

## Q1.

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

A  $^{115}_{48}\text{Cd}$

B  $^{115}_{50}\text{Sn}$

C  $^{117}_{50}\text{Sn}$

D  $^{117}_{51}\text{Sb}$

(Total 1 mark)

## Q2.

Which atom contains the most neutrons?

A  $^{54}\text{Cr}$

B  $^{55}\text{Mn}$

C  $^{57}\text{Fe}$

D  $^{58}\text{Ni}$

(Total 1 mark)

## Q3.

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

A  $^{54}_{26}\text{Cr}$

B  $^{56}_{26}\text{Cr}$

C  $^{54}_{26}\text{Fe}$

D  $^{56}_{26}\text{Fe}$

(Total 1 mark)

## Q4.

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

A  $^{33}_{16}\text{P}$

B  $^{34}_{16}\text{P}$

C  $^{33}_{16}\text{S}$

D  $^{34}_{16}\text{S}$

(Total 1 mark)

## Q5.

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

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  $^{52}\text{Cr}$ .

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?

	<b>Number of electrons</b>	<b>Number of protons</b>	<b>Number of neutrons</b>	
<b>A</b>	19	19	20	<input type="radio"/>
<b>B</b>	18	20	21	<input type="radio"/>
<b>C</b>	18	19	22	<input type="radio"/>
<b>D</b>	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
B	57	24
C	31	26
D	57	28

  
  
  


(Total 1 mark)

## Q9.

Which of these atoms has the smallest number of neutrons?

A  $^3\text{H}$

B  $^4\text{He}$

C  $^5\text{He}$

D  $^4\text{Li}$

(Total 1 mark)

## Q10.

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

**Table 1**

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

An atom of hydrogen can be represented as  $^1\text{H}$

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*.

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(1)

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

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(1)

**(Total 2 marks)**

### Q12.

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

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

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  $^{15}\text{N}$

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**(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  $^{182}\text{W}$  and  $^{186}\text{W}$

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

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(1)

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

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(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*.

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(1)

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

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(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  $^{27}\text{Al}$ .

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(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**.

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(2)**(Total 5 marks)****Q19.**

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

- A**  $^{234}\text{U}$
- B**  $^6\text{Li}$
- C**  $^3\text{He}$
- D**  $^2\text{H}$

**(Total 1 mark)**