1 Which of the following mixtures would form the best buffer solution with pH 9 for use in a school laboratory?

☒ **A** Ethanoic acid and sodium ethanoate

☒ **B** Sodium chloride and sodium hydroxide

☒ **C** Hydrocyanic acid and sodium cyanide

☒ **D** Ammonium chloride and ammonia

(Total for Question = 1 mark)

2 Which of the following mixtures would form the best buffer solution with pH 5 for use in a school laboratory?

☒ **A** Ethanoic acid and sodium ethanoate

☒ **B** Hydrochloric acid and sodium chloride

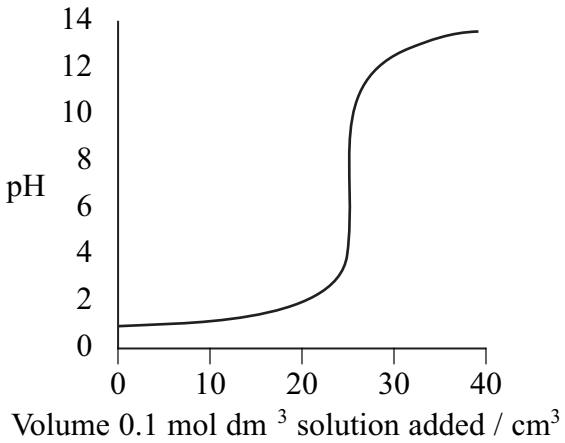
☒ **C** Sodium hydroxide and sodium methanoate

☒ **D** Ammonium chloride and ammonia

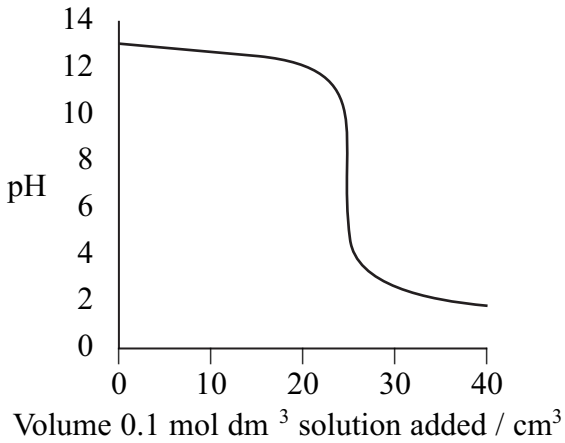
(Total for Question = 1 mark)

3 The titration curves below were obtained using different acids and bases, each with concentration 0.1 mol dm ^{3}.

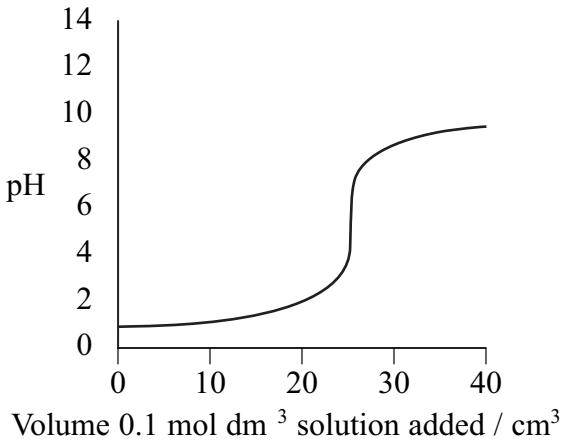
A



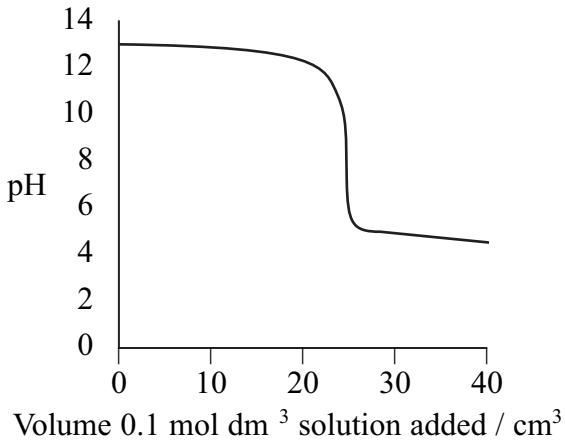
B



C



D



(a) Which curve is produced by adding ammonia to 25 cm^3 of hydrochloric acid?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(b) Which curve is produced by adding ethanoic acid to 25 cm^3 of sodium hydroxide?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(c) An indicator with pK_{In} 8.5 is suitable for the following titrations.

(1)

☒ **A** Titrations **A** and **B** only.

☒ **B** Titrations **A**, **B** and **D** only.

☒ **C** Titration **C** only.

☒ **D** Titrations **A**, **B**, **C** and **D**.

(Total for Question 3 marks)

4 Which of the following solutions, when mixed, would make a buffer with pH more than 7?

☒ **A** Methanoic acid and sodium methanoate.

☒ **B** Sodium hydroxide and sodium chloride.

☒ **C** Ammonia and ammonium chloride.

☒ **D** Ammonium chloride and ammonium ethanoate.

(Total for Question = 1 mark)

5 What is the approximate pH of a buffer solution containing 0.20 mol of a weak acid, HA, (pK_a = 4.8) and 0.20 mol of the sodium salt of the acid, NaA, in a total volume of 1 dm^3 of solution?

☒ **A** 7.0

☒ **B** 5.8

☒ **C** 4.8

☒ **D** 3.8

(Total for Question = 1 mark)

6 When equimolar amounts of the solutions below are mixed, which forms a buffer solution with a pH less than 7?

☒ **A** Hydrochloric acid and sodium chloride

☒ **B** Ethanoic acid and sodium ethanoate

☒ **C** Sodium hydroxide and sodium chloride

☒ **D** Ammonia and ammonium chloride

(Total for Question 1 mark)

7 A buffer solution is made from ammonia and ammonium chloride. When a small amount of acid is added to this buffer

☒ **A** hydrogen ions in the acid combine with chloride ions to make HCl.

☒ **B** hydrogen ions in the acid combine with NH_3 to make NH_4^+.

☒ **C** NH_4^+ ions dissociate to make more NH_3.

☒ **D** the hydrogen ions in the acid prevent dissociation of the NH_4Cl.

(Total for Question 1 mark)