2003

28 The enamel on teeth treated with fluorine may include fluoroapatite, which contains Ca^{2+}, PO_4^{3-} and F^- ions.

Which **one** of the following is a possible formula for fluoroapatite?

A $Ca(PO_4)F$

B $Ca_3(PO_4)_2F$

C $Ca_5(PO_4)_3F$

D $Ca_7(PO_4)_5F$

2004

23 In water, the Fe^{2+} ion bonds with water to form $Fe(H_2O)_6^{2+}$. In haemoglobin in the blood, five of the water molecules have been displaced. In the presence of air, the last water molecule is displaced by oxygen to give oxyhaemoglobin. In the presence of carbon monoxide, the oxygen is displaced to give carboxyhaemoglobin.

Which of the following shows the correct order of the strength of the bonding to the Fe2+ ion (weakest first)?

	weakest ⟶ strongest
A	carbon monoxide, water, oxygen
B	carbon monoxide, oxygen, water
C	oxygen, water, carbon monoxide
D	oxygen, carbon monoxide, water
E	water, oxygen, carbon monoxide
F	water, carbon monoxide, oxygen

2005

15 The reaction between nitrogen and hydrogen to form ammonia is exothermic.

$$N_2 + 3H_2 \rightarrow 2NH_3 \qquad \Delta H \text{ -ve}$$

The strengths of the bonds in the three molecules are as shown.

N ≡ N	*x* kJ
H – H	*y* kJ
N – H	*z* kJ

Which statement can be deduced from this information?

A $z > x + y$

B $2z > x + y$

C $2z > x + 3y$

D $6z > x + 3y$

2006

2 Compound T has a melting point of 78 °C and a boiling point of 134 °C. T is soluble in water and its solution does not conduct electricity. T has covalent bonding and has a simple molecular structure.

Which property of T is not usually associated with its bonding and structure?

A the melting point

B the boiling point

C the solubility in water

D the lack of conductivity of the solution