

- 1. Explain, in terms of the number of outer shell electrons and electron transfer, how calcium atoms and chlorine atoms form ions. Give the formulae of the ions formed**
  - Ca has 2 and Cl has outer electrons 7
  - Ca (atoms) lose electrons
  - Cl (atoms) gain electrons
  - $\text{Ca}^{2+}$  (ions)
  - $\text{Cl}^-$  (ions)
- 2. What is an ionic bond?**
  - Strong electrostatic force of attraction
  - Between oppositely charged ions
- 3. Physical properties of ionic compounds**
  - physical constants: high boiling point / melting point
  - conductivity: conduct (electricity) when aqueous or conduct (electricity) when molten
  - solubility: soluble in water
- 4. Atom against which the relative masses of all other atoms are compared**  
 $^{12}\text{C}$
- 5. Describe the bonding in metals**
  - Lattice of positive ions (cations)
  - Surrounded by a sea of delocalised electrons
  - Held together by strong electrostatic forces of attraction between the positive ions and the negative electrons
- 6. Define element**
  - Substance made of atoms with the same atomic number / proton number OR
  - A substance that cannot be split up / broken down into two or more simple(r) substances by chemical means
- 7. What type of structure does solid lead(II) fluoride have?**  
Giant ionic lattice
- 8. Explain, in terms of attractive forces between particles, why lead(II) fluoride has a much higher melting point than tetrafluoromethane.**
  - lead(II) fluoride forces of attraction between ions / ionic bonds
  - tetrafluoromethane forces of attraction between molecules
  - ionic bonds stronger than attractive forces between molecules / ionic bonds need more energy to break than attractive forces between molecules

**9. Define proton number**

- Number of protons
- In the nucleus of an atom

**10. Explain why the chemical properties of 2 isotopes are the same.**

- same number of electrons
- same electronic configuration // same number of electrons in the outer shell

**11. Why ionic compounds have high m.p**

- Strong electrostatic forces of attraction between oppositely charged ions // between positively charged ions and negatively charged ions
- Large amount of energy required to break/weaken the ionic bonds

**12. Why covalent compounds have low m.p**

- Weak van der waal's forces between oppositely charged ions
- Small amount of energy required to break/weaken the covalent bonds

**13. Name the type of bonding in silicon(IV) oxide**

Covalent

**14. Physical properties of silicon(IV) oxide**

- high melting / boiling point
- poor conductor of electricity
- hard
- insoluble

**15. Why argon is unreactive**

It has a complete / full outer shell / 8 electrons in outer shell

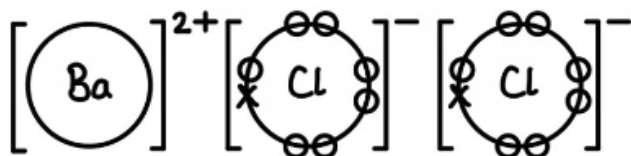
**16.**

Barium chloride is an ionic compound. Draw a diagram that shows the formula of the compound, the charges on the ions and gives the arrangement of the valency electrons around the negative ion.

The electron distribution of a barium atom is 2.8.18.18.8.2

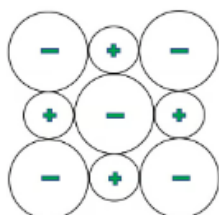
Use x to represent an electron from a barium atom.

Use o to represent an electron from a chlorine atom.



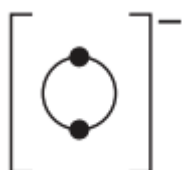
17.

Describe, by means of a simple diagram, the lattice structure of an ionic compound, such as caesium chloride.



- Alternating (positive and negative) ions; [1 mark]
  - (Regular) pattern; [1 mark]
- Ignore the size of the ions*

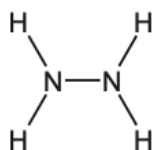
18. Chemical formula of this ion



H<sup>-</sup>

19.

The molecular structure of hydrazine, N<sub>2</sub>H<sub>4</sub>, is shown.



Which description of the bonding in hydrazine is **not** correct?

- A** Each nitrogen atom has a non-bonding pair of electrons.
- B** Each nitrogen atom has four bonding pairs of electrons.
- C** Each nitrogen atom shares one of its electrons with a nitrogen atom.
- D** Each nitrogen atom shares two of its electrons with hydrogen atoms.

Answer: B

20.

Which statement explains why methane has a lower boiling point than water?

- A Methane has weaker covalent bonds than water.
- B Methane has weaker attractive forces than water.
- C Methane molecules are heavier than water molecules.
- D Methane molecules have more bonds than water molecules.

Answer: B

NOTE: attractive forces between molecules dictate the m.p and b.p. Covalent bonds exist between the atoms, NOT between the molecules.

21. Ways in which isotopes are same and different from each other

Same

- Same number of protons
- Same number of electrons

Different

- Different number of neutrons

22. Why sodium ion has a charge of 1+

Because it has one more proton than electrons

23. State the number of covalent bonds each carbon atom has in diamond

4

24. Describe the arrangement of atoms in graphite

- In layers
- Hexagonal rings of carbon

25. Explain, in terms of structure and bonding, why potassium chloride has a much higher melting point than chlorine. Your answer should refer to the:

- types of particle held together by the forces of attraction
- types of forces of attraction between particles
- relative strength of the forces of attraction.

- ionic bonds in KCl
- attraction between molecules in Cl<sub>2</sub>
- weaker attraction (between particles) in Cl<sub>2</sub>

26. Name the type of bonding in group I elements

Metallic

**27. State the general term for the weak forces that cause carbon dioxide to have a low melting point**

Intermolecular forces

**28. Explain in terms of structure and bonding, why silicon (IV) oxide has a high melting point**

- Giant covalent structure
- covalent bonds
- Strong bonds

**29. When solid magnesium fluoride is dissolved in water it forms a solution that conducts electricity. State one other change that can be made to solid magnesium fluoride to allow it to conduct electricity.**

Melting