# GCSE Chemistry B (Twenty First Century Science)

**J258/01** Breadth in Chemistry (Foundation Tier)

## Question Set 11

Multiple Choice Questions

**1** Nanoparticles of cerium oxide, $CeO_2$, are added to diesel fuel.

**(a)** What is the size of a nanoparticle?

Tick (✓) **one** box.

| | |
|---|---|
| 0.1 nm | ☐ |
| 10 nm | ☐ |
| 150 nm | ☐ |
| 1000 nm | ☐ |

**[1]**

**(b)** Cerium oxide is a very expensive solid.

The cerium oxide nanoparticles act as a catalyst.
They help the fuel to burn completely so that less pollutant gases are formed.

Nanoparticles have a much higher surface area to volume ratio than solids.

Explain the advantages of using cerium oxide in the form of nanoparticles rather than as a solid.

**[2]**

**(c)** Diesel is a fossil fuel.

Name two pollutants caused by the incomplete combustion of fossil fuels.

**[2]**

**(d)** **(i)** $CeO_2$ contains $O^{2-}$ ions.

What is the charge on the cerium ion?

Put a (ring) around the correct answer.

**1+** **2+** **3+** **4+** **5+** **6+**

**[1]**

**(ii)** 160 g of $CeO_2$ contains 30 g of oxygen.

Calculate the percentage of **cerium** in $CeO_2$.

Percentage of cerium =..... %

**[3]**

## Total Marks for Question Set 11: 9