

# 11.3 Nitrogen and Fertilizers

## Question Paper

Level	IGCSE
Subject	Chemistry (0620)
Exam Board	Cambridge International Examinations (CIE)
Topic	Air and Water
Sub-Topic	11.3 Nitrogen and Fertilizers
Booklet	Question Paper

**Time Allowed:** 30 minutes

**Score:** /25

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

- 1 A farmer's soil is very low in both nitrogen (N) and phosphorus (P).

Which fertiliser would improve the quality of this soil most effectively?

	percentage		
	nitrogen (N)	phosphorus (P)	potassium (K)
<b>A</b>	11	11	27
<b>B</b>	12	37	10
<b>C</b>	28	10	10
<b>D</b>	31	29	9

- 2 Which compound is **not** used as a fertiliser?

- A** ammonium phosphate
- B** ammonium sulfate
- C** calcium carbonate
- D** potassium nitrate

- 3 The formulae of four compounds, W, X, Y and Z, are given.

compound	formula
W	$\text{FeSO}_4$
X	$(\text{NH}_4)_3\text{PO}_4$
Y	$\text{KNO}_3$
Z	$\text{NaCl}$

Which mixture of compounds makes a complete fertiliser?

- A** W and X      **B** W and Z      **C** X and Y      **D** Y and Z

4 Fertilisers are mixtures of different compounds used to increase the growth of crops.

Which pair of substances contains the three essential elements for plant growth?

- A ammonium nitrate and calcium phosphate
- B ammonium nitrate and potassium chloride
- C ammonium phosphate and potassium chloride
- D potassium nitrate and calcium carbonate

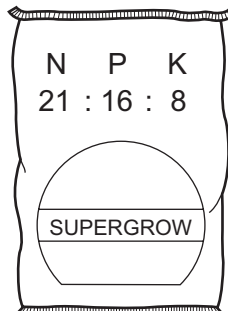
5 Which elements are present in NPK fertilisers?

- A nitrogen, phosphorus, potassium
- B nitrogen, potassium, calcium
- C sodium, phosphorus, potassium
- D sodium, potassium, calcium

6 Which compound is **not** a fertiliser?

- A ammonium sulfate,  $(\text{NH}_4)_2\text{SO}_4$
- B calcium hydroxide,  $\text{Ca}(\text{OH})_2$
- C potassium chloride,  $\text{KCl}$
- D urea,  $\text{CO}(\text{NH}_2)_2$

- 7 Which combination of chemical compounds could be used to produce the fertiliser shown?



- A**  $(\text{NH}_4)_3\text{PO}_4$ ,  $\text{KCl}$
- B**  $\text{NH}_4\text{NO}_3$ ,  $\text{Ca}_3(\text{PO}_4)_2$
- C**  $\text{NH}_4\text{NO}_3$ ,  $\text{CO}(\text{NH}_2)_2$
- D**  $\text{NH}_4\text{NO}_3$ ,  $\text{K}_2\text{SO}_4$ ,  $(\text{NH}_4)_2\text{SO}_4$
- 8 Carbon dioxide and methane are 'greenhouse gases' which contribute to global warming.
- Which process does **not** increase global warming?
- A** burning fossil fuels
- B** decay of organic waste
- C** farming cattle for beef
- D** growing crops such as sugar cane

9 A zinc compound forms carbon dioxide in two different reactions.

- 1 It is heated strongly.
- 2 It is added to hydrochloric acid.

Which type of reaction occurs in 1 and 2?

	1	2
<b>A</b>	combustion	neutralisation
<b>B</b>	combustion	oxidation
<b>C</b>	thermal decomposition	neutralisation
<b>D</b>	thermal decomposition	oxidation

10 Which method can be used to obtain ammonia from ammonium sulfate?

- A** Heat it with an acid.
- B** Heat it with an alkali.
- C** Heat it with an oxidising agent.
- D** Heat it with a reducing agent.

11 Which pair of compounds would make a N, P, K fertiliser?

- A** ammonium sulfate and potassium phosphate
- B** calcium hydroxide and ammonium nitrate
- C** calcium phosphate and potassium chloride
- D** potassium nitrate and ammonium sulfate.

- 12 Which compound contains two of the three essential elements needed for a complete fertiliser?
- A ammonium chloride
  - B ammonium nitrate
  - C ammonium phosphate
  - D ammonium sulfate
- 13 Which compound would **not** be an effective fertiliser?
- A ammonium nitrate,  $\text{NH}_4\text{NO}_3$
  - B calcium oxide,  $\text{CaO}$
  - C calcium phosphate,  $\text{Ca}_3(\text{PO}_4)_2$
  - D potassium nitrate,  $\text{KNO}_3$
- 14 Farmers add calcium oxide (lime) and ammonium salts to their fields.
- The compounds are not added at the same time because they react with each other.
- Which gas is produced in this reaction?
- A ammonia
  - B carbon dioxide
  - C hydrogen
  - D nitrogen
- 15 A sample of fertiliser is tested by warming it with aqueous sodium hydroxide.
- A colourless gas is produced which turns red litmus paper blue.
- Which element, essential for plant growth, must be present?
- A nitrogen
  - B phosphorus
  - C potassium
  - D sulfur

16 Nitrogen, phosphorus and potassium are essential elements for plant growth.

Which mixture provides all three essential elements?

	mixture	formula
<b>A</b>	ammonium phosphate + potassium chloride	$(\text{NH}_4)_3\text{PO}_4$ + $\text{KCl}$
<b>B</b>	ammonium phosphate + ammonium nitrate	$(\text{NH}_4)_3\text{PO}_4$ + $\text{NH}_4\text{NO}_3$
<b>C</b>	ammonium phosphate + ammonium chloride	$(\text{NH}_4)_3\text{PO}_4$ + $\text{NH}_4\text{Cl}$
<b>D</b>	ammonium nitrate + potassium chloride	$\text{NH}_4\text{NO}_3$ + $\text{KCl}$

17 Which substance would make the best general fertiliser?

	relative amount			solubility in water
	P	K	N	
<b>A</b>	5	0	5	soluble
<b>B</b>	5	5	20	insoluble
<b>C</b>	5	10	15	soluble
<b>D</b>	10	5	10	insoluble

18 What are X and Y in the reaction shown?



	X	Y
<b>A</b>	hydrochloric acid	ammonia
<b>B</b>	hydrochloric acid	chlorine
<b>C</b>	sodium hydroxide	ammonia
<b>D</b>	sodium hydroxide	chlorine

19 Fertilisers need to supply crops with three main elements.

Which compound contains all three of these elements?

- A**  $\text{H}_3\text{PO}_4$       **B**  $\text{KNO}_3$       **C**  $\text{NH}_4\text{K}_2\text{PO}_4$       **D**  $\text{NH}_4\text{NO}_3$

20 Fertilisers are used to provide three elements needed to increase the yield of crops.

Which two compounds, when used together, would provide all three of these elements?

- A** ammonium nitrate and calcium phosphate  
**B** ammonium nitrate and potassium sulfate  
**C** potassium nitrate and calcium phosphate  
**D** potassium nitrate and potassium sulfate
- 21 Which two substances, when reacted together, would form a salt that contains two of the essential elements provided by fertilisers?
- A** potassium hydroxide and nitric acid  
**B** potassium hydroxide and sulfuric acid  
**C** sodium hydroxide and nitric acid  
**D** sodium hydroxide and sulfuric acid



22 A bag of fertiliser ‘Watch it grow’ contains ammonium sulfate and potassium sulfate.

Which of the three elements N, P and K does ‘Watch it grow’ contain?

	N	P	K
A	✓	✓	x
B	✓	x	✓
C	x	✓	x
D	x	x	✓

23 To grow roses, a fertiliser containing nitrogen, phosphorus and potassium is needed.

For the best flowers, the fertiliser should contain a high proportion of potassium.

Which fertiliser is best for roses?

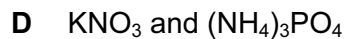
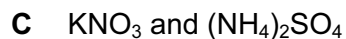
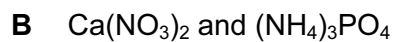
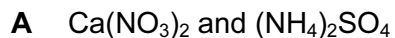
fertiliser	proportion by mass		
	N	P	K
A	9	0	25
B	13	13	20
C	29	5	0
D	29	15	5

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24 Fertilisers are used to provide three of the elements needed for plant growth.

Which two compounds would give a fertiliser containing all three of these elements?



25 Which element is **not** added to a fertiliser?

A aluminium

B nitrogen

C phosphorus

D potassium