

Question

3 g of activated charcoal was added to 50 mL of acetic acid solution (0.06N) in a flask. After an hour it was filtered and the strength of the filtrate was found to be 0.042 N. The amount of acetic acid adsorbed (per gram of charcoal) is :

- (1) 36 mg
- (2) 42 mg
- (3) 54 mg
- (4) 18 mg

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Solution

Normality = Molarity for acetic acid

Initial mmoles of acetic acid = $N \times 50$

Final mmoles of acetic acid = $N' \times 50$

$$\begin{aligned} \text{mmoles adsorbed} &= (N - N') \times 50 \\ &= (0.06 - 0.042) \times 50 \end{aligned}$$

$$\begin{aligned} \text{Mass adsorbed} &= \text{mmoles adsorbed} \times 60 \text{ mg} \\ &= (0.06 - 0.042) \times 50 \times 60 \text{ mg} \end{aligned}$$

The above mass is adsorbed by 3 g of charcoal.

Hence, the mass adsorbed per g of charcoal

$$= \frac{1}{3} (0.06 - 0.042) \times 50 \times 60 \text{ mg} = 18 \text{ mg}$$

Hence, Option (4).