

**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,  $\text{CeO}_2$ , are added to diesel fuel.

(a) What is the size of a nanoparticle?

Tick (✓) **one** box.

- |         |                          |
|---------|--------------------------|
| 0.1 nm  | <input type="checkbox"/> |
| 10 nm   | <input type="checkbox"/> |
| 150 nm  | <input type="checkbox"/> |
| 1000 nm | <input type="checkbox"/> |

[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)  $\text{CeO}_2$  contains  $\text{O}^{2-}$  ions.

What is the charge on the cerium ion?

Put a **ring** around the correct answer.

(ii) 160 g of  $\text{CeO}_2$  contains 30 g of oxygen.

[1]

Calculate the percentage of **cerium** in  $\text{CeO}_2$ .

Percentage of cerium = ..... %

[3]

**Total Marks for Question Set 11: 9**

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