2.19 Structures, Properties and Nanoparticles: 10-minute Pack

Total Marks

AQA 8464 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Ionic compounds share several typical physical properties.

(a) State one physical property, other than having a high melting point, that is typical of ionic compounds. **(1)**

(b) Explain why ionic compounds are often brittle, shattering rather than bending when a force is applied. **(2)**

(Total for Question 1 is 3 marks)

2 Pure metals are often mixed with other elements to form alloys for use in everyday products.

(a) Give one reason why an alloy such as steel is often used in construction rather than pure iron. **(1)**

(b) Name one everyday alloy, other than steel or bronze, and state one of its uses. **(2)**

(Total for Question 2 is 3 marks)

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3 A cosmetic company uses titanium dioxide nanoparticles with a diameter of 50 nm in a sun cream.

(a) Convert 50 nm into metres. Give your answer in standard form. **(1)**

.....

(b) A single human hair has a diameter of 0.05 mm. Calculate how many of these nanoparticles, placed side by side in a straight line, would span the width of one human hair. Give your answer in standard form. **(2)**

.....

(Total for Question 3 is 3 marks)

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Mark scheme · 2.19 Structures, Properties and Nanoparticles: 10-minute Pack

Question 1

(a) they are often soluble in water, and/or they are hard but brittle (any one) oe **B1**

(a) Answer: Many ionic compounds are soluble in water (they are also typically hard but brittle)

(b) when a force is applied, the layers of ions can shift slightly out of place relative to each other (oe) **M1**

(b) this brings ions of the same charge next to each other; the like charges repel strongly, forcing the layers apart and shattering the lattice (oe) **A1**

(b) Answer: A force can shift the layers of ions so that ions of the same charge line up next to each other; these like charges repel strongly, forcing the layers apart, so the lattice shatters rather than bending

Question 2

(a) steel (an alloy) is harder/stronger than pure iron (oe) **B1**

(a) Answer: Steel is harder and stronger than pure iron

(b) a valid named alloy, e.g. brass, or a named alloy of aluminium, or solder (any one) oe **B1**

(b) a matching, valid use, e.g. brass used for door fittings/musical instruments, aluminium alloys used in aircraft bodies, solder used to join electrical components (must match the alloy named) oe **B1**

(b) Answer: For example: brass, used to make door fittings and musical instruments

Question 3

(a) 5×10^{-8} m cao **B1**

(a) Answer: 5×10^{-8} m

(b) 0.05 mm converted to nm: $0.05 \times 1 \times 10^{6}$ nm = 5×10^{4} nm, then $5 \times 10^{4} / 50$ (oe method, ft from consistent unit conversion) **M1**

(b) 1×10^{3} (1000) cao **A1**

(b) Answer: 1×10^{3} (1000 nanoparticles)

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