

# Chemistry

## Practice Questions



# Instructions

## Individual, exam-style questions

The questions contained in this booklet match the style of questions that are typically asked in exams. This booklet is not however, a practice exam. Elevate's research with top students identified that top students do more practice questions than anyone else. They begin the process of testing their knowledge early in the year.

Therefore, we have provided exam-format questions that are sorted by topic so that you can answer them as you learn the information, rather than waiting until the very end of the year to complete exams.

## Comments, questions?

Let us know if you need any further advice by visiting [www.elevateeducation.com](http://www.elevateeducation.com). You can comment on any of our material, or head to the FAQ section and ask us a question. Also, you can find us on social media so you can stay up to date on any brand new tips we release throughout the year.

## Other information

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## Trends & Patterns in the Periodic Table

1. ) Sodium chloride has the chemical formula NaCl. Which of the following compounds will have similar properties to NaCl?

- a) Aluminum oxide (AlO<sub>3</sub>)
- b) Ethane (C<sub>2</sub>H<sub>6</sub>)
- c) Potassium Iodide (KI)
- d) Carbon Dioxide (CO<sub>2</sub>)

(2 marks)

2. What group are the “noble gases” located in?

(1 mark)

3. Explain why the “noble gases” have a very low reactivity? (

(1 mark)

4. Explain the following terms:

- a) Electronegativity
- b) Core charge
- c) Ionisation energy

(1+2+1 = 4 marks)

5. Consider the elements in Period 3 of the periodic table. Describe the changes that occur as you move across period in terms of:

- a) The size of the atoms
- b) Metallic character
- c) Electronegativity

(2+2+2 = 6 marks)

# Atomic Theory

1. Define the following terms:

- a) Atomic Number
- b) Mass number
- c) Isotopes

(1+1+1 = 3 marks)

2. Use the table below to identify a pair of isotopes:

Element	Number of protons	Number of electrons	Number of neutrons
A	22	23	23
B	17	18	17
C	17	19	17
D	22	21	21

(2 marks)

3. Why is the number of electrons equal to the number of protons in an atom?

(2 marks)

# Lewis Structures

1. For the species listed in the table below, draw the correct Lewis structure (electron dot) diagrams. All valence shell electron pairs should be represented either as : or as -

Species	Lewis structure (electron dot) diagram
H <sub>2</sub> O	
CO <sub>2</sub>	
CCl <sub>4</sub>	

(2+2+2 = 6 marks)

# Properties & bonding of metals

1. Give 2 unique properties of metals.

(2 marks)

2. Explain what is meant by the following terms?

a) Delocalised electrons

b) A lattice of cations

c) Metallic bonding

(1+1+1 = 3 marks)

3. Which electrons are delocalised in a metal?

(1 mark)

4. The properties of sodium mean it is classed as a metal. Describe the forces that hold the lattice together.

(2 marks)

5. Why are metals good conductors of electricity?

(2 marks)

6. Why do metals have high melting points?

(2 marks)

# Ionic Compounds

1. Complete the table below by writing the formula of each of the substance listed:

Name	Formula
Copper (II) sulfate	
Nitric acid	
Calcium hydroxide	
Calcium carbonate	

(1+1+1+1 = 4 marks)

2. Complete the table below by writing the name of each of the substance listed:

Formula	Name
Mg(OH) <sub>2</sub>	
C <sub>2</sub> H <sub>6</sub>	
Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	
AgCl	

(1+1+1+1 = 4 marks)

3. Give 2 properties of ionic compounds

(2 marks)

4. Why can ionic compounds conduct electricity in a molten or liquid state, but not in a solid state?

(2 marks)

# Organic Chemistry: Alkanes / Alkenes

1. Name the first 6 alkanes and alkenes.

(6+6 = 12 marks)

2. Explain why the boiling points of alkanes increase as molecular size increases.

(2 marks)

3. Why are alkenes (e.g. ethene) described as unsaturated and alkanes (e.g. ethane) described as saturated?

(2 marks)

4. Draw the structural formulas (showing all bonds) for the following compounds:

- a) Propene
- b) But-2-ene
- c) 2,2-dimethylpropane

(1+1+1 = 3 marks)

5. Give the balanced equation for the combustion of the following organic compounds:

- (a) Ethane
- (b) Hexane
- (c) Propene

(2+2+2 = 6 marks)



# Water: Unique Properties & Solution

## Behaviours

1. Water is considered to be a unique liquid.
  - a) Give 2 physical properties that make water unique.
  - b) What role does polarity and hydrogen bonding play in regards to these properties?

(2+2 = 4 marks)
2. Explain the meaning of the following terms:
  - a) Intramolecular bonding
  - b) Intermolecular bonding

(1+1 = 2 marks)
3. What are the intramolecular bonds and intermolecular bonds of water?

(2 marks)
4. Describe forces that must be broken for ice to melt.

(1 marks)
5. If glass bottles of drink containing predominantly water are left in a freezer for several hours, it can crack. Why does this occur? (Hint: What happens to water when it freezes?)

(1 mark)
6. Why is water a good solvent for polar and ionic compounds?

(2 marks)
7. Give ionic equations when the following substances are dissolved in water:
  - a) Sodium phosphate ( $\text{Na}_3\text{PO}_4$ )
  - b) Potassium hydroxide (KOH)
  - c) Copper (II) Sulfate ( $\text{CuSO}_4$ )

(2+2+2 = 6 marks)

# Mole Concept

1. Calculate the % mass of Ca in  $\text{Ca}(\text{OH})_2$

(2 marks)

2. Calculate the mole of the following:

- a) 0.204 g of  $\text{AgCl}$  (s)
- b) 0.578 g of  $\text{Fe}$  (s)

(2+2 = 4 marks)

3. Determine the empirical formula of a compound that contains 1.7g iron, 1.48 g sulfur and 3.02 g of oxygen.

(4 marks)

4. Solutions of barium nitrate and sodium sulfate react to produce 0.821g of precipitate, barium sulfate.

- a) Write the full equation for the reaction.
- b) Determine the mole of barium sulfate.
- c) Determine the mole of sodium sulfate.
- d) Determine the mass of sodium sulfate.

(2+1+1+1 = 5 marks)