
HL Paper 1

A buffer solution is formed by mixing equal volumes of 1.00 mol dm^{-3} propanoic acid and $0.500 \text{ mol dm}^{-3}$ potassium propanoate.

What is the concentration, in mol dm^{-3} , of $[\text{H}^+(\text{aq})]$ in this buffer solution? (K_{a} for propanoic acid is 1.30×10^{-5} .)

- A. 2.60×10^{-5}
 - B. 1.95×10^{-5}
 - C. 1.30×10^{-5}
 - D. 0.650×10^{-5}
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The $\text{p}K_{\text{a}}$ of ethanoic acid is 4.8 at 298 K. Which combination will produce a buffer solution with a pH of 4.8 at 298 K?

- A. 20.0 cm^3 of 1.0 mol dm^{-3} CH_3COOH and 10.0 cm^3 of 1.0 mol dm^{-3} NaOH
 - B. 20.0 cm^3 of 1.0 mol dm^{-3} CH_3COOH and 20.0 cm^3 of 1.0 mol dm^{-3} NaOH
 - C. 10.0 cm^3 of 1.0 mol dm^{-3} CH_3COOH and 20.0 cm^3 of 1.0 mol dm^{-3} NaOH
 - D. 14.8 cm^3 of 1.0 mol dm^{-3} CH_3COOH and 10.0 cm^3 of 1.0 mol dm^{-3} NaOH
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Which mixture will form a buffer in aqueous solution?

- A. $0.10 \text{ mol NH}_3 + 0.20 \text{ mol HCl}$
 - B. $0.10 \text{ mol NH}_3 + 0.20 \text{ mol NaOH}$
 - C. $0.10 \text{ mol NaOH} + 0.20 \text{ mol KCl}$
 - D. $0.20 \text{ mol NH}_3 + 0.10 \text{ mol HCl}$
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Which mixtures act as buffer solutions?

- I. 100 cm^3 0.1 mol dm^{-3} ethanoic acid and 100 cm^3 0.1 mol dm^{-3} sodium ethanoate
 - II. 100 cm^3 0.1 mol dm^{-3} ethanoic acid and 50 cm^3 0.1 mol dm^{-3} sodium hydroxide
 - III. 100 cm^3 0.1 mol dm^{-3} ethanoic acid and 100 cm^3 0.5 mol dm^{-3} sodium hydroxide
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

