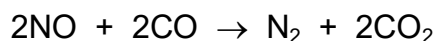


30 Catalytic converters are used to remove oxides of nitrogen from exhaust gases.

The equation represents one of the reactions that occur in a catalytic converter.



What is a disadvantage of using a catalytic converter to remove oxides of nitrogen?

- A** CO is an essential reactant in photosynthesis.
- B** CO₂ is a greenhouse gas.
- C** N₂ is acidic.
- D** N₂ is toxic.

31 Some gases are present in clean, dry air, while other gases are **only** present in polluted air.

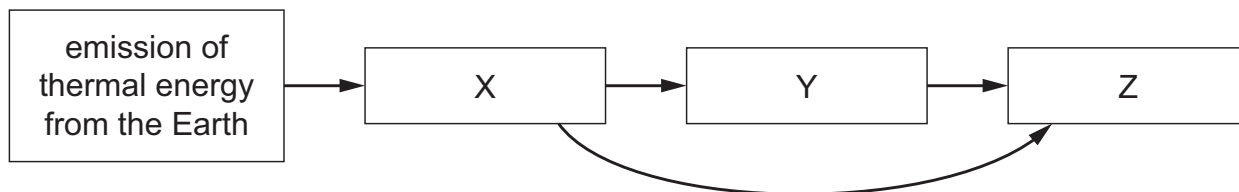
Which row is correct?

	a gas present in clean, dry air	a gas only present in polluted air
A	argon	carbon dioxide
B	argon	nitrogen dioxide
C	sulfur dioxide	carbon dioxide
D	sulfur dioxide	nitrogen dioxide

31 Which statement about oxides of nitrogen is correct?

- A** They are made in car engines by the incomplete combustion of gasoline at a high temperature.
- B** They are made in car engines when nitrogen in gasoline reacts with oxygen in air at a high temperature.
- C** They are removed from car exhausts by catalytic converters and form nitrogen and sulfur dioxide.
- D** They are removed from car exhausts when they react with carbon monoxide in catalytic converters.

- 33** The diagram represents two processes, X and Y, and their effect, Z, in increasing global warming.



Which row identifies X, Y and Z?

	X	Y	Z
A	absorption of thermal energy by greenhouse gases	emission of thermal energy to the Earth	reduced thermal energy loss to space
B	emission of thermal energy by greenhouse gases	emission of thermal energy to space	reduced thermal energy loss to space
C	absorption of thermal energy by greenhouse gases	emission of thermal energy to the Earth	increased thermal energy loss to space
D	emission of thermal energy by greenhouse gases	emission of thermal energy to space	increased thermal energy loss to space

- 29** Cars are fitted with catalytic converters.

Which equation represents a reaction that takes place in a catalytic converter?

- A** $\text{CO}_2 + \text{NO}_2 \rightarrow \text{CO} + \text{NO} + \text{O}_2$
- B** $2\text{CO} + 2\text{NO} \rightarrow 2\text{CO}_2 + \text{N}_2$
- C** $\text{CO}_2 + \text{N}_2 \rightarrow \text{C} + 2\text{NO}$
- D** $\text{C} + \text{NO}_2 \rightarrow \text{CO} + \text{NO}$

- 30** Three statements about greenhouse gases and global warming are listed.

- 1 A greenhouse gas molecule can absorb and emit thermal energy.
- 2 The Earth is a source of thermal energy.
- 3 Thermal energy emitted by a greenhouse gas molecule is sent out in all directions.

Which statements are correct?

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

31 Which statements help explain why an increasing amount of carbon dioxide or methane in the atmosphere causes global warming?

- 1 Carbon dioxide absorbs thermal energy from the Earth.
- 2 Methane does **not** absorb thermal energy from the Sun.
- 3 Carbon dioxide does **not** reflect thermal energy from the Sun to the Earth.
- 4 Methane reflects thermal energy from the Earth back to the Earth.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

32 The exhaust gases from cars contain oxides of nitrogen.

How are these oxides of nitrogen formed?

- A** Nitrogen and oxygen from the air react together at the high temperatures in the engine.
- B** Nitrogen and oxygen from the petrol react together in the car exhaust.
- C** Nitrogen from the petrol reacts with oxygen at the high temperatures in the engine.
- D** Nitrogen reacts with oxygen from the air in the catalytic converter.

30 Gases which cause acid rain form in car engines.

These gases can be removed using a catalytic converter.

Which equation represents the removal of one of these gases using a catalytic converter?

- A** $\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$
- B** $2\text{CO} + 2\text{NO} \rightarrow 2\text{CO}_2 + \text{N}_2$
- C** $\text{N}_2 + 2\text{O}_2 \rightarrow 2\text{NO}_2$
- D** $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$

34 Nitrogen monoxide, NO, and carbon monoxide, CO, are both removed from the exhaust gases of a car by a catalytic converter.

Which statement describes how nitrogen monoxide and carbon monoxide are removed by a catalytic converter?

- A** Nitrogen monoxide and carbon monoxide are both reduced.
- B** Nitrogen monoxide and carbon monoxide are both oxidised.
- C** Nitrogen monoxide is oxidised and carbon monoxide is reduced.
- D** Nitrogen monoxide is reduced and carbon monoxide is oxidised.