Download IGCSE & IB Resources from www.igcse.net

1 Ammonium chloride is present in some fertilisers.

Which **two** of the following compounds are also present in many fertilisers?
Tick **two** boxes.

hydrogen sulfide ☐

calcium phosphate ☐

copper(II) fluoride ☐

nickel(II) oxide ☐

potassium nitrate ☐

[2]

[Total: 2]

2 Answer the following question using only the substances in the list.

ammonia **bauxite** **carbon dioxide** **carbon monoxide**

hematite **oxygen** **sodium chloride** **sulfur dioxide**

State which substance is used to manufacture fertilisers.

..... [1]

[Total: 1]

3 This question is about the elements in Period 3 of the Periodic Table.

Na	Mg	A*l*	Si	P	S	C*l*	Ar

State which Period 3 element is non-metallic and an important component of fertilisers.

..... [1]

[Total: 1]

Download IGCSE & IB Resources from www.igcse.net

Download IGCSE & IB Resources from www.igcse.net

4 Which statement about sulfuric acid is correct?

A It is made by the Haber process.

B It is made in the atmosphere by the action of lightning.

C It reacts with ammonia to produce a fertiliser.

D It reacts with copper metal to produce hydrogen gas.

[1]

[Total: 1]

5 The ions present in ammonium sulfate are formed from the products of the Contact and Haber processes.

Both of these processes involve the use of a catalyst.

Which row is correct?

	ion	formed from	process	catalyst
A	ammonium	ammonia	Contact	iron
B	ammonium	ammonia	Haber	vanadium(V) oxide
C	sulfate	sulfuric acid	Contact	vanadium(V) oxide
D	sulfate	sulfuric acid	Haber	iron

[1]

[Total: 1]

6 Ammonia is produced by the Haber process.

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$$

Which statement about the Haber process is **not** correct?

A An iron catalyst is used to increase the rate of reaction.

B The reaction is carried out at high temperature to increase the rate of reaction.

C The reaction is carried out at low pressure to increase the yield of ammonia.

D The reaction is reversible.

[1]

Download IGCSE & IB Resources from www.igcse.net

Download IGCSE & IB Resources from www.igcse.net

[Total: 1]

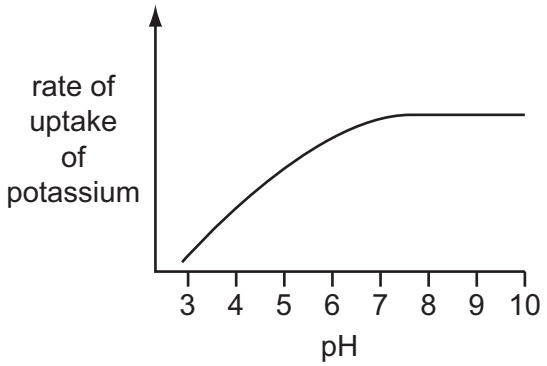
7 Fertilisers usually contain compounds of nitrogen, phosphorus and potassium.

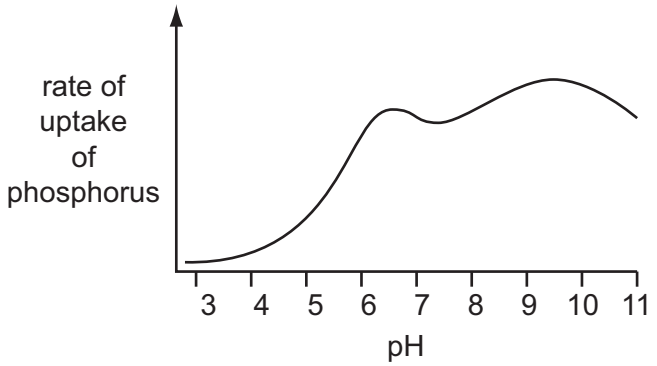
Why do farmers use fertilisers?

..... [1]

[Total: 1]

8 The graphs below show the rate of uptake of potassium and phosphate ions by plant roots at different pH values.





(a) Describe the effect of pH on the rate of uptake of potassium by plant roots.

.....

..... [2]

(b) At which pH value is the rate of uptake of phosphorus by plant roots the highest?

..... [1]

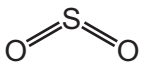
[Total: 3]

Download IGCSE & IB Resources from www.igcse.net

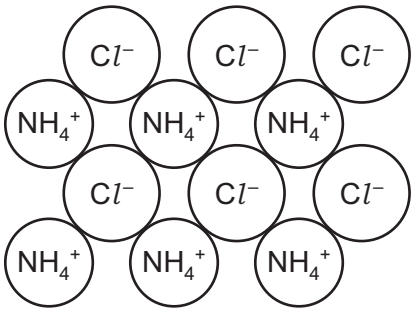
Download IGCSE & IB Resources from www.igcse.net

9 The diagram shows the structures of five substances, **A**, **B**, **C**, **D** and **E**.

A

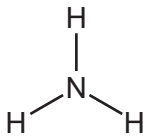


B

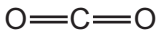


C

D



E



Which structure, **A**, **B**, **C**, **D** or **E** is a compound which is used as a fertiliser?

..... [1]

[Total: 1]

10 Farmers fertilise soil by adding compounds containing ammonium salts.

Explain why adding lime to fertilised soil may cause a loss of nitrogen from the soil.

.....

.....

..... [3]

[Total: 3]

11 Methanol is made industrially by reacting carbon monoxide with hydrogen. The gases react at a temperature of 250 °C and a pressure of 75 atmospheres.

$$CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$$

The forward reaction is exothermic.

(a) Suggest a source of hydrogen for this industrial process.

..... [1]

Download IGCSE & IB Resources from www.igcse.net

Download IGCSE & IB Resources from www.igcse.net

(b) Complete the table using only the words *increases*, *decreases* or *no change*.

	effect on the rate of the reverse reaction	effect on the equilibrium yield of $CH_3OH(g)$
adding a catalyst		no change
increasing the temperature	increases	
decreasing the pressure		

[4]

[Total: 5]

12 Ammonia is manufactured by a reversible reaction.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

The forward reaction is exothermic.

What is the effect of increasing the pressure on the percentage yield and rate of formation of ammonia?

	percentage yield	rate of formation
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

[1]

[Total: 1]

Download IGCSE & IB Resources from www.igcse.net

Download IGCSE & IB Resources from www.igcse.net

13 Ammonia is formed by a reversible reaction.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

The forward reaction is exothermic.

Which changes in conditions would increase the yield of ammonia?

	increase in pressure	increase in temperature
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

[1]

[Total: 1]

14 Plant growth is improved by the availability of essential elements, such as nitrogen, and by the soil having a suitable pH.

Nitrogen-based fertilisers are made from ammonia. Ammonia is manufactured by the Haber process.

(a) Describe the Haber process giving reaction conditions and a balanced equation.
(Do not discuss reaction rate and yield.)

.....

.....

.....

.....

..... [5]

(b) Fertilisers contain nitrogen.

Name the other **two** elements essential for plant growth commonly found in fertilisers.

..... [2]

[Total: 7]

Download IGCSE & IB Resources from www.igcse.net