

## Nitrogen and Compounds – 2021 IGCSE 0620

### 1. Nov/2021/Paper\_11/No.30

Which statement about fertilisers is correct?

- A Ammonium sulfate,  $(\text{NH}_4)_2\text{SO}_4$ , is a better fertiliser than ammonium nitrate,  $\text{NH}_4\text{NO}_3$ , because it contains more oxygen.
- B Ammonium phosphate,  $(\text{NH}_4)_3\text{PO}_4$ , is a good fertiliser because it contains hydrogen.
- C Potassium nitrate,  $\text{KNO}_3$ , is a good fertiliser because it provides potassium and nitrogen.
- D Urea,  $(\text{NH}_2)_2\text{CO}$ , is a good fertiliser because it contains carbon.

### 2. Nov/2021/Paper\_13/No.29

Which gas is released when slaked lime,  $\text{Ca}(\text{OH})_2$ , is added to a field that has previously been treated with ammonium sulfate fertiliser?

- A ammonia
- B carbon dioxide
- C nitrogen
- D sulfur dioxide

### 3. Nov/2021/Paper\_21/No.30

Which statements about the Haber process are correct?

- 1 One of the raw materials is extracted from liquid air by fractional distillation.
- 2 One of the raw materials is produced by the reaction of steam and methane.
- 3 The catalyst for the Haber process is vanadium(V) oxide.

- A 1 only      B 1 and 2 only      C 2 and 3 only      D 1, 2 and 3

### 4. Nov/2021/Paper\_22/No.29

Which conditions are used in the Haber process?

	temperature /°C	pressure / atmospheres
A	100	10
B	450	10
C	450	200
D	1000	500

5. Nov/2021/Paper\_23/No.28

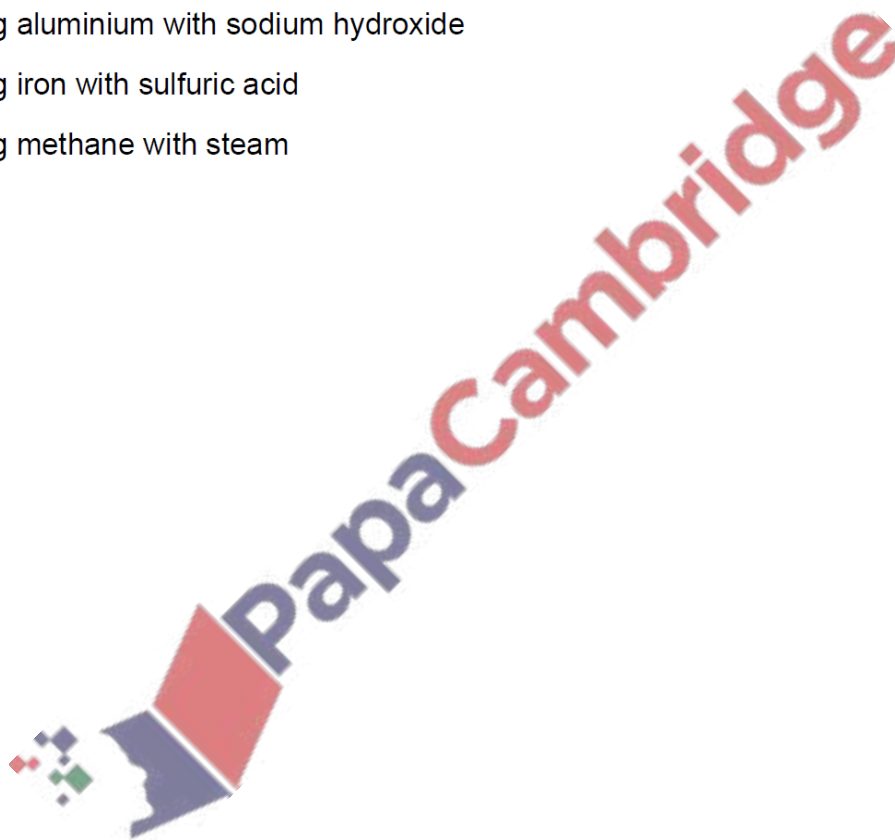
Which statement describes how oxides of nitrogen are formed in a car engine?

- A Nitrogen from the air reacts with oxygen from petrol.
- B Nitrogen from the air reacts with oxygen from the air.
- C Nitrogen from petrol reacts with oxygen from petrol.
- D Nitrogen from petrol reacts with oxygen from the air.

6. Nov/2021/Paper\_23/No.30

Which process is used to produce hydrogen for the Haber process?

- A electrolysis of water
- B reacting aluminium with sodium hydroxide
- C reacting iron with sulfuric acid
- D reacting methane with steam



This question is about nitrogen and compounds of nitrogen.

(a) When nitrogen is cooled to below  $-196^{\circ}\text{C}$  it changes state from gas to liquid.

(i) Name the change of state from gas to liquid.

..... [1]

(ii) Use the kinetic particle theory to describe the differences between nitrogen gas and liquid nitrogen in terms of:

- the separation of the particles

.....  
.....  
.....

- the motion of the particles.

.....  
.....  
.....

[4]

(b) Oxides of nitrogen are pollutants in the air.

(i) State **one** source of oxides of nitrogen in the air.

..... [1]

(ii) Oxides of nitrogen contribute to acid rain.

Give **one** adverse effect of acid rain on buildings.

..... [1]

(c) Nitric acid contains the nitrate ion.

(i) Use words from the list to complete the sentences to describe the test for nitrate ions.

- aluminium    ammonia    chloride    copper  
hydroxide    iron    oxygen    sulfate

Put the sample in a test-tube then add aqueous sodium .....

Then add .....

Warm gently. A gas is produced. The name of this gas is .....

[3]

(ii) Nitric acid reacts with calcium carbonate.

Complete the word equation for this reaction.



[3]

[Total: 13]

