

# OCR (B) Chemistry A-Level

## PAG 11: pH measurement



## 11.1 pH problem solving

### Equipment

- Boiling tubes (7)
- Universal Indicator paper
- Red litmus paper
- Digital pH probe
- Titration equipment
- Data logger.
- $0.4 \text{ mol dm}^{-3}$  NaOH
- $0.4 \text{ mol dm}^{-3}$  HCl

### Method

Using the equipment above, the task is to distinguish between the following chemicals. All of them are at a concentration of  $0.1 \text{ mol dm}^{-3}$  and labelled A-G in no particular order:

- Ammonia
  - Ethanoic acid
  - Ethanoate buffer
  - Hydrochloric acid
  - Methanoic acid
  - Sodium hydroxide
  - Sulfuric acid
1. Add  $5 \text{ cm}^3$  of each solution to a different boiling tube.
  2. Use universal indicator paper to test the pH.
  3. Record the pH of each solution using the appropriate colour scale.
  4. Test the pH using the pH probe.
  5. Using the obtained pH values sort the solutions into acids and bases.
  6. Test the bases with red litmus paper.
  7. Using a data logger connected to the pH probe, obtain titration curves by adding the NaOH to each acid and HCl to each base. This will help to identify the weak acids and weak bases. The solution that shows the least change in pH for adding the NaOH/HCl would be the ethanoate buffer.

### Errors

- Some acid/base could remain on the pH probe between measurements, contaminating the solutions.  
Clean the pH probe with distilled water between uses.

### Risk Assessment

None of these chemicals are particularly corrosive at this concentration however eye protection must be worn and the room should be well ventilated.

