

AS level Chemistry A

H032/02 Depth in chemistry

Question Set 1

1. Barium combines with oxygen, chlorine and nitrogen to form ionic compounds.
- (a) Barium oxide, BaO, has a giant ionic lattice structure.
- (i) State what is meant by the term *ionic bond*. [1]
- (ii) Draw a '*dot-and-cross*' diagram to show the bonding in barium oxide. [2]
Show outer electrons only.
- (iii) Calculate the number of barium ions in 1.50 g of barium oxide. [2]
Give your answer in standard form and to **three** significant figures.
- (b) Barium chloride, BaCl₂, is soluble in water.
- (i) Compare the electrical conductivities of solid and aqueous barium chloride. [2]
Explain your answer in terms of the particles involved.
- (ii) Describe the use of aqueous barium chloride in qualitative analysis. [2]
- (iii) Hydrated barium chloride can be crystallised from solution. [2]
Hydrated barium chloride has the formula BaCl₂•xH₂O and a molar mass of 244.3 g mol⁻¹.
Determine the value of x in the formula of BaCl₂•xH₂O.
Show your working.
- (c) Barium nitride is formed when barium is heated with nitrogen. [2]
- (i) Complete the electron configuration of a nitride ion. [1]
1s²
- (ii) Solid barium nitride is reacted with water, forming an alkaline solution **A** and an alkaline gas **B**.
Identify **A** and **B**.
Write an equation, including state symbols, for the reaction. [4]

Total Marks for Question Set 1: 16

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