

Past-paper walk-through

Brønsted–Lowry theory of acids and bases ■ 7.2

eXercise

Questions in this set

- 9701/11 N25 Q13 ■ 1 mark
- 9701/11 N25 Q14 ■ 1 mark

Question 13

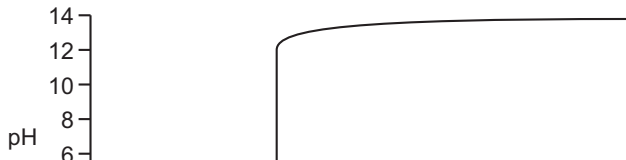
9701/11 N25 ■ Q13 ■ 1 mark

13 Aqueous acid P and aqueous alkali Q have the same concentration.

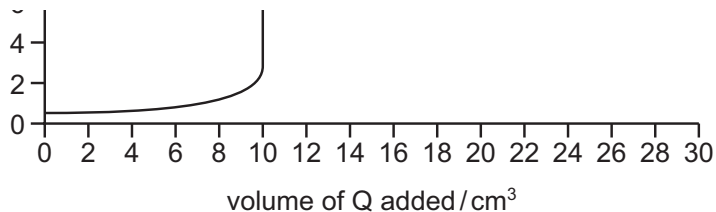
20 cm³ of P is added to a conical flask.

Q is slowly added to the flask and the volume of Q and the pH are recorded.

The pH titration curve is shown.



Question 13



Which row gives the identity of P and Q?

	P	Q
A	HCl	NaOH
B	H ₂ SO ₄	NH ₃

Question 13

C	HCl	Ba(OH)_2
D	CH_3COOH	Sr(OH)_2

Solution 13

Answer: **C**

Why

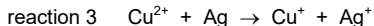
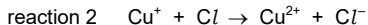
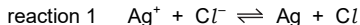
- The concentrations are equal, yet the end point comes at half the acid's volume – so each alkali unit must supply two OH^- .
- That points to $\text{Ba}(\text{OH})_2$ rather than NaOH or NH_3 .
- The curve starts at a very low pH and finishes at a very high one, so both are strong: HCl with $\text{Ba}(\text{OH})_2$.

Question 14

9701/11 N25 ■ Q14 ■ 1 mark

- 14** Photochromic glass, used for sunglasses, darkens when exposed to bright light and becomes more transparent again when the light is less bright. The darkness of the glass is due to the presence of silver atoms.

The following reactions are involved.



Which statement about these reactions is correct?

- A** Cu^+ and Cu^{2+} ions act as catalysts.
- B** Cu^+ ions act as an oxidising agent in reaction 2.

Question 14

- C** Reaction 3 increases the darkness of the glass.
- D** Silver atoms are reduced in reaction 3.

Solution 14

Answer: **A**

Why

- Reaction 1 makes silver atoms in bright light, and that is what darkens the glass.
- Reactions 2 and 3 together regenerate Cu^+ : it is used in one and remade in the other.
- A species consumed and then remade is a catalyst, so the copper ions catalyse the fading.