

12 Which is a use of graphene based on its electrical properties?

- A drill tips
- B pencils
- C touch screens
- D body armour

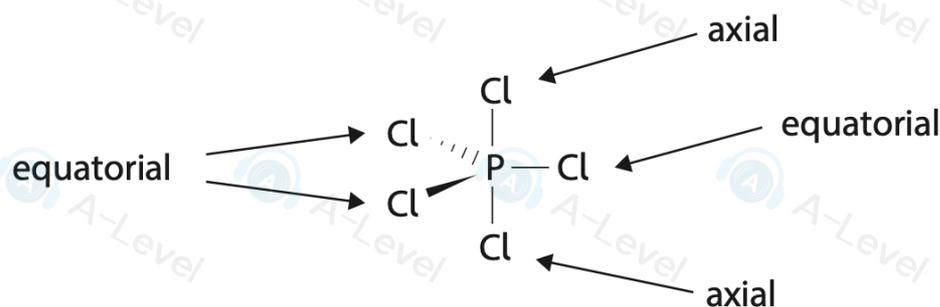
(Total for Question 12 = 1 mark)

14 Which molecule is polar?

- A 1,1-dibromopropane
- B *E*-1,2-dibromoethene
- C hexafluoroethane
- D tetrachloromethane

(Total for Question 14 = 1 mark)

13 In the gas phase, PCl_5 exists as molecules. They are trigonal bipyramidal.



Each chlorine atom can be replaced one at a time by a fluorine atom. The two axial chlorine atoms are replaced before the three equatorial atoms.

Which of the resulting molecules does **not** have a permanent dipole?

- A PCl_4F
- B PCl_3F_2
- C PCl_2F_3
- D PClF_4

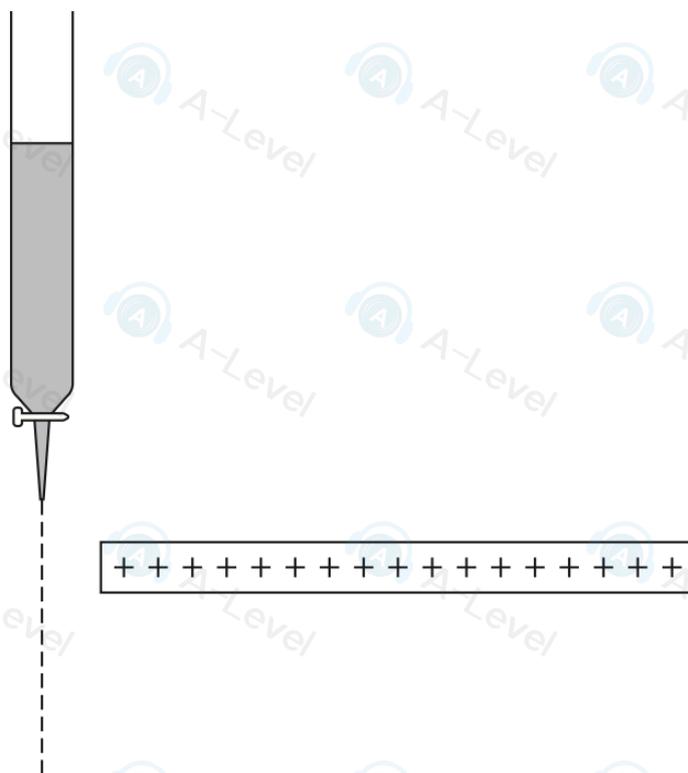
(Total for Question 13 = 1 mark)

14 Which molecule is polar?

- A CO_2
- B SF_6
- C SO_2
- D SiCl_4

(Total for Question 14 = 1 mark)

9 To compare polar and non-polar liquids, a stream of liquid from a burette and a positively charged plastic rod can be used. Which row of the table shows the correct direction of deflection?



Direction of deflection	
Polar liquid	Non-polar liquid
<input checked="" type="checkbox"/> A towards the rod	away from the rod
<input checked="" type="checkbox"/> B away from the rod	no deflection
<input checked="" type="checkbox"/> C towards the rod	no deflection
<input checked="" type="checkbox"/> D no deflection	towards the rod

(Total for Question 9 = 1 mark)

12 Which cation would be the most polarising?

- | | Radius | Charge |
|---------------------------------------|--------|--------|
| <input checked="" type="checkbox"/> A | small | large |
| <input checked="" type="checkbox"/> B | small | small |
| <input checked="" type="checkbox"/> C | large | small |
| <input checked="" type="checkbox"/> D | large | large |

(Total for Question 12 = 1 mark)