

Developments in New Materials

1 Which **one** of the following is **not** a modern material?

- | | | | |
|---|--------------------------------|--------------------------|--|
| A | Graphene | <input type="checkbox"/> | |
| B | Liquid Crystal Displays (LCDs) | <input type="checkbox"/> | |
| C | Brass | <input type="checkbox"/> | |
| D | Metal foam | <input type="checkbox"/> | |

[1 mark]

2 What type of material is titanium?

- | | | | |
|---|---------------------|--------------------------|--|
| A | a modern material | <input type="checkbox"/> | |
| B | a smart material | <input type="checkbox"/> | |
| C | a composite | <input type="checkbox"/> | |
| D | a technical textile | <input type="checkbox"/> | |

[1 mark]

3 What name is given to materials that change their properties in response to stimuli such as temperature, light, stress, moisture or pH?

- | | | | |
|---|--------------------|--------------------------|--|
| A | Technical textiles | <input type="checkbox"/> | |
| B | Alloys | <input type="checkbox"/> | |
| C | Modern materials | <input type="checkbox"/> | |
| D | Smart materials | <input type="checkbox"/> | |

[1 mark]

4 Nanomaterials are modern materials.

a) What are nanomaterials?

.....
[1 mark]

b) Give an example of a nanomaterial and where it is used.

.....
.....
[2 marks]

5 **Figure 1** shows a pair of sunglasses.

a) State **one** smart material that could be used to make a part of this product.

.....
[1 mark]



Figure 1

b) Explain how the "smart property" of the material you gave in a) could be useful to the user of the product.

.....
.....
.....

[2 marks]

6 Which **one** of the following statements is **not** true?

- A Technical textiles are designed to be functional rather than look good.
- B Kevlar® is a strong synthetic fibre that is resistant to abrasion.
- C Micro encapsulation allows microfibre fabrics to be embedded with chemicals.
- D Conductive fabrics use tiny droplets of chemicals coated in shells to conduct electricity.

[1 mark]

7 Composite materials have useful properties.

a) What is meant by the term 'composite material'?

.....
[1 mark]

b) Carbonfibre reinforced plastic (CRP) is an example of a composite material. It can be used to make bulletproof vests.

Give **two** properties of CRP that make it a suitable material for this purpose.

1.
2.
[2 marks]

8 An electronics company is designing a warning patch that uses a smart material to show when a microchip begins to overheat.

Suggest and describe a smart material that could be used.

.....
.....
[2 marks]

Score: / 15

Exam Practice Tip

Multiple choice questions can sometimes be hard, but don't panic. The beauty of this type of question is that you can still have a good go at answering it even if you're not sure of the answer — try narrowing down the choices as much as possible, by ruling out which ones are definitely wrong. Then you can pick an answer from one of the options left.

