**Solution of practice problems**

**1. Calculate the percentage strength (w/v) of an isotonic solution of boric acid (E value = 0.52)**

1 g boric acid = 0.52g NaCl

0.9% NaCl is isotonic solution

Answer:

$$0.9\% \times \frac{1}{0.52} = 1.73\%$$

**2. NaCl dissociate is a 2 ions electrolyte, dissociating 90% in certain concentration Calculate**

(a) its dissociation factor

Answer: On the basis of 90% dissociation, 100 particles of NaCl will yield:

90 Sodium ions

90 Chloride ions

10 undissociating particles

$$i = \frac{90 + 90 + 10}{100} = 1.9$$

b. Freezing point of molal solution of NaCl

Answer:

The freezing point of molal solution of nonelectrolyte (one gram molecular weight of any nonelectrolyte in 1000g water) is equal to (-1.86°C)

For electrolyte the freezing point is equal to

$$-1.86 \times its\ i\ factor = -1.86 \times 1.9 = -3.534°C$$

-1.86 X i factor = 1.86 X 1.9 = -3.534°C

**3. A solution of anhydrous dextrose (mwt 180) contains 25 g in 500 ml water. Calculate the freezing point of this solution.**

Answer: molality is number of moles of solute dissolved in 1000 gm water

$$molality\ of\ anhydrous\ dextrose = \frac{25}{180} \times \frac{1000}{500} = 0.277\ molal$$

Freezing point of 1molal solution of non electrolyte = -1.86°C

$$Freezing\ point\ of\ 0.277\ molal = \frac{-1.86 \times 0.277}{1} = -0.5166°C \approx -0.52°C$$

**6. The freezing point of a 5% solution of boric acid is -1.55°C. How many grams of boric acid should be used in preparing 1000ml of an isotonic solution?**

Answer:

The freezing point of isotonic solution should be -0.52°C

$$\frac{5\%}{x} = \frac{-1.55°C}{-0.52°C}$$

$x = 1.677\%$ the concentration of boric acid needed to lower the freezing to -0.52 °C

Thus to make 1000ml

1.67% x 1000 = 16.77 g ≈ 16.8 *g* of boric acid

**23.** Rx  Tetracaine Hydrochloride          0.5%

Sol. Epinephrine Bitartrate (1:1000)    10

Purified Water ad                          30

Make isoton. Sol.

Sig. eye drops.

The solution of . Epinephrine Bitartrate (1:1000). How many grams of boric acid should be used in compounding the prescription?

Answer:

E value of tetracaine Hydrochloride (E = 0.18). The prescription calls for 0.15 g tetracaine Hydrochloride calculated as shown below

$0.5 \times \frac{30}{100} = 0.15$ g Tetracaine Hydrochloride need to make 30 ml

Step1.

0.15 x 0.18 = 0.027 g of sodium chloride represented by tetracaine Hydrochloride

Step 2.

20 x 0.009 = 0.18 g of sodium chloride in 20 mL of an isotonic sodium chloride solution

Step 3.

0.18 g (from Step 2) - 0.027 g (from Step 1) = 0.153g of sodium chloride required to make the solution isotonic

But because the prescription calls for boric acid:

Step 4.

0.153 g ÷ 0.52 (sodium chloride equivalent of boric acid) = 0.294 g of boric acid to be used