



Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. reactants
2. products
3. atoms
4. conservation of mass
5. coefficients
6. precipitate
7. catalyst
8. activation energy

K • 4

Each carries 0.5 mark.

2 Label the diagram

1. test tube
2. iron nail
3. copper sulphate
4. At the start blue copper sulphate

5. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
6. nail coated with reddish-brown copper

U • 3

Each carries 0.5 mark.

3 Multiple choice

- i. a. addition reaction

K • 1

Two reactants combine into one product: a combination, also called an addition reaction.

- ii. c. decomposition reaction

K • 1

$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$; one reactant breaks into two products when heated (thermal decomposition).

- iii. d. double displacement reaction

U • 1

$\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$; the two compounds swap partners, and white silver chloride precipitates.

- iv. a. NaOH

A • 1

Acid + base $\rightarrow$ salt + water. Count: the right side has Na, Cl, 2 H and O; HCl gives H and Cl, so X must give Na, O and H: NaOH. (Sodium metal with HCl would give hydrogen gas, not water.)

- v. b. nothing: copper is less reactive than zinc

A • 1

Copper is below zinc in the reactivity series, so it can't push zinc out of its compound. The reverse works: a strip of zinc in copper sulphate gets coated with copper.

4 Very short answers

- a. MARKING SCHEME

K • 1

✓ $\text{AB} \rightarrow \text{A} + \text{B}$ written.

- b. MARKING SCHEME

K • 1

✓ Manganese dioxide (MnO_2).

- c. MARKING SCHEME

A • 1

✓ $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ (balanced).



5 Short answers

a. MARKING SCHEME

U · 2

- ✓ Light increases the rate at which hydrogen peroxide decomposes ($2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$).
- ✓ In a dark (brown or opaque) bottle it keeps its strength longer.

b. MARKING SCHEME

U · 2

- ✓ An acid and a base react to form a salt and water (H^+ and OH^- ions combine into water).
- ✓ They cancel each other's properties, and the products are neutral.

c. MARKING SCHEME

U · 2

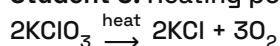
- ✓ Any one difference, e.g. in single displacement an element displaces another from its compound; in double displacement two compounds exchange their radicals.
- ✓ Any second difference, e.g. $\text{AB} + \text{C} \rightarrow \text{A} + \text{BC}$ against $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{CB}$, or an element and a compound react against two compounds.

6 Long answer

ANSWER

HA · 4

Student C. Heating potassium chlorate breaks one reactant into two products:



The others did different reactions: A did a combination ($2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$); B and D did single displacements ($\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$, and $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$).

MARKING SCHEME

- ✓ Student C did the decomposition reaction.
- ✓ $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ (balanced, by heat).
- ✓ A did a combination reaction ($2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$).
- ✓ B and D did single displacement reactions (zinc displaces iron, or hydrogen).

7 Balancing equations

a. MARKING SCHEME

A · 1

- ✓ $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ (0.5) and decomposition (0.5).

b. MARKING SCHEME

A · 1

- ✓ $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$ (0.5) and combination (0.5).

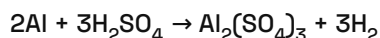
c. MARKING SCHEME

A · 1

- ✓ Already balanced (0.5) and single displacement (0.5).

d. ANSWER

A · 2



Check: Al 2 = 2, H 6 = 6, S 3 = 3, O 12 = 12. **Single displacement.**

MARKING SCHEME

- ✓ $2\text{Al} + 3\text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{H}_2$, with the atoms counted (Al 2, H 6, S 3, O 12 on each side).
- ✓ Single displacement reaction.



8 Think

ANSWER

HA · 2

Coal dust has a far larger surface area than the same mass of coal in a lump. Many more particles touch the oxygen of the air, so there are many more collisions, and the burning spreads almost instantly: an explosion.

MARKING SCHEME

- ✓ Dust has a much larger surface area for its mass than a lump.
- ✓ More particles touch the air, so more collisions and a much faster reaction, which spreads almost at once.

9 Activity: Slow the browning

(not marked)

WHAT STUDENTS SHOULD FIND

The slice on the plate browns fastest: an enzyme in the apple reacts with oxygen from the air. The lemon-juice slice stays pale (the acid slows the enzyme), the one in the refrigerator browns slowly (cold slows reactions), and the one under water stays pale (less oxygen reaches it).

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	8	10	8	6	32

