Practice Question Set For A-Level
**Subject : Chemistry**
**Paper-1 Topic: Physical 1_Acids And Bases**

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**Name of the Student**:_____
**Max. Marks : 20 Marks** **Time : 20 Minutes**

Q1.

This question is about weak acids.

(a) The table below shows the pH ranges of some indicators.

| **Indicator** | **pH range** |
|---|---|
| Bromocresol green | 3.8 – 5.4 |
| Bromothymol blue | 6.0 – 7.6 |
| Thymol blue | 8.0 – 9.6 |

Identify the indicator that is most suitable for use in a titration between propanoic acid and sodium hydroxide.

_____

**(1)**

(b) Give the expression for the acid dissociation constant (*K*a) for propanoic acid ($CH3CH_2COOH$).

*K*a

**(1)**

(c) Calculate the pH of a 0.100 mol $dm^{-3}$ propanoic acid solution.
Give your answer to 2 decimal places.

For propanoic acid, $pK_a = 4.87$

pH _____

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**(4)**

(d) For butanoic acid, $K_a = 1.51 \times 10^{-5}$ mol dm$^{-3}$

20.0 cm$^3$ of 0.100 mol dm$^{-3}$ sodium hydroxide solution are added to 25.0 cm$^3$ of 0.100 mol dm$^{-3}$ butanoic acid solution.

Calculate the pH of the solution formed.

pH _____

**(5)**

(e) A student plans to titrate butanoic acid solution with a solution of ethylamine.

Explain why this titration could **not** be done using an indicator.

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**(2)**

**(Total 13 marks)**

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Q2.

Calcium hydroxide is almost insoluble in water, but it reacts with dilute hydrochloric acid.

$$Ca(OH)_2(s) + 2\ HCl(aq) \rightarrow CaCl_2(aq) + 2\ H_2O(l)$$

A student adds 100 $cm^3$ of 0.100 mol $dm^{-3}$ hydrochloric acid to 0.600 g of solid calcium hydroxide.

(a) Show, by calculation, that the calcium hydroxide is in excess.

**(2)**

(b) The final mixture contains a saturated solution of $Ca(OH)_2$ at 293 K

At 293 K

- the solubility of $Ca(OH)_2$ in this solution is 0.400 g $dm^{-3}$
- $K_w = 6.80 \times 10^{-15}$ $mol^2$ $dm^{-6}$

Calculate the pH of this solution.
Give your answer to two decimal places.

pH _____

**(5)**

**(Total 7 marks)**

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