is not reduced
Q	No reaction (reacts with steam)	Reacts, H_2 evolved	Oxide is reduced to the metal
R	No reaction (even with steam)	No reaction	Oxide decomposes on heating alone
S	No reaction (reacts with steam)	Reacts, H_2 evolved	Oxide is not reduced

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

(a) Arrange the metals P, Q, R and S in the decreasing order of their reactivity.

(b) Which metal is most likely to occur in the free (native) state or to be obtained by heating its oxide?

(c) Name the method by which metal P is extracted from its compounds.

(d) Why cannot the oxide of metal S be reduced by carbon?

(ii) Assume that Q is zinc and R is mercury. Write balanced equations for: [3]

(a) the reaction of Q with steam.

(b) the reduction of the oxide of Q with carbon.

(c) the decomposition of the oxide of R on heating.

(iii) Zinc is extracted from zinc blende, ZnS. [3]

(a) Name the process used to concentrate zinc blende.

(b) Write the equation for the conversion of the concentrated ore into zinc oxide.

(c) Name the process in which the oxide is then heated with coke to obtain zinc.

Question 6

The table below gives the composition and uses of some common alloys.

Alloy	Composition	Use / property
Duralumin	Al, Cu, Mg, Mn	Bodies of aircraft
Brass	(a)	Making utensils and decorative articles
Solder	Pb and Sn	(b) .....
Stainless steel	Fe, Cr, Ni and C	(c) .....
Fuse metal	(d)	Used in automatic sprinklers

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

(ii) Answer the following questions on alloys: [3]

(a) What is an alloy?

(b) Why is solder preferred to pure lead or pure tin for joining electrical connections?

(c) Name the alloy that is used for making electric cables of high resistance (such as heating coils).

(iii) Iron is extracted from haematite in the blast furnace. [3]

(a) Write the formula of haematite and name the reducing agent that reduces it in the upper region of the furnace.

(b) Write the equation for the reduction of haematite in the furnace.

(c) What is the function of limestone? Write the equation for the formation of the slag.

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