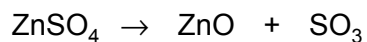


1 The equation shows the effect of heat on anhydrous zinc sulfate.



(a) What type of chemical reaction is this?
Tick **one** box.

- addition
- decomposition
- displacement
- oxidation

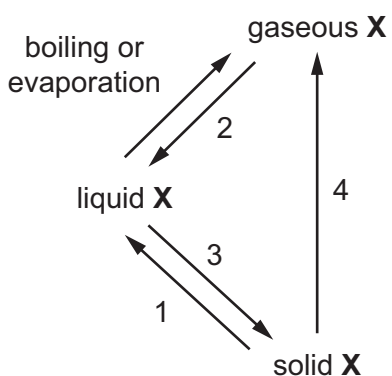
[1]

(b) When 12.60 g of anhydrous zinc sulfate is heated, the mass of zinc oxide formed is 6.34 g.
Calculate the mass of zinc oxide formed when 63.0 g of anhydrous zinc sulfate is heated.

mass of zinc oxide = g [1]

[Total: 2]

2 Element X can undergo the following physical changes.



(a) Give the scientific name for each of the numbered physical changes.

1

2

3

4 [4]

(b) Explain why the changes shown are physical changes.

.....

..... [1]

(c) One difference between boiling and evaporation is the rate at which the processes occur.

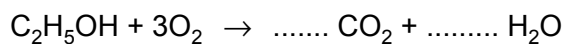
State **one** other difference between boiling and evaporation.

.....

..... [1]

[Total: 6]

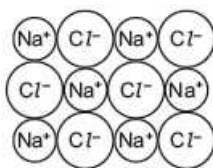
3 Balance the chemical equation for the complete combustion of ethanol.



[2]

[Total: 2]

- 4 Substance **Y** undergoes physical and chemical changes.



Which **two** of the following are physical changes?
Explain your answer.

- A** Substance **Y** dissolves easily in water.
- B** An aqueous solution of substance **Y** gives a white precipitate with acidified aqueous silver nitrate.
- C** Substance **Y** melts at 801 °C.
- D** Substance **Y** reacts with concentrated sulfuric acid.

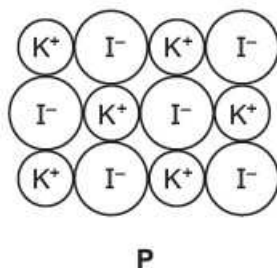
.....

.....

..... [3]

[Total: 3]

- 5 Substance **P** undergoes physical and chemical changes.



Which **two** of the following are physical changes? Explain your answer.

- A** Substance **P** reacts with concentrated sulfuric acid.
- B** Iodine forms when chlorine is added to an aqueous solution of substance **P**.
- C** Substance **P** boils at 1330°C.
- D** Substance **P** dissolves easily in water.

.....

.....

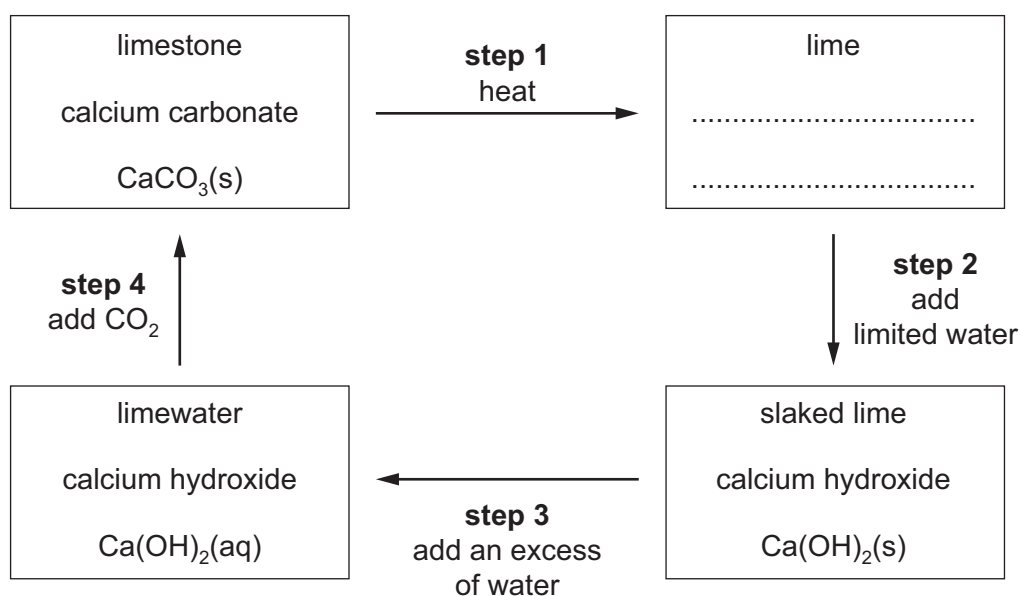
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[3]

[Total: 3]

- 6 Limestone rock is mainly calcium carbonate, CaCO_3 .

The 'limestone cycle' is shown. Each step is numbered.



- (a) Complete the box to give the chemical name and formula of lime. [2]
- (b) Which step involves a physical change?
..... [1]
- (c) What type of reaction is **step 1**?
..... [1]
- (d) Suggest how **step 2** could be reversed.
..... [1]
- (e) Write a chemical equation for **step 4**.
..... [1]
- (f) Explain why **step 4** is a neutralisation reaction. Refer to the substances reacting in your answer.
..... [2]

[Total: 8]