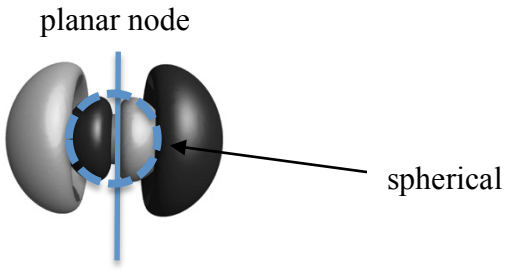
	Marks
• A schematic representation of a *p* orbital is shown below. The central sphere (mostly obscured) represents the atomic nucleus.	**2**



How many spherical and planar nodes does this orbital have? Label them on the diagram above.

Number of spherical nodes: **1**	Number of planar nodes: **1**

What is the principal quantum number, *n*, of this orbital? Explain your answer.

***n* = 3**

The total number of nodes is 1 fewer than the principal quantum number. As the total number of nodes is 1 + 1 = 2, the principal quantum number is 3.

• Shielding is important in multi-electron atoms. Briefly explain the concept of shielding.	**3**

Electrons closer to the nucleus partially block the attractive force of the nucleus on the electrons that are further away, resulting in a lowering of the effective nuclear charge on such electrons.

Give one example of a consequence of shielding.

The elements in a group of the Periodic Table have similar reactivities but ionisation energies decrease and sizes increase.