

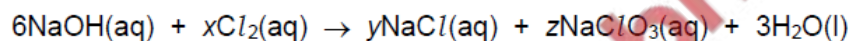
1. Nov/2022/Paper_11/No.21

Which statement about Group 17 elements and compounds is correct?

- A** Sodium chloride produces chlorine when reacted with concentrated sulfuric acid.
- B** Sodium chloride produces chlorine when reacted with bromine.
- C** Sodium bromide produces bromine when reacted with concentrated sulfuric acid.
- D** Sodium bromide produces bromine when reacted with iodine in aqueous potassium iodide.

2. Nov/2022/Paper_11/No.22

Chlorine is bubbled through 100 cm³ of hot 4.0 mol dm⁻³ sodium hydroxide until the reaction is complete.

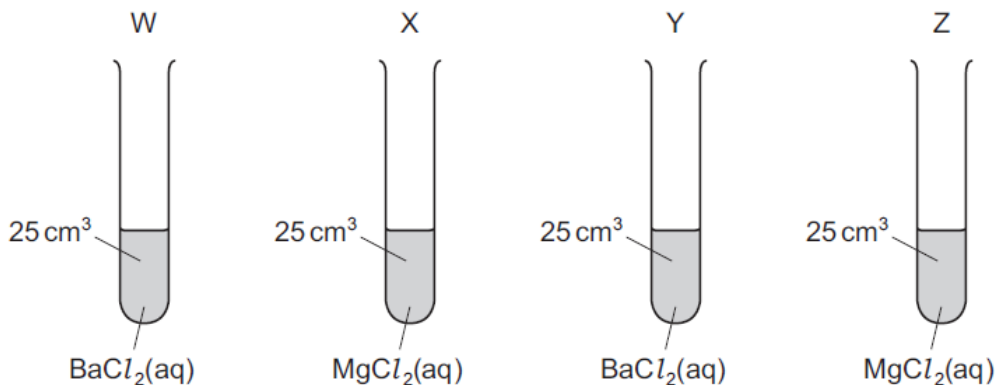


Which row is correct?

	x	$[\text{Na}^+](\text{aq})$ after reaction / mol dm ⁻³
A	3	4.0
B	3	less than 4.0
C	6	4.0
D	6	less than 4.0

3. Nov/2022/Paper_12/No.20

In the diagram, each test-tube W, X, Y and Z contains 25 cm³ of a 0.1 mol dm⁻³ solution of a salt.



To test-tubes W and X, 25 cm³ of 0.1 mol dm⁻³ NaOH(aq) is added.

To test-tubes Y and Z, 25 cm³ of 0.1 mol dm⁻³ H₂SO₄(aq) is added.

In which of test-tubes W and X does the liquid have the higher pH and which of test-tubes Y and Z has the greater mass of precipitate?

	higher pH	greater mass of precipitate
A	W	Y
B	W	Z
C	X	Y
D	X	Z

4. Nov/2022/Paper_12/No.21

What is the oxidation state of the chlorine-containing species that kills bacteria in drinking water?

- A** -1 **B** +1 **C** +3 **D** +5

5. Nov/2022/Paper_12/No.22

Compound Q is a white crystalline solid which dissolves easily in water.

When concentrated sulfuric acid is added to a dry sample of Q, steamy white fumes are formed.

When these white fumes are passed into aqueous silver nitrate solution, a white precipitate forms.

This precipitate is soluble in dilute ammonia solution.

What is compound Q?

- A** AgCl **B** NaBr **C** NaCl **D** PbBr₂

(e) (i) An excess of $Cl^{-}(aq)$ is added to 1 cm^3 of $Br_2(aq)$.

Describe what is observed. Explain your answer.

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(ii) SCl_2 has $M_r = 103.1$ and is a liquid at room temperature. SBr_2 has $M_r = 191.9$ and is a gas at room temperature.

Explain the difference in the physical state of SCl_2 and SBr_2 . Give your answer in terms of intermolecular forces.

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(f) Bismuth is a dense metal in the same group as phosphorus.

(i) Draw a labelled diagram to show the bonding in bismuth metal.



[2]

(ii) Bismuth reacts with chlorine to form $BiCl_3$.
 $BiCl_3$ is a solid at room temperature. It melts when heated gently.
 $BiCl_3$ reacts vigorously with water at room temperature to form an acidic solution.

Suggest the type of bonding and structure shown by $BiCl_3$. Explain your answer.

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