

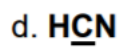
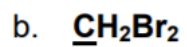
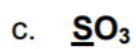
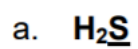
Level	Atomic Structure and Periodic Table	Ionic Bonding	Covalent Bonding	Properties of bonds
1-2 State Suggest Interpret	State the three subatomic particles State the location of different types of elements	State the characteristics of an ionic bond	State the characteristics of an covalent bond	State the characteristics of the ionic lattice State the characteristics of simple or giant molecular structures
3-4 Outline Solve familiar Interpret scientifically	Outline the number of subatomic particles in a given atom Outline the electron arrangement based on the period and group location of an atom	Interpret whether the bond between two given atoms will be ionic	Interpret whether the bond between two given atoms will be covalent	Outline the physical properties of ionic lattices and covalent structures
5-6 Describe Solve unfamiliar Analyse	Describe and sketch the complete structure of a given atom	Describe and sketch a given ionic bond Analyse the multiplicity of atoms in a bond given the identity of the atoms	Describe and sketch a given covalent bond Describe and sketch the Lewis structure of simple covalent compounds that have a small number of bonds and atoms	Describe how characteristics of ionic lattices/covalent structures give rise to their physical properties
7-8 Explain Solve unfamiliar Evaluate		Explain and sketch the Lewis structure of complex ionic compounds that have multiple bonds and atoms	Explain and sketch the Lewis structure of complex covalent compounds that have multiple bonds and atoms	Explain how characteristics of ionic lattices/covalent structures give rise to their physical properties

i) [Level 1-2] **State** the name given to a material made out of only one type of atom? _____

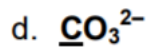
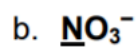
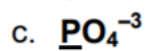
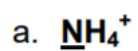
ii) [Level 1-2] **State** the name given to a material made out of two or more types of atom chemically bonded together? _____

1. Identify the type of bond described for each of the following as ionic, polar covalent, nonpolar covalent, or metallic. _____ i. The C–O bonds in CO₂. _____ iv. The C–C bonds in C₃H₈ _____
ii. The bonds in F₂. _____ v. The bonds in Ba. _____ iii. The bonds in K₂O. _____ vi. The bonds in H₂O.

2. Draw the Lewis dot structures for each of the following molecules:



3. Draw the Lewis dot structure for each of the following polyatomic ions:



3.

Table 9.1 shows information about the atomic structures of four particles **W**, **X**, **Y** and **Z**.

Table 9.1

	number of protons	number of neutrons	electrons in 1st shell	electrons in 2nd shell	electrons in 3rd shell
W	11	12	2	8	-
X	9	10	2	8	-
Y	12	12	2	8	2
Z	12	13	2	8	2

Explain which **two** particles from **W**, **X**, **Y** and **Z** in the table would attract one another very strongly.

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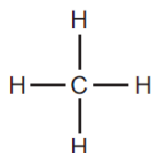
.....

..... [3]

- 6 Element Y is in the second Period of the Periodic Table. An atom of element Z has six more protons than an atom of element Y.

Which statement **must** be correct?

- A Elements Y and Z are in the same Period.
 - B Elements Y and Z have the same number of electrons in the first shell.
 - C Element Z has six more electrons in its outer shell than element Y.
 - D The nucleon number of element Z is six more than that of element Y.
- 7 The diagram shows the structure of methane.

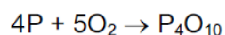


What is the total number of electrons used for bonding in this molecule?

- A 2 B 4 C 8 D 10

4. A

The element phosphorus burns in air, as shown.



What does the formula P_4O_{10} show?

- A a mixture of atoms of two elements
- B a mixture of molecules of two elements
- C a molecule of a compound
- D an atom of a compound

- 4 An element S has the proton number 18. The next element in the Periodic Table is an element T.

Which statement is correct?

- A Element T has one more electron in its outer shell than element S.
- B Element T has one more electron shell than element S.
- C Element T is in the same group of the Periodic Table as element S.
- D Element T is in the same period of the Periodic Table as element S.

- 5 Which numbers are added together to give the nucleon number of an ion?

- A number of electrons + number of neutrons
- B number of electrons + number of protons
- C number of electrons + number of protons + number of neutrons
- D number of protons + number of neutrons

5. What is the most likely physical state of a substance which has ionic bonds between its atoms?

Explain your answer in detail.

6. What is the most likely physical state of a substance which has covalent bonds between its atoms? Explain your answer in detail.

7.

1) Here is a list of elements:

bromine
nitrogen
fluorine
krypton
Sodium
Oxygen

ONLY use these elements in your answers to this question

1) a) [3-4] **State** which two elements are in the same group of the Periodic table

_____ and _____

1) b) [3-4] **State** two elements that are in the same period of the Periodic table

_____ and _____

1) c) [3-4] **State** the element in the list has the highest atomic number: _____

1) d) [1-2] **Recall** which two elements from the list make up most of the air

_____ and _____

1) e) [3-4] **State** one metal and one non-metal from the list that could form an ionic bond

_____ and _____

1) f) [5-6] Draw 'dot (•) and cross (x)' diagrams for the **atoms** in 1) e) before bonding then the **ions** after bonding (only show the outer shell electrons)

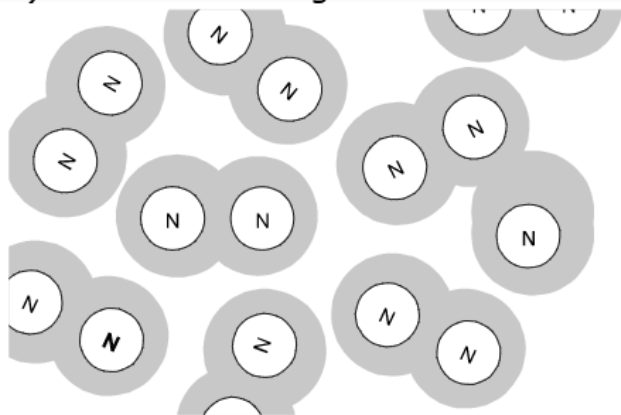
Atoms before bonding

Ions after bonding

8.

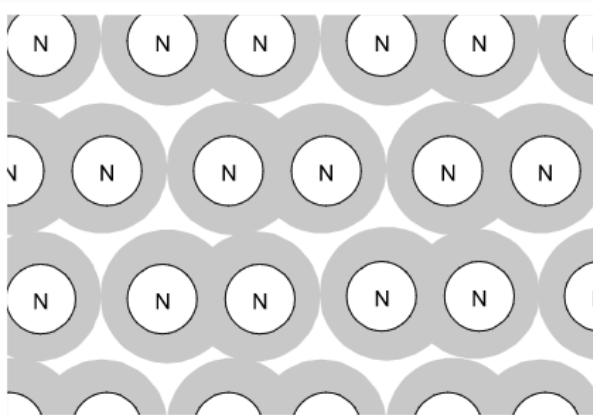
9. A

2) Look at these diagrams of an element.



before

→



after

a) [1-2] **Recall** the name of this element: _____

b) [3-4] **State** the formula of a molecule in these diagrams: _____

c) [5-6] **Outline** the change that the two diagrams show and state whether it is a chemical or a physical change.

d) Look this element up in the periodic table.

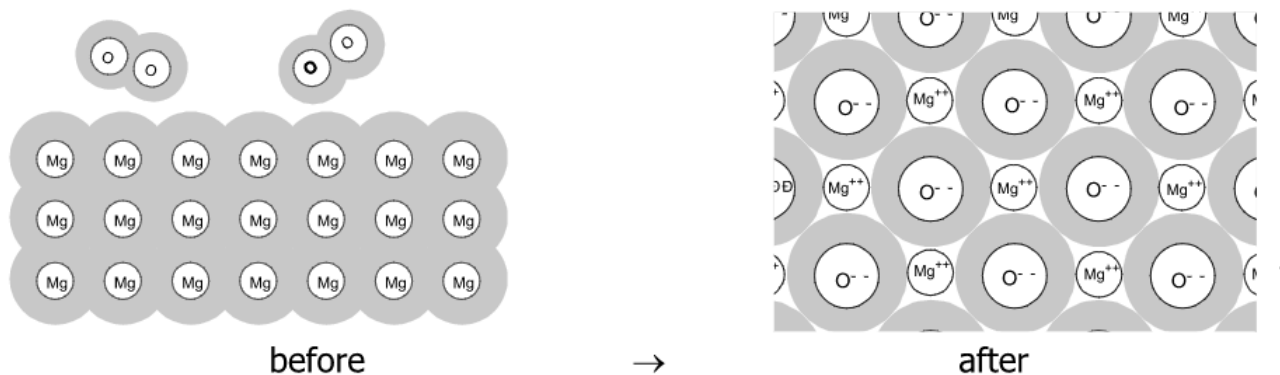
i) [3-4] **State** how many protons, electrons and neutrons one atoms contains.

ii) [5-6] Suggest (have a guess) how many protons, electrons and neutrons a different **isotope** of this element might contain.

iii) [7-8] **Describe** why the two particles (in i) and ii)) are isotopes of each other.

e) [5-6] **Outline** how we use one of the other isotopes (^{14}C , ^{235}U , ^{241}Am) you have studied.

3) Here are some more diagrams showing a **chemical change**.



a) [1-2] **Recall** the name of these two elements: _____

b) [5-6] **State** then **outline** whether the diagrams represent an element, mixture or compound:

'before' diagram – what it represents: _____

Why? _____

'after' diagram – what it represents: _____

Why? _____

c) [7-8] **Write** a word and symbol equation for the change taking place:

Word: _____ + _____ → _____

Symbol: _____ + _____ → _____

d) [5-6] **Outline** two observations you might make that are evidence that this is a chemical change:

1) _____

2) _____

e) [3-4] **State** the two types of bonding in the 'before' diagram:

_____ and _____

and the type of bonding in the 'after' diagram: _____

f) [7-8] **Suggest** one property you think the material in the 'after' diagram has due to its bonding, then **describe** why you think it has this property.

Property?: _____ Why does it do this?: _____
