

REAKSI ASAM BASA

PH CAMPURAN

Nama :

Kelas/No : XI MIPA /....

Kompetensi
Dasar

3.10 Menjelaskan konsep asam basa serta kekuatannya dan kesetimbangan pengionannya dalam larutan

Tujuan
Pembelajaran

1. Siswa dapat menghitung pH larutan asam, basa dan campuran asam basa
2. Siswa menentukan konsentrasi ion dalam larutan



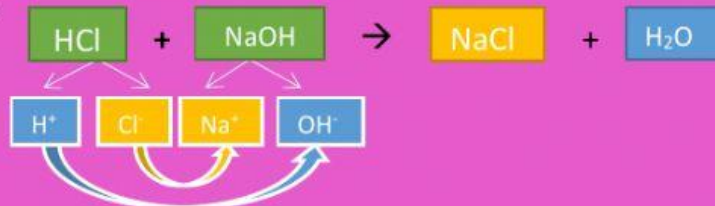
MATERI 1

REAKSI ASAM BASA

Reaksi asam dan basa menghasilkan garam dan air

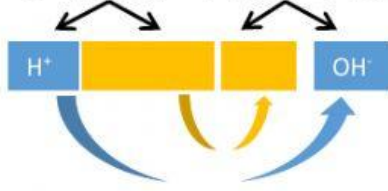
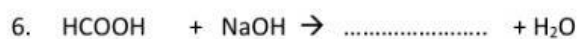
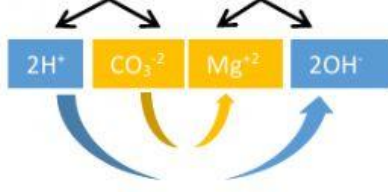
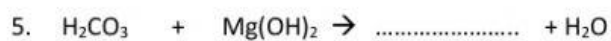
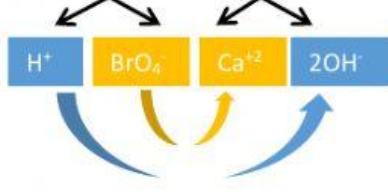
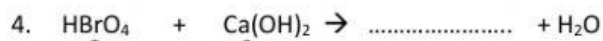
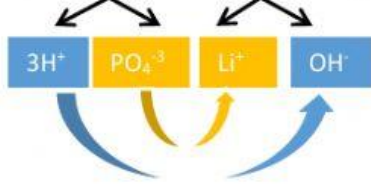
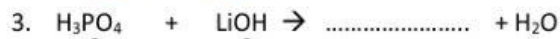
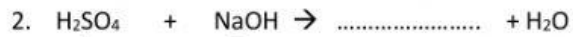
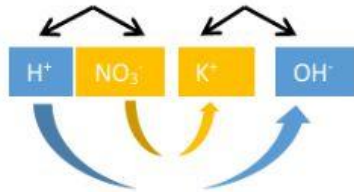
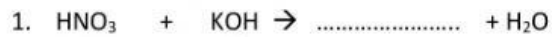


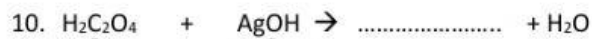
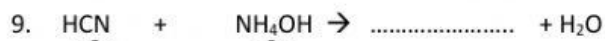
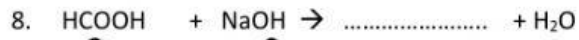
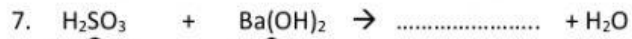
Contoh :

HCl terionisasi menjadi H⁺ dan Cl⁻, NaOH terionisasi menjadi Na⁺ dan OH⁻Ion Na⁺ dan Cl⁻ bergabung membentuk garam NaCl sedangkan H⁺ dan OH⁻ membentuk H₂O



SOAL 1. Setelah kalian mempelajari materi di atas maka lengkapi reaksi asam basa berikut ini!





MATERI 2

PH Pengenceran

$$V_1 \times [\text{H}^+]_1 = V_2 \times [\text{H}^+]_2$$

$$V_1 \times [\text{OH}^-]_1 = V_2 \times [\text{OH}^-]_2$$

$$\text{pH} = -\log [\text{H}^+]$$

$$\text{pH} + \text{pOH} = 14$$

Asam 1 + Asam 2

$$(V_1 + V_2) \times [\text{H}^+]_{\text{campuran}} = V_1 \times [\text{H}^+]_1 + V_2 \times [\text{H}^+]_2$$

Basa 1 + Basa 2

$$(V_1 + V_2) \times [\text{OH}^-]_{\text{campuran}} = V_1 \times [\text{OH}^-]_1 + V_2 \times [\text{OH}^-]_2$$



SOAL 2. Setelah kalian mempelajari materi di atas hitung pH campuran berikut!

1. Larutan 10 mL H_2SO_4 0,01 M ditambahkan air sebanyak 90 mL. Berapa pH H_2SO_4 sekarang?

Diketahui :

$$V_1 = \dots\dots \text{ mL}$$

$$M_1 = \dots\dots \text{ M}$$

$$V_2 = \dots\dots + \dots\dots = \dots\dots \text{ mL}$$

Jawab :

$$[\text{H}^+] = \dots\dots \times \dots\dots = \dots\dots \text{ M}$$

Rumus :

$$V_1 \times [\text{H}^+]_1 = V_2 \times [\text{H}^+]_2$$

$$\dots\dots \times \dots\dots = \dots\dots \times [\text{H}^+]_2$$

$$[\text{H}^+]_2 = \dots\dots$$

$$\text{pH} = -\log \dots\dots = \dots\dots$$

2. Bila larutan 10 ml HCl (pH = 2) dicampur 90 ml H_2SO_4 0,005 M, tentukan pH campuran!

Diketahui :

$$[\text{H}^+]_{\text{HCl}} = \dots\dots \text{ M}$$

$$V_{\text{HCl}} = \dots\dots \text{ mL}$$

$$V_{\text{H}_2\text{SO}_4} = \dots\dots \text{ mL}$$

Jawab :

$$[\text{H}^+]_{\text{H}_2\text{SO}_4} = a \times M_a = \dots\dots \times \dots\dots = 10^{-2} \text{ M}, V_2 = 90 \text{ mL}$$

$$(V_1 + V_2) \times [\text{H}^+]_{\text{campuran}} = V_1 \times [\text{H}^+]_1 + V_2 \times [\text{H}^+]_2$$

$$(\dots\dots + \dots\dots) \times [\text{H}^+]_{\text{campuran}} = \dots\dots \times [\dots\dots] + \dots\dots \times [\dots\dots]$$

$$\dots\dots \times [\text{H}^+]_{\text{campuran}} = \dots\dots + \dots\dots$$

$$[\text{H}^+]_{\text{campuran}} = \dots\dots \text{ M}$$

$$\text{pH} = \dots\dots$$

3. Dalam sebuah wadah terdapat 200 mL larutan NH_3 0,01 M ($\alpha = 1\%$) kemudian ditambahkan 300 mL larutan $\text{Ba}(\text{OH})_2$ 0,005 M. Berapa pH campuran?

Diketahui :

$$M_{\text{NH}_3} = \dots \text{ M}, V_{\text{NH}_3} = \dots \text{ mL}$$

$$M_{\text{Ba}(\text{OH})_2} = \dots \text{ M}, V_{\text{Ba}(\text{OH})_2} = \dots \text{ mL}$$

Jawab :

$$[\text{OH}^-]_{\text{NH}_3} = \dots \times \dots = \dots \text{ M}$$

$$[\text{OH}^-]_{\text{Ba}(\text{OH})_2} = \dots \times \dots = \dots \text{ M}$$

$$(V_1 + V_2) \times [\text{OH}^-]_{\text{campuran}} = V_1 \times [\text{OH}^-]_1 + V_2 \times [\text{OH}^-]_2$$

$$(\dots + \dots) \times [\text{OH}^-]_{\text{campuran}} = \dots \times \dots + \dots \times \dots$$

$$[\text{OH}^-]_{\text{campuran}} = \dots$$

$$\text{pOH} = \dots$$

$$\text{pH} = \dots$$

4. Larutan fenol yang pHnya 4 sebanyak 1 mL diencerkan menjadi 100 mL ($K_a = 10^{-10}$). pH larutan akan berubah menjadi
5. Sebanyak 100 mL larutan H_2SO_4 yang pH = 1 dimasukkan larutan 400 mL H_2SO_4 yang pHnya = 2. pH campuran



MATERI 3

PH CAMPURAN ASAM DAN BASA

- Asam Kuat + Basa Kuat $\rightarrow$ Garam + Air
- Mol asam > mol basa : sisa asam $\rightarrow$ pH asam kuat
- Mol basa > mol asam : sisa basa $\rightarrow$ pH basa kuat

$$(V_a + V_b) [\text{H}^+]_{\text{campuran}} = V_a [\text{H}^+] - V_b [\text{OH}^-]$$

$$(V_a + V_b) [\text{OH}^-]_{\text{campuran}} = V_b [\text{OH}^-] - V_a [\text{H}^+]$$

$$\text{pH} = -\log [\text{H}^+]$$

$$\text{pH} + \text{pOH} = 14$$



SOAL 3 . Hitunglah pH campuran asam basa berikut ini!

1. Sebanyak 100 mL larutan KOH 0,02 M dicampur dengan 100 mL larutan H_2SO_4 0,02 M. pH campuran tersebut adalah

Diketahui :

$$M_{\text{KOH}} = \dots \text{ M}$$

$$V_{\text{KOH}} = \dots \text{ mL}$$

$$M_{\text{H}_2\text{SO}_4} = \dots \text{ M}$$

$$V_{\text{H}_2\text{SO}_4} = \dots \text{ mL}$$

Jawab:

$$[\text{OH}^-] = \dots \text{ M}$$

$$[\text{H}^+] = \dots \text{ M}$$

$$(V_a + V_b) [\text{H}^+]_{\text{campuran}} = V_a [\text{H}^+] - V_b [\text{OH}^-]$$

$$(\dots + \dots) [\text{H}^+]_{\text{campuran}} = \dots \times \dots - \dots \times \dots$$

$$[\text{H}^+]_{\text{campuran}} = \dots$$

$$\text{pH}_{\text{campuran}} = \dots$$

2. Diberikan larutan HNO_3 250 mL dengan pH = 2 yang dicampurkan dengan 250 mL KOH dengan pH = 12. Tentukan pH larutan yang diperoleh!

Diketahui :

$$M_{\text{KOH}} = \dots \text{ M}$$

$$V_{\text{KOH}} = \dots \text{ mL}$$

$$M_{\text{HNO}_3} = \dots \text{ M}$$

$$V_{\text{HNO}_3} = \dots \text{ mL}$$

Jawab:

$$[\text{OH}^-] = \dots \text{ M}$$

$$[\text{H}^+] = \dots \text{ M}$$

$$(V_a + V_b) [\text{H}^+]_{\text{campuran}} = V_a [\text{H}^+] - V_b [\text{OH}^-]$$

$$(\dots + \dots) [\text{H}^+]_{\text{campuran}} = \dots \times \dots - \dots \times \dots$$

$$[\text{H}^+]_{\text{campuran}} = \dots$$

$$\text{pH}_{\text{campuran}} = \dots$$

FINISH