

The Haber process and the use of NPK fertilisers – GCSE Chemistry**1. No.1.2**

Which catalyst is used when ammonia is produced from nitrogen and hydrogen?

[1 mark]Tick (✓) **one** box.

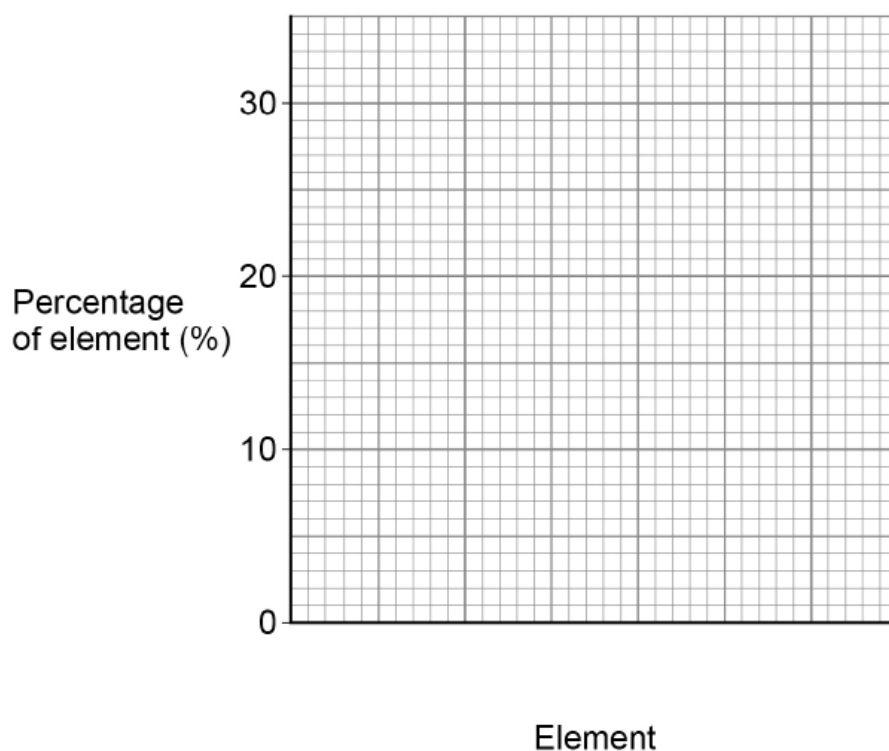
Chlorine

☐

Iron

☐

Oxygen

☐**2. No.1.4-1.5**Draw a bar chart on **Figure 2** to show the percentages of phosphorus and of potassium in this fertiliser.**[2 marks]****Figure 2**

Why do the percentages of phosphorus and of potassium in this fertiliser **not** add up to 100%?

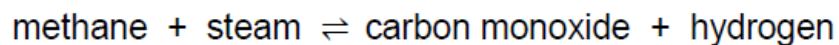
[1 mark]

3. No.3

Hydrogen is a raw material in the Haber process.

Hydrogen is produced from methane.

The word equation for the reaction is:



How can you tell that the reaction is reversible?

[1 mark]

The forward reaction is endothermic.

Name the type of energy change in the reverse reaction.

[1 mark]

A nickel catalyst is used in this reaction.

Why is a catalyst used in this reaction?

[2 marks]

Tick (✓) **two** boxes.

To increase the temperature

☐

To produce less carbon monoxide

☐

To reduce costs

☐

To use less energy

☐

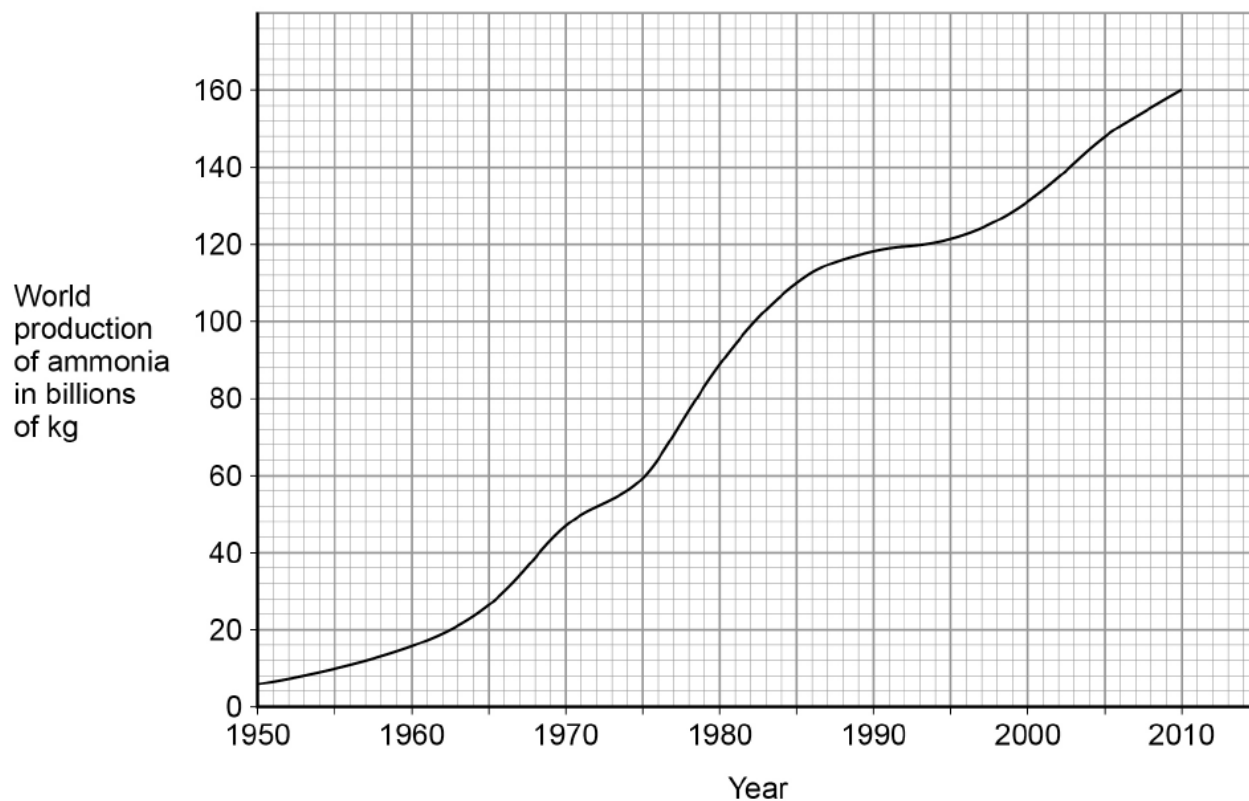
To use less methane

☐

The Haber process also uses nitrogen to produce ammonia.

Figure 1 shows how the world production of ammonia changed between 1950 and 2010.

Figure 1



Describe how the world production of ammonia changed between 1950 and 2010.

[2 marks]

Most of the ammonia produced is used to make fertilisers.

Why did the world production of ammonia change between 1950 and 2010?

[2 marks]

Tick (✓) **two** boxes.

The demand for food changed.

☐

The demand for fuels changed.

☐

The nitrogen percentage in air changed.

☐

The number of cars changed.

☐

The world population changed.

☐

Table 1 shows data about four fertilisers, **A**, **B**, **C** and **D**.

Table 1

Fertiliser	Percentage by mass of nitrogen (%)	Percentage by mass of phosphorus (%)	Percentage by mass of potassium (%)
A	35.0	0.0	0.0
B	21.2	0.0	0.0
C	21.2	23.5	0.0
D	0.0	0.0	52.3

Which combination of fertilisers **A**, **B**, **C** and **D** provides **all** of the elements needed for an NPK fertiliser?

Use **Table 1**.

[1 mark]

Tick (✓) **one** box.

A and **C**

☐

A and **D**

☐

B and **C**

☐

C and **D**

☐

Which fertiliser is **not** made using ammonia?

Use **Table 1**.

[1 mark]

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐