### Quiz (Reactivity of Metals)

#### Section A: Multiple-choice

- 1. What would be observed when potassium is added to cold water?
  - (1) A lilac flame is observed.
  - (3) A white suspension forms.
  - A. (1) only
  - C. (1) and (3) only

- Β. (2) only
- D. (2) and (3) only

(2) It sinks to the bottom.

- Which of the following reactions produce hydrogen? 2.
  - (1) Reaction between magnesium and dilute hydrochloric acid
  - (2) Reaction between zinc and cold water
  - (3) Reaction between iron and steam
  - A. (1) and (2) only (1) and (3) only Β.
  - C. (2) and (3) only D. (1), (2) and (3)

#### Titanium can be prepared by the Kroll process: 3.

 $TiCl_4 + 2Mq \longrightarrow Ti + 2MqCl_2$ 

Titanium can displace iron from iron(II) chloride solution. The order of reactivity of titanium, magnesium and iron is

- A. Ti > Mg > Fe. B. Mq > Fe > Ti.
- C. Mg > Ti > Fe.
- All metals below react with cold water to give hydrogen except 4.
  - A. Ba. B. Ca. C. Li. D. Mg.
- Which of the following statements about iron is INCORRECT? 5.
  - A. It is a transition metal.
  - B. It can be extracted by heating haematite with coke in a blast furnace.
  - C. It reacts with cold water to give iron(II) hydroxide and hydrogen.
  - D. It reacts with hydrochloric acid to give iron(II) chloride and hydrogen.
- Which of the following reactions would NOT occur? 6.
  - A.  $Cu(s) + 2Ag^{+}(aq) \longrightarrow Cu^{2+}(aq) + 2Ag(s)$
  - B.  $Zn(s) + Mg^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Mg(s)$
  - C.  $2AI(s) + 3Pb^{2+}(aq) \longrightarrow 2AI^{3+}(aq) + 3Pb(s)$
  - D.  $Fe(s) + Cu^{2+}(aq) \longrightarrow Fe^{2+}(aq) + Cu(s)$
- 7. What would be observed when a piece of polished magnesium is added to copper(II) sulphate solution?
  - (1) The solution becomes paler.
  - (2) Some reddish brown deposits form on magnesium.
  - (3) Colourless gas bubbles evolve.
  - A. (1) and (2) only

B. (1) and (3) only

C. (2) and (3) only

D. (1), (2) and (3)

- D. Fe > Ti > Mg.

- 8. Which of the following CANNOT show that calcium is more reactive than zinc?
  - A. Calcium is extracted by electrolysis of its molten ore while zinc is extracted by carbon reduction of its ore.
  - B. Calcium can displace zinc from zinc sulphate solution.
  - C. Calcium reacts with cold water while zinc does not.
  - D. Calcium has a smaller relative atomic mass than zinc.

# Section B: Structured questions

Metal X and metal Y react with steam and cold water as shown below. When X is added to cold water, there is no observable change.



- (a) Compare the reactivity of metal X and Y.
- (b) Give ONE example of X and Y respectively.
- (c) Why is hydrogen burnt at the outlet for the reaction of metal X?
- (d) (i) Write a chemical equation for the reaction between metal X and steam.
  - (ii) Write a chemical equation for the reaction between metal Y and water.
- (e) Name the method of collection for hydrogen in the reaction of metal Y.

# **Suggested Answer**

## **Section A**

1.	А	5.	С
2.	В	6.	В
3.	С	7.	A
4.	D	8.	D

## Section **B**

- (a) Y more reactive than X.
- (b) X: magnesium / zinc Y: calcium
- (c) Leakage of hydrogen may cause explosion. Hydrogen is burnt for safety reason.
- (d) (i)  $Mg + H_2O \longrightarrow MgO + H_2 / Zn + H_2O \rightarrow ZnO + H_2$ 
  - (ii) Ca +  $2H_2O \longrightarrow Ca(OH)_2 + H_2$
- (e) Displacement of water