

Q1.

Which atom has 2 more protons and 3 more neutrons than an atom of $^{112}_{48}\text{Cd}$?

- | | |
|--------------------------|--------------------------|
| A $^{115}_{48}\text{Cd}$ | <input type="checkbox"/> |
| B $^{115}_{50}\text{Sn}$ | <input type="checkbox"/> |
| C $^{117}_{50}\text{Sn}$ | <input type="checkbox"/> |
| D $^{117}_{51}\text{Sb}$ | <input type="checkbox"/> |

(Total 1 mark)

Q2.

Which atom contains the most neutrons?

- | | |
|-------------------------|--------------------------|
| A $^{54}_{24}\text{Cr}$ | <input type="checkbox"/> |
| B $^{55}_{25}\text{Mn}$ | <input type="checkbox"/> |
| C $^{57}_{26}\text{Fe}$ | <input type="checkbox"/> |
| D $^{58}_{28}\text{Ni}$ | <input type="checkbox"/> |

(Total 1 mark)

Q3.

Which atom has two more protons and two more neutrons than $^{52}_{24}\text{Cr}$?

- | | |
|-------------------------|--------------------------|
| A $^{54}_{26}\text{Cr}$ | <input type="checkbox"/> |
| B $^{56}_{26}\text{Cr}$ | <input type="checkbox"/> |
| C $^{54}_{26}\text{Fe}$ | <input type="checkbox"/> |
| D $^{56}_{26}\text{Fe}$ | <input type="checkbox"/> |

(Total 1 mark)

Q4.

Which atom has one more proton and two more neutrons than $^{31}_{15}\text{P}$?

- | | |
|------------------------|--------------------------|
| A $^{33}_{16}\text{P}$ | <input type="checkbox"/> |
| B $^{34}_{16}\text{P}$ | <input type="checkbox"/> |
| C $^{33}_{16}\text{S}$ | <input type="checkbox"/> |
| D $^{34}_{16}\text{S}$ | <input type="checkbox"/> |

(Total 1 mark)

Q5.

- (a) State, in terms of the numbers of fundamental particles, **one** similarity and **one** difference between atoms of ^{50}Cr and ^{53}Cr

Similarity _____

Difference _____

(Total 2 marks)

Q6.

This question is about chromium and its compounds.

- (a) An atom has 2 more protons and 3 more neutrons than an atom of ^{52}Cr .

Deduce the symbol, including the mass number and the atomic number, for this atom.

(Total 1 mark)

Q7.

Which of these correctly shows the numbers of sub-atomic particles in a $^{41}\text{K}^+$ ion?

	Number of electrons	Number of protons	Number of neutrons	
A	19	19	20	<input type="radio"/>
B	18	20	21	<input type="radio"/>
C	18	19	22	<input type="radio"/>
D	19	18	23	<input type="radio"/>

(Total 1 mark)

Q8.What are the numbers of neutrons and electrons in the $^{57}\text{Fe}^{2+}$ ion?

	Neutrons	Electrons	
A	31	24	<input type="checkbox"/>
B	57	24	<input type="checkbox"/>
C	31	26	<input type="checkbox"/>
D	57	28	<input type="checkbox"/>

(Total 1 mark)

Q9.

Which of these atoms has the smallest number of neutrons?

A	^3H	<input type="checkbox"/>
B	^4He	<input type="checkbox"/>
C	^5He	<input type="checkbox"/>
D	^4Li	<input type="checkbox"/>

(Total 1 mark)

Q10.(a) **Table 1** shows some data about fundamental particles in an atom.**Table 1**

Particle	proton	neutron	electron
Mass / g	1.6725×10^{-24}	1.6748×10^{-24}	0.0009×10^{-24}

An atom of hydrogen can be represented as ^1H Use data from **Table 1** to calculate the mass of this hydrogen atom.

(Total 1 mark)

Q11.

- (a) State the meaning of the term *mass number*.

(1)

- (b) Give the symbol of the element with a mass number of 68 and has 38 neutrons in its nucleus.

(1)

(Total 2 marks)

Q12.

The element rubidium exists as ^{85}Rb and ^{87}Rb

- (a) State the number of protons and the number of neutrons in an atom of ^{85}Rb

Number of protons _____

Number of neutrons _____

(Total 2 marks)

Q13.

Define the term *mass number* of an atom.

The mass number of an isotope of nitrogen is 15. Deduce the number of each of the fundamental particles in an atom of ^{15}N

(Total 3 marks)

Q14.

In 1913 Niels Bohr proposed a model of the atom with a central nucleus, made up of protons and neutrons, around which electrons moved in orbits. After further research, the model was refined when the existence of energy levels and sub-levels was recognised.

(a) Complete the following table for the particles in the nucleus.

Particle	Relative charge	Relative mass
proton		
neutron		

(2)

(b) Atoms of tungsten include ^{182}W and ^{186}W

(i) Deduce the number of protons in ^{182}W

(1)

(ii) Deduce the number of neutrons in ^{186}W

(1)

(Total 4 marks)

Q15.

In one model of atomic structure, the atom has a nucleus surrounded by electrons in levels and sub-levels.

(a) Define the term *atomic number*.

(1)

(b) Explain why atoms of an element may have different mass numbers.

(1)

(Total 2 marks)

Q16.

(a) Complete the following table.

	Relative mass	Relative charge
Neutron		
Electron		

(2)

(b) An atom has twice as many protons as, and four more neutrons than, an atom of ${}^9\text{Be}$. Deduce the symbol, including the mass number, of this atom.

(2)

(Total 4 marks)

Q17.

(a) Complete the following table.

	Relative mass	Relative charge
Proton		
Electron		

(2)

(b) An atom of element **Q** contains the same number of neutrons as are found in an atom of ${}^{27}\text{Al}$. An atom of **Q** also contains 14 protons.

(i) Give the number of protons in an atom of ${}^{27}\text{Al}$.

(ii) Deduce the symbol, including mass number and atomic number, for this atom of element **Q**.

(3)

(Total 5 marks)

Q18.

(a) Complete the following table.

Particle	Relative charge	Relative mass
Proton		
Neutron		
Electron		

(3)

(b) An atom of element **Z** has two more protons and two more neutrons than an atom of $^{34}_{16}\text{S}$. Give the symbol, including mass number and atomic number, for this atom of **Z**.

(2)

(Total 5 marks)

Q19.

An atom in which the number of protons is greater than the number of neutrons is

A $^{234}_{92}\text{U}$

B ^6_3Li

C ^3_2He

D ^2_1H

(Total 1 mark)