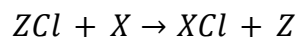
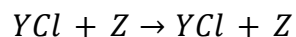
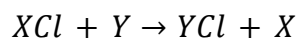


Topic 9.1C Oxidation and Reduction

Past Exam Questions (Paper 1, 2)

1. [1 mark]

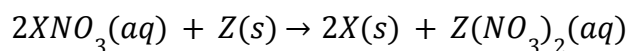
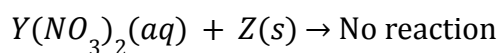
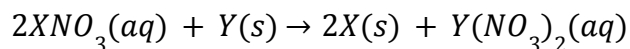
What is the correct **decreasing** order of reactivity of the metals X, Y and Z based on the following equations?



- A. $X > Y > Z$
- B. $Y > Z > X$
- C. $Z > Y > X$
- D. $Y > X > Z$

2. [1 mark]

Consider the following reactions of three unknown metals X, Y and Z.



What is the order of **increasing** reactivity of the metals (least reactive first)?

- A. $X < Y < Z$
- B. $X < Z < Y$
- C. $Z < Y < X$
- D. $Y < Z < X$

3. [1 mark]

Use the following information to identify the most reactive metal and the possibly identity of W

- I. W, X and Y are metals, one of which is copper and one of which is iron.
- II. W has a coloured oxide which can be reduced by carbon.
- III. X has a black oxide and is also found in nature as a pure metal.
- IV. Y has an oxide which cannot be reduced by carbon.

	most reactive metal	possible identity of W
A	X	C
B	X	F
C	Y	C
D	Y	F

4. [1 mark]

Tin is a metal that is less reactive than iron and is extracted from its ore cassiterite, SnO_2 . Which statements about tin are correct?

- I. Tin can be extracted from cassiterite using carbon.
- II. Tin does not conduct electricity.
- III. Tin is hard and shiny.

- A. I, II and III
- B. I and II
- C. I and III
- D. II and III

5. [1 mark]

Some chemical properties of three metals W, X and Y and their oxides are shown.

metal	reaction with steam	reaction with dilute hydrochloric acid	reaction of metal oxide with carbon
W	reacts	reacts	reacts
X	no reaction	no reaction	reacts
Y	reacts	reacts	no reaction

What is the order of reactivity of these metals, most reactive first?

- A. $W \rightarrow Y \rightarrow X$
- B. $X \rightarrow Y \rightarrow W$
- C. $Y \rightarrow W \rightarrow X$
- D. $Y \rightarrow X \rightarrow W$

6. [1 mark]

The list shows the order of reactivity of some elements.

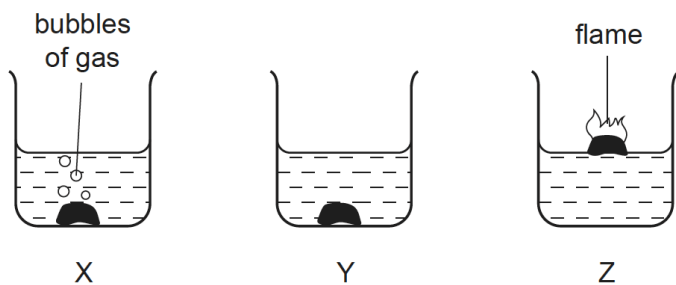
$K > Na > Ca > Mg > Zn > Fe > (H) > Cu$

Which statement about the reactivity of these metals is correct?

- A. Copper reacts with water to form hydrogen gas.
- B. Magnesium is more reactive than calcium.
- C. Potassium reacts with water to form hydrogen gas.
- D. Sodium oxide is reduced by carbon to sodium.

7. [1 mark]

The diagrams show what happens when three different metals are added to water.



What are X, Y and Z?

	X	Y	Z
A	calcium	copper	potassium
B	copper	calcium	potassium
C	potassium	calcium	copper
D	potassium	copper	calcium

8. [1 mark]

Which substances do not react together?

- A. calcium + water
- B. copper + dilute hydrochloric acid
- C. sodium + water
- D. zinc + dilute hydrochloric acid

9. [1 mark]

W, X, Y and Z are four metals. Some properties of these metals are listed below.

- I. Only W and Z can be extracted by reduction of their oxides with carbon.
- II. Only X will react with cold water.
- III. Only Z can be found 'native' (not combined with any other element).

What is the correct order of these metals in the reactivity series (most reactive first)?

- A. X, W, Y, Z
- B. X, Y, W, Z
- C. Z, W, Y, X
- D. Z, Y, W, X

10. [1 mark]

Metal X lies between zinc and iron in the reactivity series.

Which statements about metal X are correct?

- I. It reacts with steam to produce hydrogen gas.
 - II. It does not react with steam but will produce hydrogen with dilute acid.
 - III. The metal can be obtained from its oxide by heating strongly with charcoal.
 - IV. The metal oxide cannot be reduced using carbon.
-
- A. I and III
 - B. I and IV
 - C. II and III
 - D. II and IV

11. [1 mark]

The oxide of element X is reduced by heating with carbon.

Element X does not react with cold water, steam or dilute hydrochloric acid.

What is X?

- A. copper
- B. iron
- C. magnesium
- D. zinc

12. [1 mark]

A chemical engineer plans to produce hydrochloric acid.

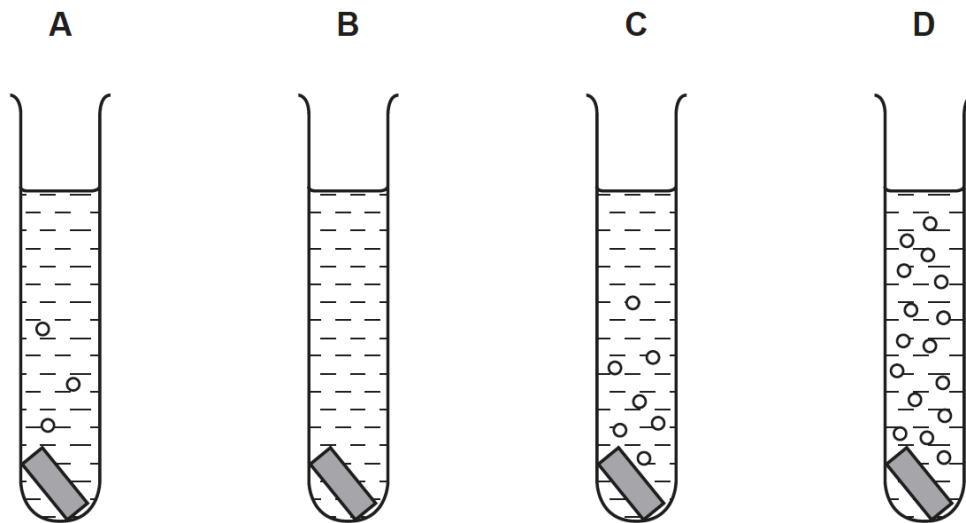
Which metal is best for the reaction container?

- A. copper
- B. iron
- C. magnesium
- D. zinc

13. [1 mark]

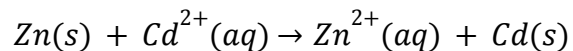
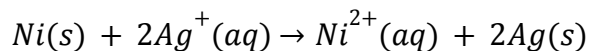
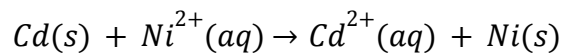
Pieces of copper, iron, magnesium and zinc are added to separate test-tubes containing dilute hydrochloric acid.

Which test-tube contains iron and dilute hydrochloric acid?



14. [4 marks]

Consider the following three redox reactions.



(i) Deduce the order of reactivity of the four metals, cadmium, nickel, silver and zinc and list in order of **decreasing** reactivity.

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.....

(ii) Identify the best oxidizing agent and the best reducing agent.

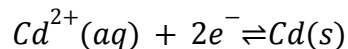
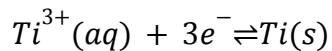
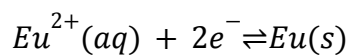
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15a. [1 mark]

A reactivity series comparing titanium, cadmium and europium is given below.

Least reactive Cd < Ti < Eu Most reactive

The half-equations corresponding to these metals are:



Deduce which of the species would react with titanium metal.

.....
.....
.....

15b. [1 mark]

Deduce the balanced equation for this reaction.

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15c. [1 mark]

Deduce which of the six species is the strongest oxidizing agent.

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