Basicity

1 Definition

- max. no. of ionizible hydrogen atoms in an acid molecule

HCl

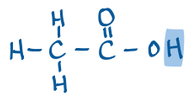
$HCl \rightarrow H^+ + Cl^-$

H – Cl

↳ monobasic

CH_3COOH

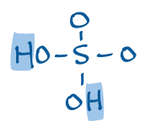
$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$



↳ monobasic

H_2SO_4

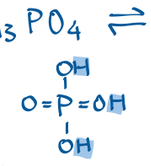
$H_2SO_4 \rightarrow 2H^+ + SO_4^{2-}$



↳ dibasic

H_3PO_4

$H_3PO_4 \rightleftharpoons 3H^+ + PO_4^{3-}$



↳ tribasic

2 Question types

WHICH IS MORE ACIDIC?

- 0.1M CH_3COOH / 0.1M HCl → fair test ← conc./dilute 一样；basicity 一样；strong/weak 不一样
- 0.1M H_2CO_3 / 0.1M HCl → 理论上不可能知道 (x fair test) ← conc./dilute 一样；basicity 不一样；strong/weak 不一样 → 可是实际上 strength 影响更大 ← 在 weak acid 里，只有几% 的 ionizable H atom 会 ionize

MOLE RATIO OF ACID-BASE REACTIONS

知识点：

- 从 acid 的 basicity 和 base anion 的 charge 判断 mole ratio
- 把两个数字调转，再约简

→ HCl + NaOH, basicity = 1, anion charge = -1 → 1 : 1
→ H_2SO_4 + NaOH, basicity = 2, anion charge = -1 → 1 : 2
→ H_3PO_4 + Na_2CO_3, basicity = 3, anion charge = -2 → 2 : 3

2g dibasic acid requires $30cm^3$ of 2.15M NaOH for complete neutralisation.
Find its molar mass.

acid mole : NaOH mole = 1 : 2

$n = \frac{2.15 \times 0.03}{}$ = 1 : 2

mole = molarity x volume

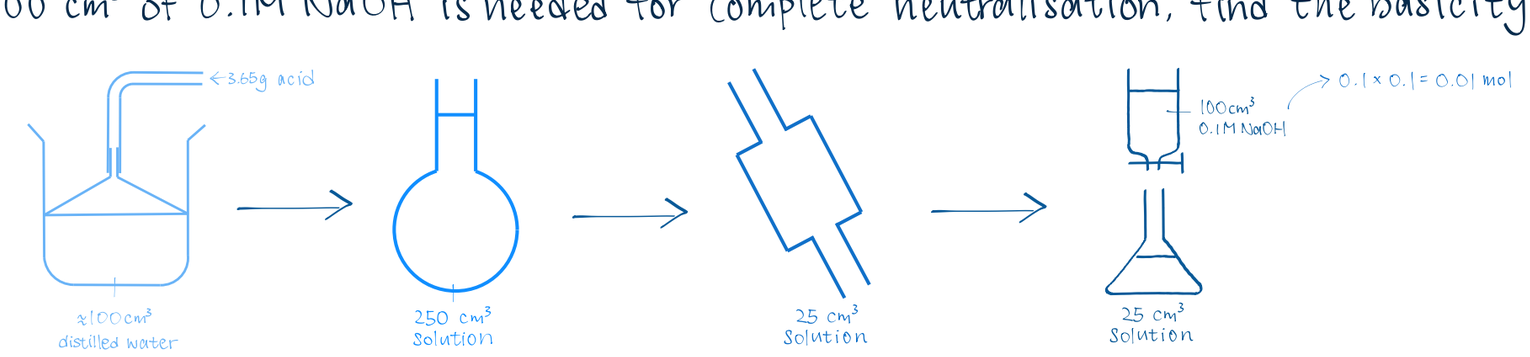
$n = 0.03225$

$\frac{mass}{Mr} = mole$

$\frac{2}{Mr} = 0.03225$

$Mr = 62.0$

3.65g acid in gas state w/ Mr 36.5 is dissolved completely into $100cm^3$ distilled water.
The Sol. is poured into $250\ cm^3$ volumetric flask for dilution.
$25\ cm^3$ of the Sol. is pipetted out to a conical flask and titrated against 0.1M NaOH.
If $100\ cm^3$ of 0.1M NaOH is needed for complete neutralisation, find the basicity of the acid.



$\frac{3.65}{36.5} = 0.1$ mol

0.1 mol (加水 mol 不变)

0.01 mol (抽古倍 sol., mol 减至原本古倍)

0.01 mol

mole of acid : mole of alkali
= 0.01 : 0.01
= 1 : 1

∴ monobasic