Paper 1

Questions are applicable for both core and extended candidates

1 Which statement about isotopes is correct?

A Atoms with different numbers of electrons are isotopes of each other.

B Atoms with the same mass numbers are isotopes of each other.

C Isotopes of the same element have different numbers of neutrons.

D Isotopes of the same element have different numbers of protons.

2 The atomic structures of four particles, W, X, Y and Z, are shown.

	electrons	neutrons	protons
W	2	2	2
X	2	2	3
Y	2	3	2
Z	3	2	3

Which particles are isotopes of the same element?

A W and X **B** W and Y **C** X and Y **D** X and Z

3 An isotope of chromium is represented by $^{52}_{24}Cr$.

Which statement about an atom of this isotope of chromium is correct?

A It contains 24 electrons.

B It contains 24 neutrons.

C It contains 28 protons.

D It contains 52 neutrons.

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

4 Two of the isotopes of calcium are represented as $^{40}_{20}Ca$ and $^{44}_{20}Ca$.

Which statement explains why these isotopes of calcium have identical chemical properties?

(extended only)

A Both isotopes have the same number of neutrons.

B Both isotopes have an electronic configuration of 2,8,8,2.

C Both isotopes have a mass number of 20.

D Both isotopes have four fully occupied electron shells.

5 There are two stable isotopes of bromine.

The mass number of isotope 1 is 79.

The mass number of isotope 2 is 81.

Which statement is correct?

A The isotopes have the same number of neutrons.

B The isotopes have different chemical properties.

C The isotopes have different numbers of protons.

D The isotopes have the same number of outer electrons.

6 Which statement explains why isotopes of the same element have the same chemical properties?

(extended only)

A They have the same number of outer shell electrons.

B They have the same number of neutrons.

C They have different numbers of protons.

D They have different mass numbers.

7 X and Y are atoms.

- X and Y have the same number of electron shells.
- X and Y have the same number of outer electrons.
- X and Y have different mass numbers.

Which statements about X and Y are correct? **(extended only)**

1 X and Y are isotopes.

2 X and Y have the same total number of electrons.

3 X and Y have the same chemical properties.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

8 Which statements about isotopes of the same element are correct? **(extended only)**

1 They are atoms which have the same chemical properties because they have the same number of electrons in their outer shell.

2 They are atoms which have the same number of electrons and neutrons but different numbers of protons.

3 They are atoms which have the same number of electrons and protons but different numbers of neutrons.

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

9 The numbers of protons and neutrons and the electronic structures of four particles, W, X, Y and Z, are shown.

	number of protons	number of neutrons	electronic structure
W	8	8	2,8
X	8	10	2,6
Y	8	8	2,6
Z	10	8	2,8

Which particles have the same chemical properties? **(extended only)**

A W and Y **B** W and Z **C** X and Y **D** X and Z

10 Which statement explains why isotopes of the same element have the same chemical properties?

(extended only)

A They have the same electronic structure.

B They have the same relative mass.

C They have the same nucleon number.

D They have the same proton number.