

- Calculate Total hardness of the given hard water sample with following data:
- [i] 50 mL of standard hard water sample consume 42 mL of EDTA solution.
 - [ii] 50 mL of hard water sample consume 20 mL of EDTA solution before boiling.
- Standard hard water is prepared by dissolving 1.0 gram of CaCO_3 per Litre.

1000 mL of Standard hard water contains 1 g of CaCO_3

⇒ 50 ml of standard hard water contains = $50/1000$ g of CaCO_3

Given that, 42 mL of EDTA is consumed by 50 mL of standard hard water

$$42 \text{ mL of EDTA} = 50/1000 \text{ g of } \text{CaCO}_3$$

$$\therefore 1 \text{ mL of EDTA} = [50/(42*1000)] \text{ g of } \text{CaCO}_3$$

⇒ EDTA consumed by sample hard water = 20 mL

$$\text{So, 20 mL of EDTA} = [(50*20)/(42*1000)] \text{ g of } \text{CaCO}_3$$

Hence, 50 mL of sample hard water contains $[(50*20)/(42*1000)]$ g of CaCO_3

$$\therefore 1000 \text{ mL of sample hard water} = [(50*20*1000)/(42*1000*50)] \text{ g of } \text{CaCO}_3 = 0.476 \text{ g of } \text{CaCO}_3$$

i.e. Total hardness of sample hard water = 0.476 g = 476 mg of CaCO_3 /liter = 476 ppm

- Calculate Total, Temporary and Permanent hardness of the given hard water sample with following data:
- [i] 50 mL of standard hard water sample consume 42 mL of EDTA solution.
 - [ii] 50 mL of hard water sample consume 19.9 mL of EDTA solution before boiling.
 - [iii] 50 mL of hard water sample consume 8.9 mL of EDTA solution after boiling.
- Standard hard water is prepared by dissolving 1.5 gram of CaCO_3 per Litre.