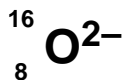
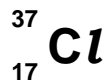


1 Look at the information about a chlorine atom and an oxide ion.



(a) Complete the table to show the number of protons, neutrons and electrons in each particle.

Two have been done for you.

| | Chlorine atom, Cl | Oxide ion, O ²⁻ |
|---------------------|-------------------|----------------------------|
| Number of protons | ..... | 8 |
| Number of neutrons | ..... | ..... |
| Number of electrons | 17 | ..... |

[3]

(b) Many scientists have helped in the development of the theory of atomic structure.

Two of these scientists were J. J. Thomson and Niels Bohr.

Describe what J. J. Thomson and Niels Bohr contributed to the theory of atomic structure.

J. J. Thomson

.....

Niels Bohr

..... [2]

2 This question is about atomic structure and bonding.

(a) Atoms are made up of protons, neutrons and electrons.

Complete the table.

| Particle | Relative charge | Relative mass |
|----------|-----------------|---------------|
| proton | +1 | 1 |
| neutron | 0 | ..... |
| electron | ..... | 0.0005 |

[2]

(b) Sodium chloride is an **ionic** compound.

Carbon dioxide is a **covalent** compound.

Look at the table.

| | Sodium chloride | Carbon dioxide |
|---------------------------|-----------------|-----------------|
| Formula | NaCl | CO ₂ |
| Type of particles present | ions | ..... |
| Melting point | ..... | low |

(i) Complete the table.

[2]

(ii) Carbon dioxide has a low melting point.

Explain why, using ideas about forces.

.....
..... [1]

[Total: 5]

4 Atoms contain electrons, neutrons and protons.

Look at the table. It shows the number of electrons, neutrons and protons in some atoms and ions.

| Atom or ion | Number of | | |
|-----------------------------|-----------|----------|---------|
| | electrons | neutrons | protons |
| ${}^1_1\text{H}$ | 1 | | |
| ${}^2_1\text{H}$ | 1 | | |
| ${}^{31}_{15}\text{P}$ | 15 | 16 | 15 |
| ..... | 15 | 17 | 15 |
| ${}^{32}_{16}\text{S}^{2-}$ | ..... | 16 | 16 |

(a) Complete the table. [2]

(b) ${}^1_1\text{H}$ and ${}^2_1\text{H}$ are **isotopes** of hydrogen.

What is meant by the term **isotope**?

.....
 [1]

(c) In 1808, a scientist named Dalton published his atomic theory.

About a century later, a scientist called Rutherford published another atomic theory.

Why is it important that scientists publish their theories?

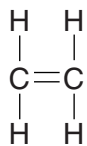
.....

 [2]

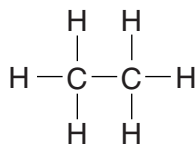
[Total: 5]

This question is about compounds containing carbon. Look

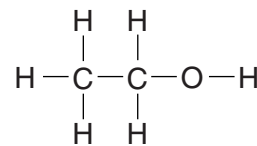
5 at the displayed formulas of some compounds.



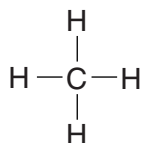
compound A



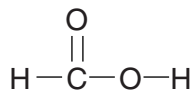
compound B



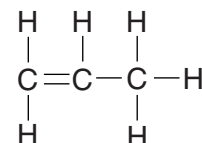
compound C



compound D



compound E



compound F

(a) What is the **molecular formula** for compound B?

.....

[1]

(b) Explain why compound B is a hydrocarbon but compound C is not a hydrocarbon.

.....
.....
.....

[3]

(c) Two compounds are **unsaturated**.

Which two?

..... and

[1]

[Total: 5]