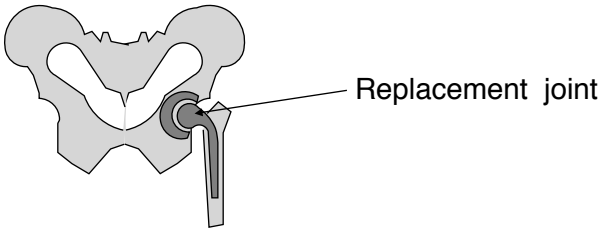
Do not write outside the box

1 Hip joints can sometimes wear away causing pain and discomfort when moving. The joint can be replaced using a metal structure which is shaped just like a healthy, working joint.

Diagram 1 shows what the replacement joint looks like in its correct location in the hip.

Diagram 1



Here is is some information about two metals that may be used to make an artificial hip joint.

Steel is stronger than titanium alloys. 1 g of steel has a mass of 7.85g, and pure titanium has a mass per cm^3 that is 56% that of steel.

The extraction of titanium from titanium ore involves many stages.

Titanium is a transition element.

1 (a) (i) Use the information given and your own knowledge to evaluate the use of **titanium** as a material for making replacement hip joints. **[4 marks]**

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1 (a) (ii) Copper is a transition metal that is often used to make electrical wiring and pipes for plumbing.

Explain why copper is a suitable metal for these uses. **[3 marks]**

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(Total 7 marks)

End