



O-Level Chemistry (5070)

Topical Paper MCQs

ATOMIC STRUCTURE

TOPICAL PAST PAPER

2026 EDITION

Q1

5070/11/O/N/22/Q8

Atomic Structure

What is the nucleon number of the isotope of uranium, ${}_{92}^{235}\text{U}$?

- A** 92 **B** 143 **C** 235 **D** 327

Q2

5070/11/M/J/25/Q4

Atomic Structure

Which definition of isotopes is correct?

- A** atoms of different elements that have the same number of electrons
B atoms of different elements that have the same number of neutrons
C atoms of the same element that have different numbers of electrons
D atoms of the same element that have different numbers of neutrons

Q3

5070/12/M/J/25/Q3

Atomic Structure

Which statement is correct?

- A** All compounds are ionic.
B All compounds conduct electricity when molten.
C Each atom of an element contains the same number of protons.
D In a mixture of substances, the proportions of the substances are always the same.

Q4

5070/11/O/N/22/Q6

Atomic Structure

Which statement about iodine atoms and iodide ions is correct?

- A** They are both isotopes of iodine.
B They undergo the same chemical reactions.
C They have the same number of protons.
D They have the same physical properties.

Q5

5070/12/O/N/23/Q4

Atomic Structure

Which statement about the isotopes of bromine is correct?

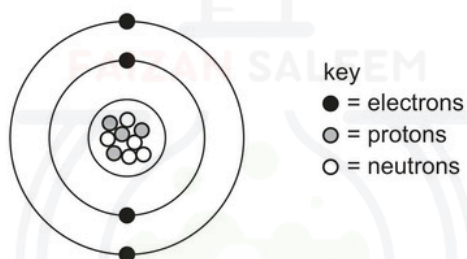
- A They are atoms with the same number of electrons and a different number of protons.
- B They are atoms with the same number of neutrons and the same number of electrons.
- C They are atoms with the same number of protons and the same chemical properties.
- D They are atoms with the same number of protons and the same physical properties.

Q6

5070/11/M/J/25/Q3

Atomic Structure

An atom of element X is shown.



Which element is X?

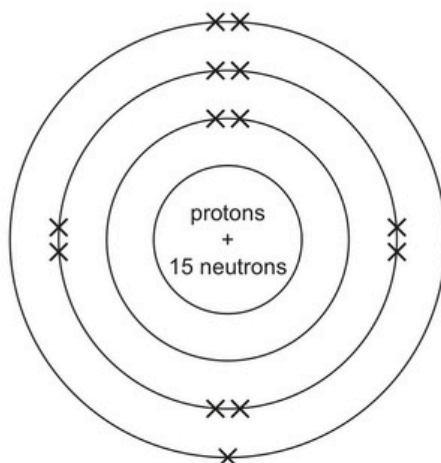
- A beryllium
- B boron
- C carbon
- D magnesium

Q7

5070/12/O/N/24/Q3

Atomic Structure

The diagram shows an atom of element Z.



Which symbol for element Z is correct?

- A ${}_{28}^{15}\text{Z}$
- B ${}_{13}^{26}\text{Z}$
- C ${}_{13}^{28}\text{Z}$
- D ${}_{15}^{28}\text{Z}$

Q8

5070/12/O/N/25/Q3

Atomic Structure

Atom X has an atomic number of 19 and a nucleon number of 42.

Atom Y has an atomic number of 20 and a nucleon number of 40.

Which statement is correct?

- A Atom X contains two more electrons than atom Y.
- B Atom X contains three more neutrons than atom Y.
- C Atom Y contains one more neutron than atom X.
- D X and Y are atoms of the same element.

Q9

5070/11/M/J/24/Q3

Atomic Structure

A chlorine atom, Z, has a nucleon number of 37.

Which row is correct?

	number of neutrons in Z	number of electrons in the second shell of Z
A	17	7
B	17	8
C	20	7
D	20	8

Q10 5070/11/M/J/24/Q4

Atomic Structure

Which particles are isotopes of the same element?

particle	electrons	neutrons	protons
W	22	28	25
X	23	28	25
Y	26	30	26
Z	26	28	26

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

Q11 5070/11/M/J/21/Q6

Atomic Structure

Which particle contains most electrons?

A O^{3-} **B** Ne**C** Na^- **D** Mg^{3+}

Q12 5070/12/M/J/25/Q5

Atomic Structure

Which particle contains the greatest number of electrons?

A Mg^{2+} **B** N^{3-} **C** Ne**D** S^{2-}

Q13 5070/12/M/J/21/Q7

Atomic Structure

Use the Periodic Table to answer this question.

Which two particles have the same number of electrons?

- A** Ar and Ca
B Na^+ and K^+
C Fe^{2+} and Fe^{3+}
D Ca^{2+} and Sc^{3+}

Q14 5070/12/M/J/22/Q6

Atomic Structure

Element X can be represented by the symbol ${}^{14}_6\text{X}$.

Which statements about an atom of element X are correct?

- 1 It has 6 electrons.
- 2 It has 8 protons.
- 3 It is an isotope of carbon.
- 4 It is an isotope of nitrogen.

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 4

Q15 5070/11/M/J/23/Q3

Atomic Structure

The numbers of electrons, protons and neutrons in four different particles are shown.

particle	electrons	protons	neutrons
1	19	19	20
2	18	19	20
3	20	20	20
4	19	19	22

Which particles are isotopes of the same element?

- A** 1 and 2 only **B** 1 and 3 only **C** 1 and 4 **D** 1, 2 and 3

Q16 5070/12/M/J/23/Q3

Atomic Structure

Naturally occurring bromine has a relative atomic mass of 80 and consists entirely of two of relative atomic masses 79 and 81.

What can be deduced about naturally occurring bromine from this information only?

- A Bromine contains the two isotopes in equal proportions.
- B Bromine has different oxidation states.
- C Bromine isotopes have different numbers of protons.

Q17 5070/11/O/N/23/Q4

Atomic Structure

The letters X, Y and Z represent different atoms.



Which statement is correct?

- A X and Y are the same element.
- B X and Z are the same element.
- C X has more protons than Y.
- D Z has more neutrons than Y.

Q18 5070/11/O/N/21/Q8

Atomic Structure

Which statement about atoms and ions is correct?

- A Atoms and ions of the same element must have different numbers of neutrons.
- B Isotopes of different elements must have different numbers of neutrons.
- C The charge on a positive ion = (nucleon number – number of neutrons – number of electrons).
- D The number of protons and number of neutrons in an atom must be the same.

Q19 5070/12/O/N/24/Q25

Atomic Structure

Which property determines the order of the elements in the Periodic Table?

- A the masses of their atoms
- B the number of electrons in the outer shell
- C the number of neutrons in the nucleus
- D the number of protons in the nucleus

Q20 5070/12/O/N/24/Q26

Atomic Structure

Which statement explains why helium and neon are unreactive?

- A They are both gases at room temperature and pressure.
- B They both have eight electrons in their outer shell.
- C They both have equal numbers of protons and electrons in their atoms.
- D They both have all their occupied electron shells completely filled.

Q21 5070/11/M/J/22/Q6

Atomic Structure

Two particles have the symbols ${}^{54}_{26}\text{Fe}^{2+}$ and ${}^{59}_{27}\text{Co}^{3+}$.

Which statement about these particles is correct?

- A They contain the same number of electrons.
- B They contain the same number of neutrons.
- C They contain the same number of protons.
- D They do not contain the same number of protons, neutrons or electrons.

Q22 5070/11/M/J/22/Q7

Atomic Structure

Two isotopes of chlorine are ^{35}Cl and ^{37}Cl .

Using these isotopes and ^{12}C and ^1H , how many different relative molecular masses are possible for the compound with molecular formula $\text{C}_2\text{H}_3\text{Cl}_3$?

- A** 2 **B** 3 **C** 4 **D** 5

Q23 5070/12/M/J/21/Q8

Atomic Structure

The table shows data for particles W, X, Y and Z.

particle	proton number	nucleon number	number of electrons
W	6	12	6
X	6	14	6
Y	7	14	7
Z	8	16	10

Which statements are correct?

- 1 W and X are isotopes of the same element.
- 2 Y is in Group V of the Periodic Table.
- 3 Z is a cation.

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

Q24 5070/12/O/N/21/Q8

Atomic Structure

The table shows data for some particles.

particle	proton number	nucleon number	number of protons	number of neutrons	number of electrons
sodium ion	11	23	11	W	10
fluoride ion	9	19	9	10	X
magnesium ion	12	24	Y	12	10

What are the values of W, X and Y?

	W	X	Y
A	10	10	12
B	11	12	10
C	12	10	12
D	12	10	10

Q25

5070/11/M/J/23/Q2

Atomic Structure

X, Y and Z are elements.

X and Y are in the same period of the Periodic Table.

Y and Z are in the same group of the Periodic Table.

What are possible electronic configurations for X, Y and Z?

	X	Y	Z
A	2,4	2,7	2,8,4
B	2,4	2,7	2,8,7
C	2,4	2,8,4	2,8,7
D	2,8,4	2,8,7	2,4

Q26

5070/12/M/J/23/Q2

Atomic Structure

Element Z, nucleon number 31, forms an ion Z^{3-} .

Where is Z found in the Periodic Table?

- A Group III
- B Group V
- C Period 4
- D Period 5

Q27

5070/11/O/N/24/Q4

Atomic Structure

An ion has an electronic configuration of 2,8,8.

It has a 2– charge and a nucleon number of 36.

How many neutrons are present in the nucleus of this ion?

- A 16 B 18 C 19 D 20

Q28

5070/11/O/N/24/Q5

Atomic Structure

The formulae for two ions are given.



Which statement is correct?

- A The chemical properties of both ions are the same.
- B The number of electrons in each ion is different.
- C The number of neutrons in each ion is the same.
- D The number of protons in each ion is different.

Q29

5070/12/M/J/25/Q4

Atomic Structure

Atoms of element Q form positive ions.

An ion of Q has 10 electrons and 14 neutrons.

Which statement is correct?

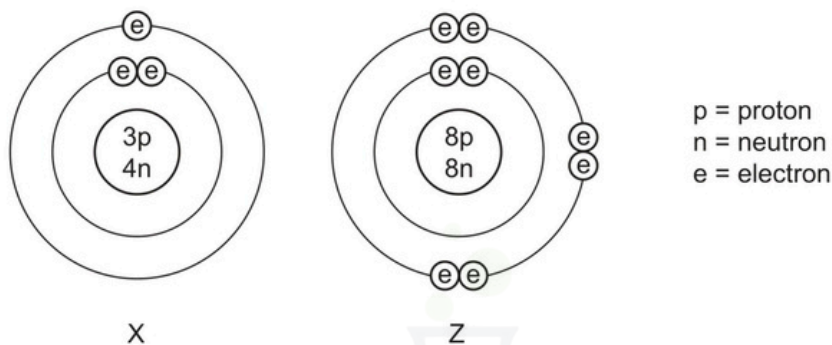
- A An atom of Q has only two occupied electron shells.
- B Q is a non-metal.
- C The atomic number of Q is 10.
- D The mass number of Q is greater than 24.

Q30 5070/12/M/J/23/Q10

Atomic Structure

The diagram shows the structures of the atoms of two elements, X and Z.

X and Z are **not** the atomic symbols for these elements.



The elements combine to form a compound.

What is the mass of one mole of this compound?

- A 11 g B 12 g C 23 g D 30 g

Q31 5070/11/O/N/22/Q5

Atomic Structure

The diagram shows the outer shell electrons of the atoms of two elements, Q and R.



The sulfate of Q is insoluble.

Element R is gaseous at room temperature and pressure.

Which row could be correct?

	proton number of Q	relative atomic mass of R
A	12	35.5
B	12	80
C	56	80
D	56	35.5

ATOMIC STRUCTURE

MARKING SCHEME

SECTION A - EASY

Questions 1-20

Question	Answer	Reference
1	C	5070/11/O/N/22/Q8
2	D	5070/11/M/J/25/Q4
3	C	5070/12/M/J/25/Q3
4	C	5070/11/O/N/22/Q6
5	C	5070/12/O/N/23/Q4
6	A	5070/11/M/J/25/Q3
7	C	5070/12/O/N/24/Q3
8	B	5070/12/O/N/25/Q3
9	D	5070/11/M/J/24/Q3
10	D	5070/11/M/J/24/Q4
11	C	5070/11/M/J/21/Q6
12	D	5070/12/M/J/25/Q5
13	D	5070/12/M/J/21/Q7
14	C	5070/12/M/J/22/Q6
15	C	5070/11/M/J/23/Q3
16	A	5070/12/M/J/23/Q3
17	A	5070/11/O/N/23/Q4
18	C	5070/11/O/N/21/Q8
19	D	5070/12/O/N/24/Q25
20	D	5070/12/O/N/24/Q26

ATOMIC STRUCTURE

MARKING SCHEME

SECTION B - HARD

Questions 21-31

Question	Answer	Reference
21	A	5070/11/M/J/22/Q6
22	C	5070/11/M/J/22/Q7
23	A	5070/12/M/J/21/Q8
24	C	5070/12/O/N/21/Q8
25	B	5070/11/M/J/23/Q2
26	B	5070/12/M/J/23/Q2
27	D	5070/11/O/N/24/Q4
28	A	5070/11/O/N/24/Q5
29	D	5070/12/M/J/25/Q4
30	D	5070/12/M/J/23/Q10
31	D	5070/11/O/N/22/Q5