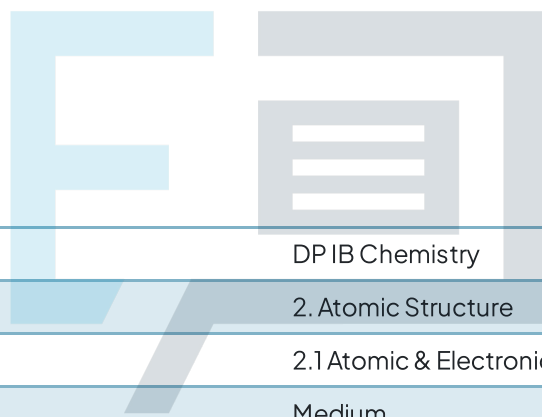




2.1 Atomic & Electronic Structure

Question Paper



Course	DP IB Chemistry
Section	2. Atomic Structure
Topic	2.1 Atomic & Electronic Structure
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Chemistry HL
Students of other boards may also find this useful

Question 1

A periodic table is needed for this question

In which of the following species are the numbers of protons, neutrons and electrons all different?

- A. $^{23}\text{Na}^+$
- B. ^{27}Al
- C. $^{19}\text{F}^-$
- D. $^{32}\text{S}^{2-}$

[1 mark]

Question 2

The atomic number of an element gives the number of protons in the nucleus which is also equal to the number of electrons. Which statement explains why atoms are neutral?

- A. one proton has a mass 1840 times greater than one electron
- B. the charge on an electron is equal and opposite to the charge on a proton
- C. the difference in charge between electrons and protons is balanced by the neutrons
- D. electrons are spread out in shells around the nucleus while protons are concentrated inside the nucleus

[1 mark]

Question 3

Which statements correctly describe the distribution of mass and charge in the atom?

- 1 the negative charge is concentrated in one area outside the nucleus
- 2 the mass is concentrated inside the nucleus
- 3 the negative charge is spread around outside the nucleus

- A. 1 and 3
- B. 1 and 2
- C. 2 and 3
- D. 1, 2 and 3

[1 mark]

Question 4

A periodic table is needed for this question

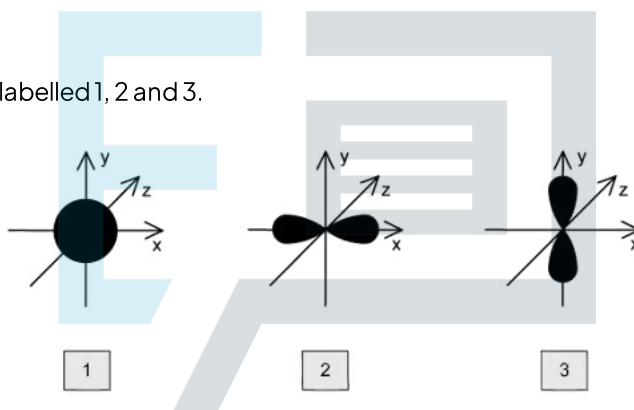
There are six unpaired electrons in atoms of element Z. What could element Z be?

- A. sulfur
- B. iron
- C. carbon
- D. chromium

[1 mark]

Question 5

The diagram shows three orbitals labelled 1, 2 and 3.



What is the correct label for each orbital?

- A. p_x , p_y and p_z
- B. s , p_z and p_y
- C. s , p_x and p_z
- D. s , p_x and p_y

[1 mark]

Question 6

A periodic table is needed for this question

What is the electronic configuration of an ion with a single negative charge and atomic number 17?

- A. $1s^2 2s^2 2p^6 3s^1 3p^6$
- B. $1s^2 2s^2 2p^6 3s^2 3p^6$
- C. $1s^2 2s^2 2p^6 3s^1 3p^5$
- D. $1s^2 2s^2 2p^6 3s^2 3p^5$

[1 mark]

Question 7

A periodic table is needed for this question

What is the correct sequence for the orbitals shown in an atom of vanadium in order of decreasing energy?

- A. 3s 3p 4s 3d
- B. 4s 3d 3s 3p
- C. 4s 3d 3p 3s
- D. 3d 4s 3p 3s

[1 mark]

Exam Papers Practice

Question 8

The isotope ${}_{27}^{60}\text{Co}$ is used in the treatment of cancer cells in the body.

Which statements about this isotope are correct?

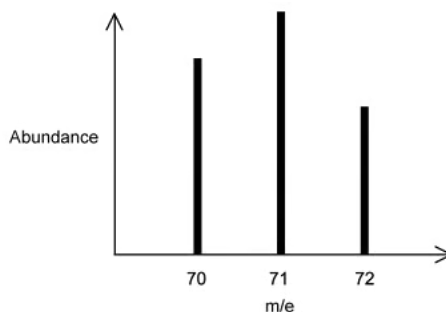
- 1 the charge on the nucleus is +27
- 2 there are 33 neutrons in the nucleus
- 3 it has the same number of neutrons as other isotopes of cobalt

- A. 1 and 2
- B. 1 and 3
- C. 2 only
- D. 1, 2 and 3

[1 mark]

Question 9

The mass spectrum of element X is shown below.



Which of the following statements is correct?

- A. X has a relative atomic mass between 70 and 71
- B. The three isotopes of X are separated after being converted to anions
- C. The most abundant isotope of X contains 71 neutrons
- D. The isotope of X with mass 72 will be deflected the most

[1 mark]

Question 10

A periodic table is needed for this question

Which row correctly describes the subatomic particles found in $^{26}\text{Mg}^{2+}$?

	protons	neutrons	electrons
A	10	14	12
B	12	14	10
C	12	26	10
D	14	12	12

[1 mark]