CH12 [1.5] - Ionic Compounds - Test

Saturday 11 January 2025 2:17 PM

CH12 [1.5] - Ionic...

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Website: contoureducation.com.au | Phone: 1800 888 300
Email: hello@contoureducation.com.au

VCE Chemistry ½
Ionic Compoundy (1.5)
Test

20 Marks. 1 Minute Reading. 16 Minutes Writing

Results:

Test Questions	_____ / 15
Extension	_____ / 5

Section A: Test Questions (15 Marks)

Question 1 (4 marks)

Tick whether the following statements are **true** or **false**.

	Statements	True	False
a.	The overall charge of an ionic compound is 0.	✓	
b.	Typically, in ionic bonding, a metal donates one or more electrons which are received by a non-metal.	✓	
c.	Electrostatic attraction occurs when a positively charged ion (metal) ion is near a negatively charged metal ion.		✓
d.	When writing the formula for ionic compounds, we write the symbol of the anion first and the cation second.		✓
e.	The bond holding together sodium chloride is ionic.	✓	
f.	The transfer of electrons is what defines an ionic bond.		✓
g.	Ionic compounds are ductile due to the strong electrostatic attraction present within the lattice.		✓
h.	The dichromate ion has a 2- charge whereas the chromate ion has a 1- charge.		✓

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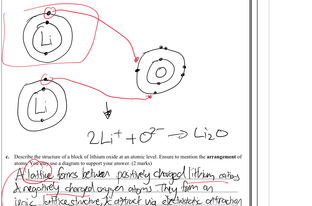
Question 2 (8 marks)

James is considering the ionic compound named lithium oxide. With a small sample to test, he runs it through several different experiments.

a. Write the formula for lithium oxide. (1 mark)

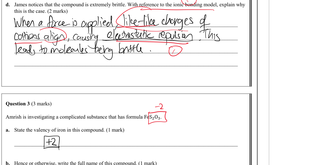
Li_2O

b. Draw an electron transfer diagram for the formation of lithium oxide from lithium and oxygen. (3 marks)



c. Describe the structure of a block of lithium oxide at an atomic level. Ensure to mention the **arrangement** of atoms. You may use a diagram to support your answer. (2 marks)

Alattice forms between positively charged lithium cations & negatively charged oxygen anions. They form an ionic lattice structure & attract via electrostatic attraction



d. James notices that the compound is extremely brittle. With reference to the ionic bonding model, explain why this is the case. (2 marks)

When a force is applied, like-like charges of cations align, causing electrostatic repulsion. This leads to molecules being broken.

Question 3 (3 marks)

Amrish is investigating a complicated substance that has formula Fe_2O_3.

a. State the valency of iron in this compound. (1 mark)

+2

b. Hence or otherwise, write the full name of this compound. (1 mark)

Iron (III) trioxide

c. Amrish suggests that one of the ions in his compound is polyatomic. Suggest whether he is correct or not, with appropriate justification. (1 mark)

Yes, SO_4^{2-} is polyatomic as it is made up of multiple (many) atoms

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Section B: Extension (5 Marks)

Question 4 (5 marks)

After a long day at work, Harry takes to the lab and works on melting NaCl. After it has reached a molten state, Harry runs an electrical current through the molten NaCl. As he watches the molten cool, he notices the conductivity decreases.

a. Explain Harry's observations with reference to ionic bonding. (3 marks)

As NaCl cools, it solidifies & thus there are no longer any free moving charges as cations & anions are fixed in lattice structure

However, in molten state, these attractions are disrupted, allowing cations/anions to flow, allowing for movement of charges.

Describes why molten conducts electricity

NaCl has a melting point of roughly 800°C, whereas pure sodium metal has a melting point of 98°C.

b. Suggest why the melting point of NaCl is significantly higher than that of pure Na. (2 marks)

Ionic compounds have great electrostatic attraction between cations/anions, which is a stronger attraction than electrostatic attraction between cations & electrons. This results in greater thermal energy required to overcome bonds

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