What will be the normality of a solution obtained by mixing 0.45 N and 0.60 N NaOH in the ratio 2:1 by volume?

(1) 0.4 N (2) 0.5 N

(3) 1.05 N (4) 0.15 N

$$N_R = \frac{0.45 \cdot 2 + 0.6 \times 1}{2+1}$$

$$N_R = \frac{0.90 + 0.60}{3} = \frac{1.5}{3} = 0.5$$

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100 mL of each 0.5N NaOH, N/5 HCl and N/10 H_2SO_4 are mixed together. The resulting solution will be

(1) acidic (2) neutral

(3) alkaline (4) None of these

Base = 0.5 × 100

= 50

Acid = $\frac{1}{5} \times 100 + \frac{1}{10} \times 100$

= 30

(gm-eq Base) > (gm-eq Acid)

Basic → alkaline

What volume of 0.8M solution is contained in 0.1 mole of solute?

(1) 100 mL (2) 125 mL

(3) 500 mL (4) 0.125 mL

$M = \frac{n}{V(l+r)}$

$M = \frac{n}{V} \times 1000$

$0.8 = \frac{0.1}{V} \times 1000$

$V = \frac{1000}{8} = 125 ml$

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171 g of sugar (MW = 342) are dissolved in 1000 g of water at 30°C. Its

$d = 1$ gm/ml

(1) Molarity < Molality

(2) Molarity = Molality

(3) Molarity > Molality

(4) None

$W_{soln} = 171 + 1000$

$= 1071$ gm.

$V_{sol} = 1071$ ml

$M = \frac{n}{V_{soln}}$; $m = \frac{n}{W_{solvent}}$

$V_{soln} \to 1071$; $W_{solvent} \to 1000$

1071 ml → 1/2

1 ml →

$M/m \propto \frac{1}{V/W}$

$n = \frac{171}{342} = \frac{1}{2}$ mole

$m > M$

45 g of acid of MW 90 neutralized by 200 mL of 5 N caustic potash. The basicity of the acid is

(1) 1 → V.f.

(2) 2

(3) 3

(4) 4

$$V.f = 2 \rightarrow \text{Acid} \rightarrow \text{Basicity}$$

gm eq. Acid = gm Base

(M.V.f.) = (N.V.)

Mole.V.f = N.V.

$$\frac{45}{90} \times V.f = 5 \times \frac{200}{1000}$$

If 250 mL of a solution contains 24.5 g H_2SO_4, the molarity and normality, respectively, are

(1) 1 M, 2 N (2) 1 M, 0.5 N

(3) 0.5 M, 1 N (d) 2 M, 1 N

$$M = \frac{24.5}{98} \times \frac{1000}{250}$$

$$= \frac{98.0}{98} = 1$$

$$M = 1$$

$$N = M \cdot V.f.$$

$$= 1 \times 2$$

$$N = 2$$

An aqueous solution of urea containing 18 g of urea in 1500 cm^3 of solution has a density of 1.052 g/cm^3. If the molecular weight of urea is 60, then the molality of solution is

(1) 0.2 (2) 0.192

(3) 0.226 (4) 0.113

$d = \frac{w_{soln}}{V}$

$d_{soln} = 1.052\ gm/cm^3$

$V_{soln} = 1500\ cm^3 = 1500\ ml$

$w_{soln} = 1.052 \times 1500 = 105.2 \times 15$

$w_{soln} = 1578.0$

$w_{solvent} = 1578 - 18 = 1560$

$m = \frac{18}{60} \times \frac{1000}{1560}$

$m = 0.192$

The mole fraction of NaCl in a solution containing 1 mole of NaCl in 1000 g of water is

(1) 0.0177 (2) 0.001

(3) 0.5 (4) 0.244

$$X_{NaCl} = \frac{1}{1 + \frac{1000}{18}}$$

$$= \frac{1}{1 + 55.55} = \frac{1}{56.55}$$

$$= 0.0177$$

1.5 L of solution of normality N and 25 L of 2 M HCl are mixed together. The resultant solution has a normality of 5. The value N is

(1) 6 (2) 10

(3) 8 (4) 4

$2.5 + 1.5 = 4$

$$\frac{N \times 1.5 + 2 \times 25}{26.5} = 5$$

2.5

$$\frac{N \times 1.5 + 2.5 \times 2}{4} = 5$$

$N \times 1.5 + 5 = 20$

$1.5 N = 15$

$N = 10$

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1	2	3	4	5	6	7	8	9	10
2	3	2	1	2	1	1	2	1	2

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