Iron

Question Paper

Level	O Level
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	Metals
Sub-Topic	Iron
Booklet	Question Paper

Time Allowed: **31 minutes**

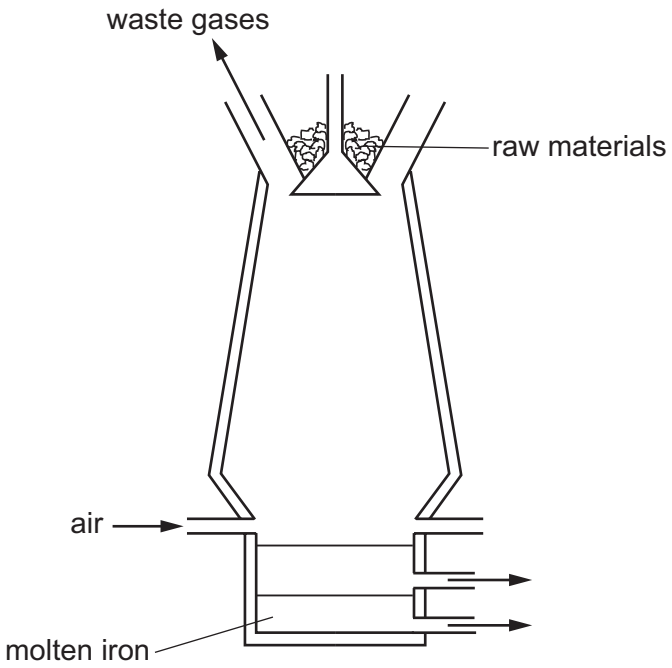
Score: **/26**

Percentage: **/100**

1 Which row correctly compares high carbon steels and low carbon steels?

	high carbon steels	low carbon steels
A	stronger	more brittle
B	stronger	more easily shaped
C	weaker	more brittle
D	weaker	more easily shaped

2 Iron is extracted from haematite in the blast furnace.



Which other raw material is added in this extraction?

A bauxite

B cryolite

C limestone

D slag

3 Aluminium reacts with chromium(III) oxide as shown.

$$\text{aluminium} + \text{chromium(III) oxide} \rightarrow \text{chromium} + \text{aluminium oxide}$$

Which statements are correct?

1 Aluminium is more reactive than chromium.

2 A similar reaction would also take place between aluminium and iron(III) oxide.

3 Iron III) oxide is reduced by another metal in the blast furnace.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

4 Which item is made from mild steel?

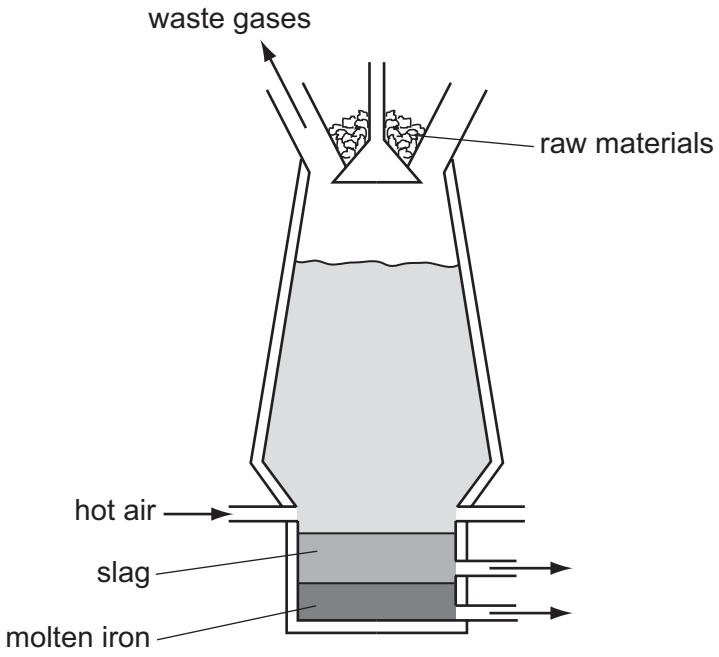
A a car body

B a container to store gas in a chemical plant

C a scalpel for use in an operating theatre

D a set of cutlery

5 Iron is produced in the blast furnace.



Which statement about this process is correct?

A Carbon is oxidised to carbon dioxide.

B Carbon monoxide is produced by the thermal decomposition of calcium carbonate.

C Haematite is reduced by calcium carbonate.

D Impurities are removed by the hot air blast.

6 Iron rusts when exposed to oxygen in the presence of water.

Which method will **not** slow down the rate of rusting of an iron roof?

A attaching strips of copper to it

B coating it with plastic

C galvanising it with zinc

D painting it

7 Aluminium and copper are often used to make coins but iron is not.

Which statement explains this?

A Iron is above both aluminium and copper in the reactivity series.

B Iron is more expensive to manufacture than aluminium or copper.

C Iron is rarer than both aluminium and copper.

D Iron reacts with water.

8 Which two substances are removed from the bottom of the blast furnace?

1 coke

2 iron

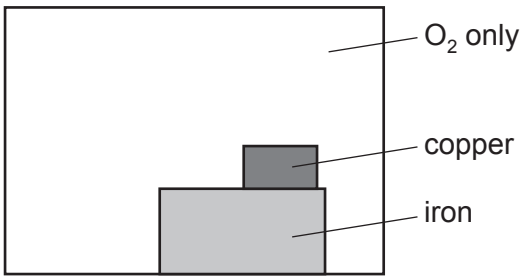
3 limestone

4 slag

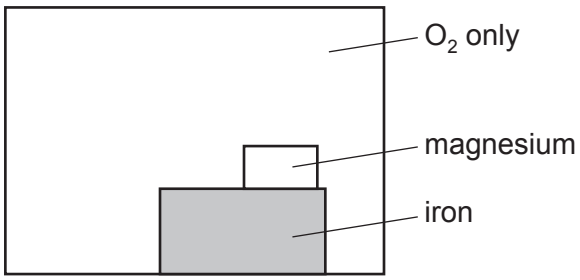
A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

9 Which diagram correctly illustrates the conditions necessary for the rusting of iron and also the metal that can be used to prevent rusting by sacrificial protection?

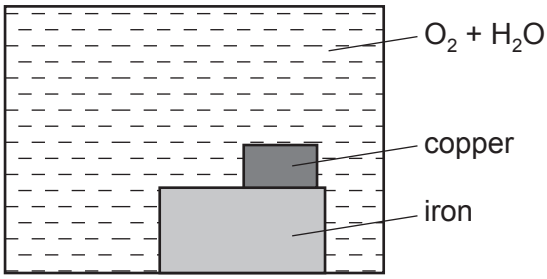
A



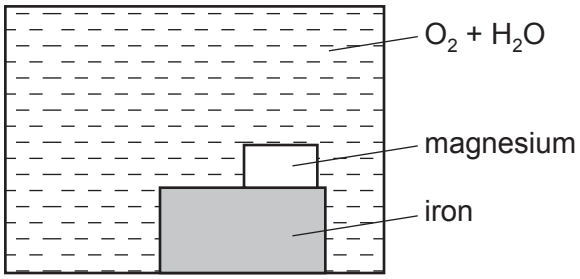
B



C



D



10 Iron is extracted from iron ore in a blast furnace.

Which solid substances are fed into the top of the blast furnace?

1 coke

2 cryolite

3 limestone

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

11 Iron is manufactured in the blast furnace.

Which statement about iron and its manufacture is **not** true?

A Iron ore is readily abundant.

B It is a continuous process.

C Pure iron is produced.

D The reducing agent is cheap.

12 In the extraction of iron, carbon monoxide acts as

A a catalyst.

B an inert gas.

C an oxidising agent.

D a reducing agent.

13 Iron is extracted from its ore haematite, Fe_2O_3, by a reduction process in the blast furnace.

Which equation for reactions in the blast furnace shows the formation of the reducing agent?

A $CaCO_3 \rightarrow CaO + CO_2$

B $CaO + SiO_2 \rightarrow CaSiO_3$

C $CO_2 + C \rightarrow 2CO$

D $C + O_2 \rightarrow CO_2$

14 The steel bodies of cars can be protected from rusting by spraying them with zinc.

Why is zinc used?

A Zinc does not react with acidic exhaust fumes.

B Zinc forms a stable compound with iron.

C Zinc has a high melting point.

D Zinc is higher in the reactivity series than iron.

15 In the manufacture of iron, using a blast furnace, which reaction generates heat?

A $CaCO_3 \rightarrow CaO + CO_2$

B $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

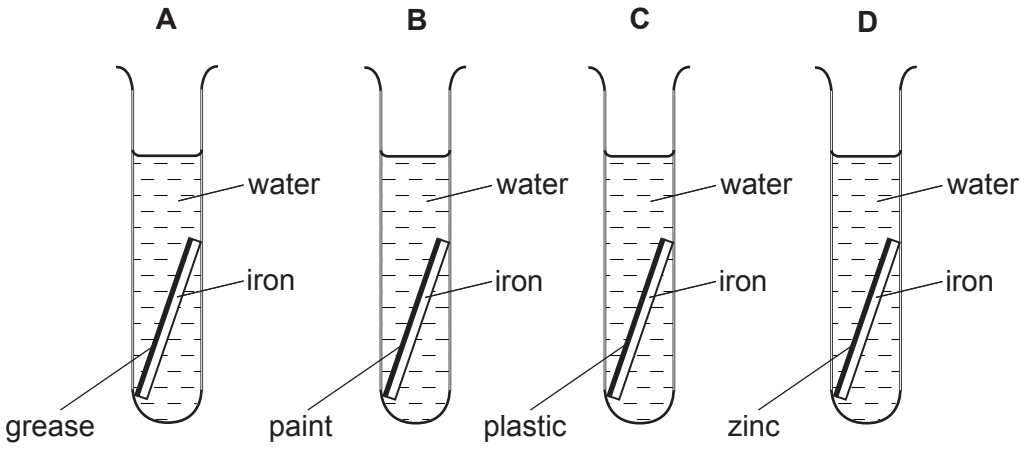
C $C + O_2 \rightarrow CO_2$

D $C + CO_2 \rightarrow 2CO$

16 Four test-tubes were set up as shown.

Each piece of iron was protected on one side by a different coating.

In which test-tube is the iron **least** likely to rust?



17 Three types of steel have different properties.

steel 1 easily shaped

steel 2 brittle

steel 3 resistant to corrosion

What are the names of these three types of steel?

	steel 1	steel 2	steel 3
A	high carbon	mild	stainless
B	high carbon	stainless	mild
C	mild	high carbon	stainless
D	mild	stainless	high carbon

18 Which metal is used in the sacrificial protection of iron pipes?

A copper

B lead

C magnesium

D sodium

19 Which pair of substances act as reducing agents in the blast furnace?

A carbon and oxygen

B carbon monoxide and carbon dioxide

C carbon and carbon monoxide

D carbon dioxide and oxygen

20 Iron pipes corrode rapidly when exposed to sea water.

Which metal, when attached to the iron, would **not** offer protection against corrosion?

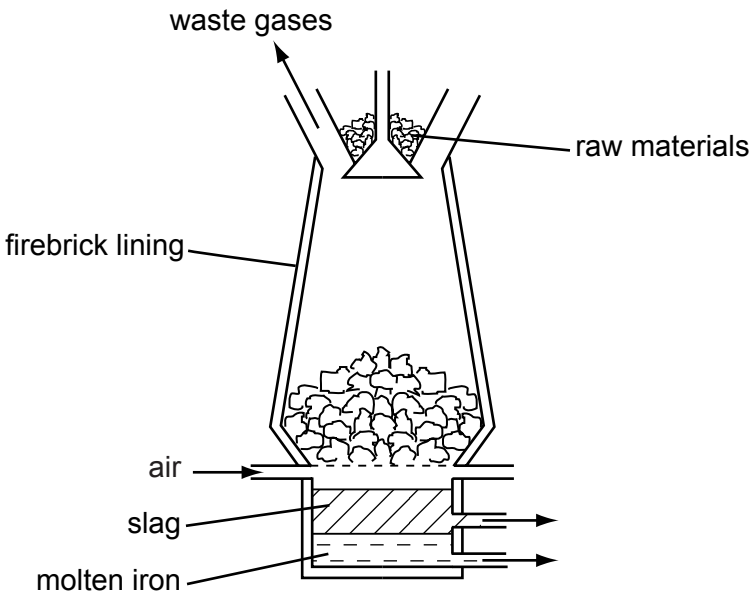
A aluminium

B copper

C magnesium

D zinc

21 Iron is extracted in the blast furnace using the raw materials haematite, coke and limestone.



Which substance undergoes thermal decomposition?

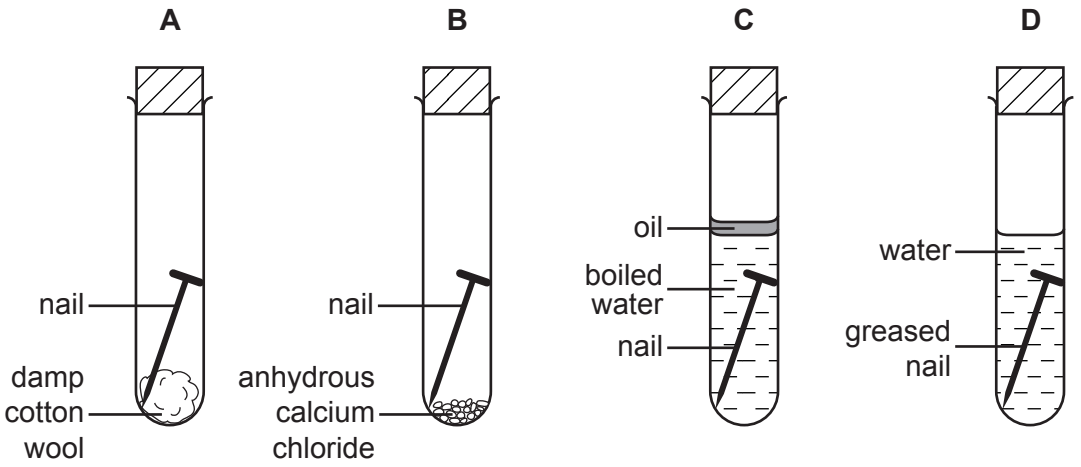
A limestone

B carbon dioxide

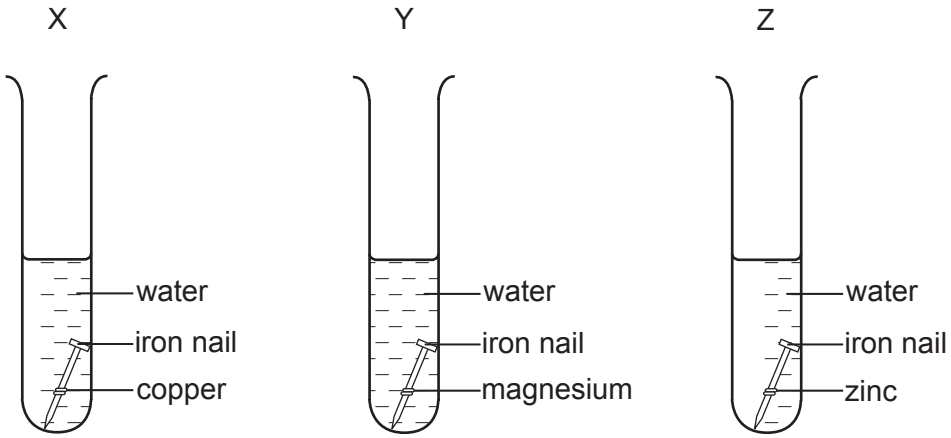
C haematite

D slag

22 In which test-tube is the iron nail **most** likely to rust?



23 Experiments are set up to investigate the sacrificial protection of iron.

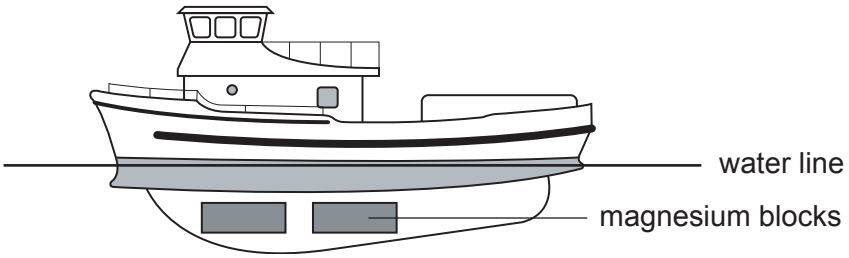


In which test-tubes will the iron rust?

A X only **B** Y only **C** X and Z only **D** Y and Z only

24 The diagram shows a boat made from iron.

Some magnesium blocks are attached to the iron below the water line.



Why does the magnesium stop the iron from rusting?

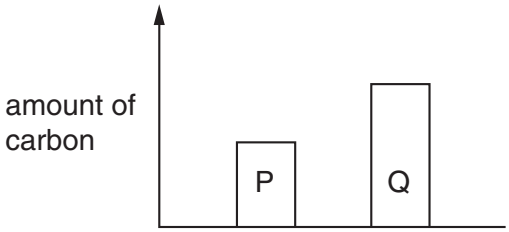
A Magnesium reacts in preference to the iron.

B Magnesium reacts to form a protective coating of magnesium oxide on the iron.

C The magnesium forms an alloy with the iron.

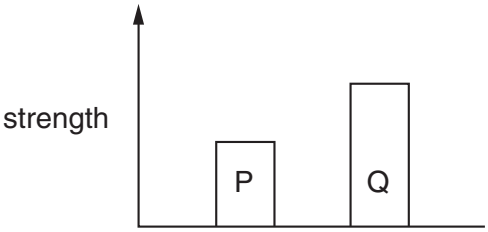
D The magnesium stops oxygen in the water from getting to the iron.

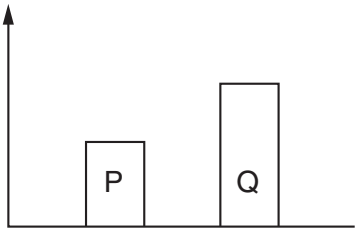
25 The diagram compares the amount of carbon in two steels, P and Q.



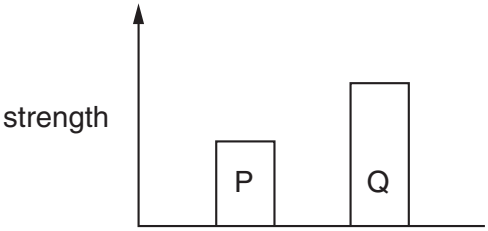
Which two diagrams correctly compare the strength and brittleness of P and Q?

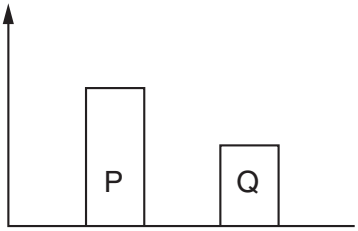
A



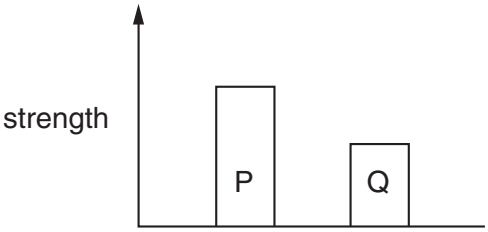


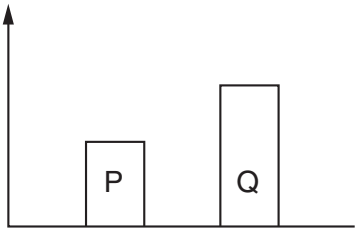
B



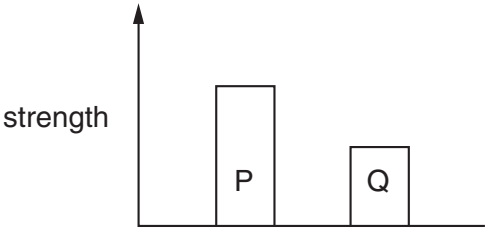


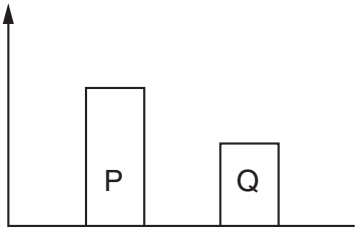
C



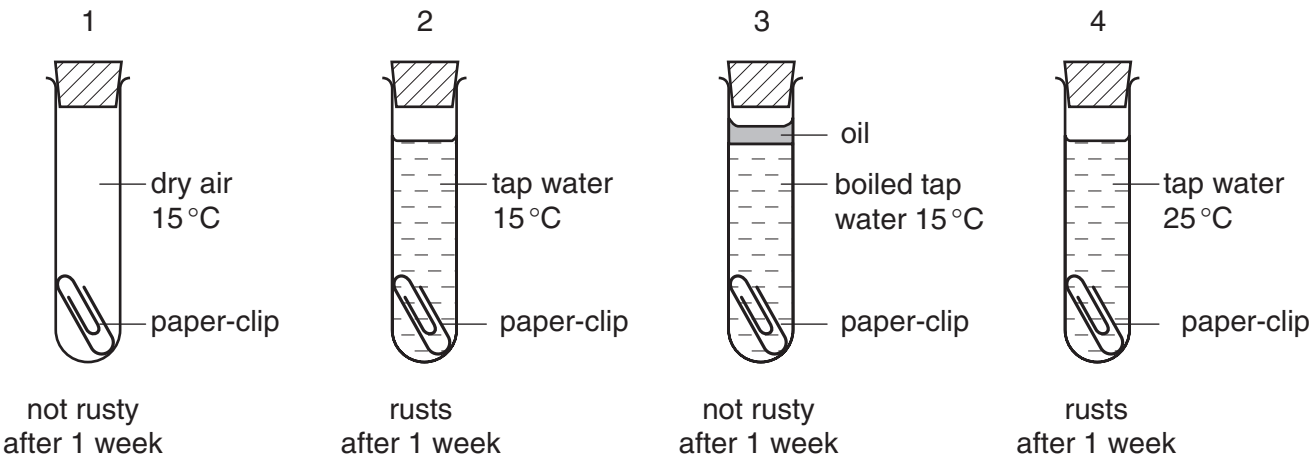


D





26 Four experiments on rusting are shown.



Which two experiments can be used to show that air is needed for iron to rust?

A 1 an

B 1 an

C 2 an

D 2 an