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CAIE A LEVEL Chemistry Topic Questions / 9701

1.3.1-Shells-Subshells-Orbitals-and-Principle-Quantum-set-1-qp

Total Questions: 11

Note:

- For questions with answer choices as statements 1, 2 and 3, follow these instructions for selecting options A/B/C/D:
- A= 1, 2 and 3 are correct
- B=1 and 2 only are correct
- C=2 and 3 only are correct
- D=1 only is correct

Questions

Question 1:

Which atom has its outermost electron in an orbital of the shape shown, with principal quantum number 3?



- A sodium
- B chlorine
- C calcium
- D bromine

Question 2:

Which atomic orbitals are occupied in an atom of phosphorus?

- A 1p2s2p B 2s2p2d C 2s2p3s D 2p3s3d

Question 3:

Which statement about a 3p orbital is correct?

- A It can hold a maximum of 6 electrons.
- B It has the highest energy of the orbitals with principal quantum number 3.
- C It is at a higher energy level than a 3s orbital but has the same shape.
- D It is occupied by one electron in an isolated phosphorus atom.

Question 4:

In which pair do both atoms have one electron only in an s orbital in their ground states?

- A Ca, Sc B Cu, Be C H, He D Li, Cr

Questions (Continued)

Question 5:

Which element has an equal number of electron pairs and of unpaired electrons within orbitals of principal quantum number 2?

- A beryllium
- B carbon
- C nitrogen
- D oxygen

Question 6:

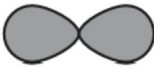
Which statement about the electrons in a ground state carbon atom is correct?

- A Electrons are present in four different energy levels.
- B There are more electrons in p orbitals than there are in s orbitals.
- C The occupied orbital of highest energy is spherical.
- D The occupied orbital of lowest energy is spherical.

Question 7:

The outermost electron in an atom of neon occupies a particular orbital.

Which row shows the relative energy and shape of this orbital?

	energy of orbital relative to other occupied orbitals	shape of orbital
A	higher or equal	
B	higher or equal	
C	lower or equal	
D	lower or equal	

Questions (Continued)

Question 8:

Which atom has more unpaired electrons than paired electrons in orbitals of principal quantum number 2?

- A carbon
- B nitrogen
- C oxygen
- D fluorine

Question 9:

Which molecule contains a nitrogen atom with sp hybridised orbitals?

- A $\text{CH}_3\text{CH}_2\text{NH}_2$ B HNO_3 C HCN D NH_3

Question 10:

Which statement about the electrons in a ground state carbon atom is correct?

- A Electrons are present in four different energy levels.
- B There are more electrons in p orbitals than there are in s orbitals.
- C The occupied orbital of highest energy is spherical.
- D The occupied orbital of lowest energy is spherical.

Question 11:

Why is the first ionisation energy of oxygen less than that of nitrogen?

- A The nitrogen atom has its outer electron in a different subshell.
- B The nuclear charge on the oxygen atom is greater than that on the nitrogen atom.
- C The oxygen atom has a pair of electrons in one p orbital that repel one another.
- D There is more shielding in an oxygen atom.