

18/03/2021

Engineering ChemistryTutorial - 2 - Water

- 1) A 50 ml of water sample contains 500 ppm of dissolved oxygen. The water sample is diluted to 100 ml. After 5 days of incubation the DO value of water sample reduces to 400 ppm. Calculate BOD of water sample.

Ans Given:

Water sample before dilution = 50 ml.

Water sample after dilution = 100 ml.

$$\therefore DO_b = 500 \text{ ppm}$$

$$DO_i = 400 \text{ ppm}$$

$$\therefore BOD = [DO_b - DO_i] \times \text{Dilution factor.}$$

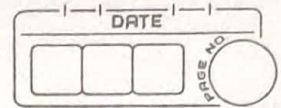
$$= [DO_b - DO_i] \times \frac{\text{ml. of sample after dilution}}{\text{ml. of sample before dilution}}$$

$$= [500 - 400] \times \frac{100}{50}$$

$$= \frac{100 \times 100}{50}$$

$$= 200 \text{ ppm}$$

\therefore BOD of water sample is 200 ppm.



- 2) 10 ml of waste water was refluxed with 20 ml of $K_2Cr_2O_7$ and after refluxing the excess unreacted dichromate required 26.2 ml of 0.1N FAS solution. A blank of 10 ml of distilled water on refluxing with 20 ml of $K_2Cr_2O_7$ solution required 36 ml of 0.1N FAS solution. Calculate the COD of waste water sample.

Solution: Given:

$$V_B = 36 \text{ ml}$$

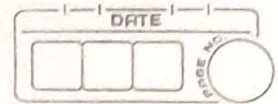
$$V_t = 26.2 \text{ ml}$$

$$N = 0.1 \text{ normal}$$

$$V_e = 10 \text{ ml}$$

$$\begin{aligned}\therefore \text{COD} &= \frac{(V_B - V_t) \times N \times 8000}{V_e} \\ &= \frac{(36 - 26.2) \times 0.1 \times 8000}{10} \\ &= 784 \text{ ppm}\end{aligned}$$

\therefore COD of waste water sample is 784 ppm.



- 3) 20 ml of waste water was refluxed with 30 ml of $K_2Cr_2O_7$ and after refluxing the excess unreacted dichromate required 11 ml of 0.1N FAS solution. A blank of 20 ml of distilled water on refluxing with 30 ml of $K_2Cr_2O_7$ solution required 14 ml of 0.1N FAS solution. Calculate the COD of waste water sample.

Solution.

Given:

$$V_b = 20 \text{ ml} = 14 \text{ ml}$$

$$V_t = 11 \text{ ml}$$

$$N = 0.1 \text{ Normal}$$

$$V_e = 20 \text{ ml}$$

$$\therefore \text{COD} = \frac{(V_b - V_t) \times N \times 8000}{V_e}$$

$$= \frac{(14 - 11) \times 0.1 \times 8000}{20}$$

$$= 120 \text{ ppm}$$

\therefore COD of waste water sample is 120 ppm.