

1. June/2022/Paper_11/No.24

In a catalytic converter, 5.6 g of carbon monoxide react with an excess of nitrogen monoxide.

What is produced in this reaction?

- A 2.4 g of C and 6.0 g of NO_2
- B 2.4 g of C and 9.2 g of NO_2
- C 8.8 g of CO_2 and 1.4 g of N_2
- D 8.8 g of CO_2 and 2.8 g of N_2

2. June/2022/Paper_11/No.25

Which reaction mixture produces an acidic gas?

- A aqueous ammonium nitrate and solid calcium oxide
- B calcium and aqueous hydrochloric acid
- C potassium chloride and concentrated sulfuric acid
- D sodium oxide and water

3. June/2022/Paper_11/No.29

Carbon monoxide, CO , nitrogen dioxide, NO_2 , and sulfur dioxide, SO_2 , are all atmospheric pollutants.

Which reaction occurs in the atmosphere?

- A CO is spontaneously oxidised to CO_2 .
- B NO_2 is reduced to NO by SO_2 .
- C NO_2 is reduced to NO by CO .
- D SO_2 is oxidised to SO_3 by CO_2 .

4. June/2022/Paper_12/No.24

A catalytic converter reduces the amount of pollutants in the fumes from a car exhaust.

Which row identifies a pollutant and shows how it is removed by the action of the catalyst?

	pollutant	chemical removal
A	carbon dioxide	reduced to carbon
B	carbon monoxide	oxidised to carbon dioxide
C	oxides of nitrogen	oxidised to nitric acid
D	unburnt hydrocarbons	oxidised to carbon dioxide and hydrogen

5. June/2022/Paper_13/No.25

Solid R is added to a solution of ammonium nitrate and the mixture is heated. A gas is given off which turns red litmus to blue.

What could be R?

- A aluminium chloride
- B magnesium chloride
- C sodium oxide
- D phosphorus oxide

6. June/2022/Paper_13/No.24

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Nitrogen molecules, $N_2(g)$, contain two atoms attracted to each other by a triple covalent bond.

- (a) Describe how the triple covalent bond forms in a $N_2(g)$ molecule. Refer to orbital overlap and hybridisation in your answer.

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- (b) Nitrogen oxides, NO_2 and NO , are produced in internal combustion engines. Release of these gases into the atmosphere leads to the formation of photochemical smog.

- (i) Outline how nitrogen oxides are involved in the formation of photochemical smog.

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- (ii) Construct an equation to demonstrate how a catalytic converter reduces the amount of nitrogen oxide gases released into the atmosphere.

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- (c) $N_2(g)$ is very unreactive. It is difficult to make ammonia, $NH_3(g)$, directly from its elements but it can be made from $NH_4Cl(s)$.

Identify a reagent and the conditions required to make $NH_3(g)$ from $NH_4Cl(s)$.

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