

Calculation

Volume of NaOH consumed at neutralisation point ($V_{\text{Neutralisation}}$): 15 mL

Volume of NaOH at half neutralisation point ($V_{\text{Neutralisation}}/2$) = $15/2=7.5$ mL

pH at neutralisation point = 10

pH at half neutralisation point = 5

At half neutralisation point, $\text{pH}=\text{pK}_a$

So, $K_a = (10)^{-\text{pH}}$

$$K_a = (10)^{-5}$$

$$= 1 \times 10^{-5}$$