Q1. Read the inform stions.

Sun Creams

Sun creams c sorbs harmful radiation.

Traditional sun creams contain normal-sized particles of titanium oxide. Normal-sized particles of titanium oxide are known to be safe to put on the skin.

Many new sun creams contain nano-sized particles of titanium oxide.

Experiments suggest that nano-sized particles might pass through the pores of the skin more easily than normal-sized particles.

(a) Explain why nano-sized particles might pass more easily through the pores of the skin than normal sized particles.

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(1)

(b) Using these sun creams is beneficial because they absorb harmful radiation.

Suggest **one** possible risk of using these sun creams.

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(1)

(Total 2 marks)

Standard Demand Questions

Q2. Read the article an

Tennis balls contain ir bounce. Normal tennis balls are char tches because they slowly lose some of the air.

'Nanocoated' tennis balls have a 'nanosize' layer of butyl rubber. This layer slows down the escape of air so that the ball does not lose its pressure as quickly.

(a) What is the meaning of *nanosize*?

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(1)

(b) Suggest why using 'nanocoated' tennis balls would be good for the environment.

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(2)
(Total 3 marks)

Standard Demand Questions

Q3. Read the article a .

Tennis balls contain air un nce. Normal tennis balls are changed s because they slowly lose some of of balls are needed for a tennis tournament, using up a lot of materials.

'Nanocoated' tennis balls have a 'nanosize' layer of butyl rubber. This layer slows down the escape of air so that the ball does not lose its pressure as quickly. The 'nanocoated' tennis balls last much longer and do not need to be replaced as often.

(a) How does the 'nanosize' layer make the tennis balls last longer?

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(1)

(b) Put a tick (✓) next to the best description of a 'nanosize' layer.

Description	(✓)
A layer one atom thick.	
A layer a few hundred atoms thick.	

A layer millions of atoms thick.	

(1)

(c) Suggest why using ‘nanocoated’ tennis balls would be good for the environment.

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(2)

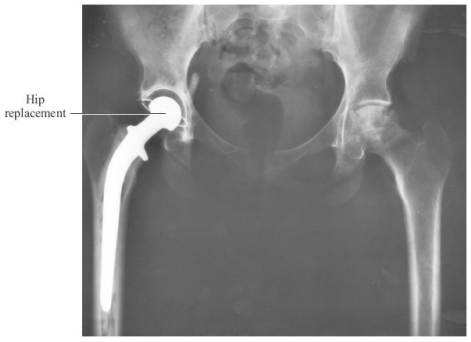
High Demand Questions

Q4. Read this passage

Metals are crystalline mater ut 20 000 nm (nanometres) in diameter. Th ed in layers.

A new nanoscience process ystalline metals are stronger and harder than no

It is hoped that nanocrystalline metals can be used in hip replacements.



The use of nanocrystalline metals should give people better hip replacements which last longer.

(a) State why metals can be bent and hammered into different shapes.

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(1)

(b) How is the size of the crystals in nanocrystalline metals different from the size of the crystals in normal metals?

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(1)

(c) Hip joints are constantly moving when people walk.

Suggest and explain why the hip replacement made of nanocrystalline metal should last longer than one made of normal metals.

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(2)

Name some other uses of nanotechnology: uses of graphene specifically

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