

AS Level Chemistry A
H032/01 Breadth in chemistry

Question Set 18

1. This question is about atomic structure and the compounds of calcium, nitrogen and oxygen.

(a) Most elements contain different isotopes.

different number of neutrons
different atomic mass

State **two** differences between isotopes of the same element.

[1]

(b) Complete the table for an atom and an ion of two different elements.

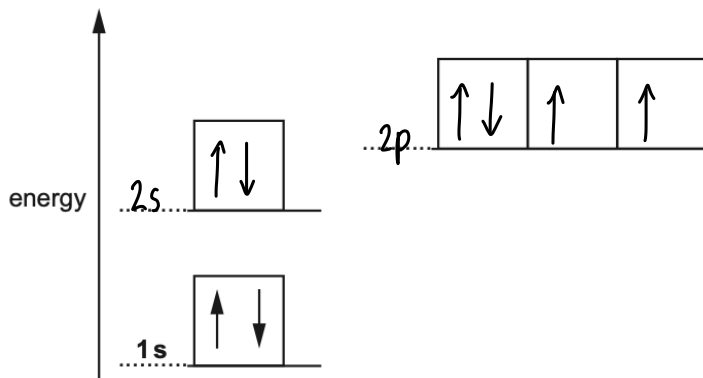
Element	Mass number	Protons	Neutrons	Electrons	Charge
Fe	54	26	28	26	0
Se	80	34	46	36	2-

[2]

(c) Electrons occupy orbitals which are arranged in energy levels.

In the diagram below, each box represents an orbital and each electron is shown as an arrow.

Label the sub-shells and add arrows to show how electrons occupy orbitals in an atom of oxygen.



[2]

(d) Calcium reacts with nitrogen to form calcium nitride, Ca_3N_2 , which is an ionic compound.

(i) Construct a 'dot-and-cross' diagram for Ca_3N_2 .

Show outer electrons only and the charges on each ion.

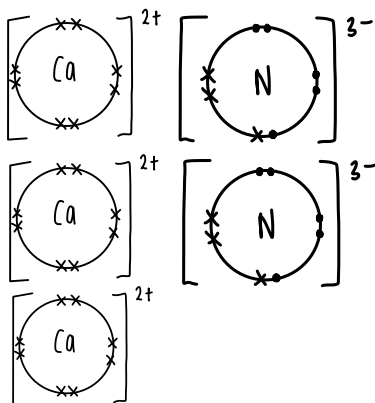
[2]

(ii) Calcium nitride reacts with water to form a solution containing two alkaline compounds.

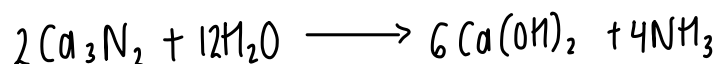
Write an equation for this reaction.

[2]

d)i)



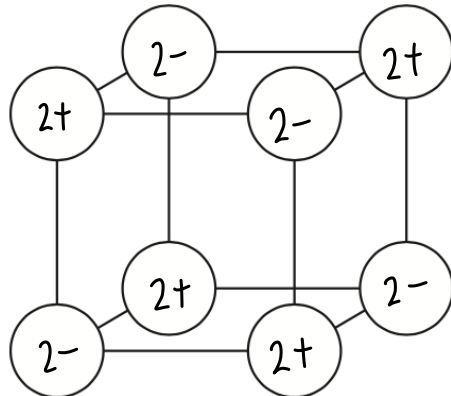
ii)



Ca^{2+} O^{2-}
 Calcium reacts with oxygen to form a compound which has a giant ionic lattice structure.

The diagram shows ions as circles in part of the lattice.

Complete the diagram by showing the symbols of the ions, including charges.

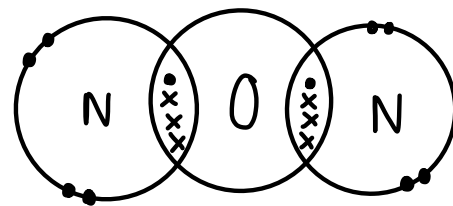


[2]

Nitrogen forms an oxide with the formula N_2O . A molecule of N_2O is linear and has a nitrogen atom in the centre.

Draw a 'dot-and-cross' diagram for an N_2O molecule.

Show outer electrons only.



[2]

Total Marks for Question Set 18: 13

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