

APOLLO

Ideal gases

HL

Chemistry

First assessment 2025

6 questions | questions

5. Which row shows a gas that would deviate the least from ideal gas behaviour?

	Gas	Pressure	Temperature
A.	Phosphine, PH_3	Low	High
B.	Ammonia, NH_3	Low	High
C.	Phosphine, PH_3	High	Low
D.	Ammonia, NH_3	High	Low

17. The volume of a container filled with a fixed amount of gas is increased by 100 % at constant temperature. How does this affect the pressure in a container? $pV = nRT$
- A. Pressure increases by 100 %
 - B. Pressure decreases by 100 %
 - C. Pressure increases by 50 %
 - D. Pressure decreases by 50 %

5. In which of the following sets of conditions does the gas exhibit behaviour closest to an ideal gas ?

	Gas	Pressure / kPa	Temperature / K
A.	H ₂	100	273
B.	NH ₃	50	473
C.	H ₂	50	473
D.	NH ₃	100	273

— T —

Turn over

0020-0201

5. A fixed volume of an ideal gas, initially at 30°C and with a pressure of **P** Pa, was heated to 60°C . What is the resulting pressure in Pa?
- A. Half of **P**
 - B. A little less than **P**
 - C. A little more than **P**
 - D. Two times **P**

1. Nitrogen monoxide, NO(g), is produced in internal combustion and jet engines.

(a) Outline a reason why NO is a pollutant.

[1]

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(b) Calculate the amount, in moles, of NO in $1.0 \times 10^{-3} \text{ m}^3$ of engine exhaust gas which contains 0.10 % NO by volume at 200°C and $1.0 \times 10^5 \text{ Pa}$.

Use sections 1 and 2 of the data booklet.

[3]

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(c) Outline why NO deviates more than nitrogen, N_2 , from the ideal gas model.

[2]

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(Question 1 continued)

(d) In an exhaust pipe catalytic converter, NO reacts with carbon monoxide, CO, to form N₂.

(i) State the initial and final oxidation states of nitrogen. [1]

Initial: Final:

(ii) Deduce the second product and the balanced equation for the reaction. [1]

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**Turn over**

— T —

0020-0221

5. A gas storage tank of fixed volume V contains N molecules of an ideal gas at 300 K with a pressure of 40 kPa. $\frac{N}{4}$ molecules are removed, and the temperature is changed to 450 K.

What is the new pressure of the gas in kPa?

- A. 15
- B. 30
- C. 45
- D. 60