LAMPIRAN

1. Perhitungan Pembuatan Bahan Analisa

- $AgNO_3$ 0,1 M dalam 100 ml

  Sifat kimia :

  Massa molar 169,87 gr/mol

  Rumus :

$$M = \frac{gr}{Mr}\ x\ \frac{1000\ ml}{V}$$

$$0{,}1M = \frac{gr}{169{,}87}\ x\ \frac{1000\ ml}{100\ ml}$$

$$gr = 1{,}69\ gram$$

2. Perhitungan Densitas

$$densitas\ (gr/ml)\ = \frac{(berat\ pikno + isi) -\ berat\ pikno\ kosong}{V_{piknometer}}$$

- Perhitungan Densitas pada Air Awal (Air Laut Marina)

$$densitas\ = \frac{(41{,}61 - 15{,}91)gr}{25\ ml} = 1{,}028\ gr/ml$$

- Perhitungan Densitas pada Column Kation
  - Bukaan Valve 1/3

$$densitas\ = \frac{(41{,}16 - 15{,}95)gr}{25\ ml} = 1{,}008\ gr/ml$$

  - Bukaan Valve 2/3

$$densitas = \frac{(41{,}63 - 15{,}92)gr}{25\ ml} = 1{,}028\ gr/ml$$

  - Bukaan Valve Penuh (1)

$$densitas = \frac{(41{,}31 - 15{,}89)gr}{25\ ml} = 1{,}017\ gr/ml$$

- Perhitungan Densitas pada Column Anion
  - Bukaan Valve 1/3

    $$densitas = \frac{(41{,}41 - 15{,}86)gr}{25\ ml} = 1{,}022\ gr/ml$$

  - Bukaan Valve 2/3

    $$densitas = \frac{(41{,}62 - 15{,}91)gr}{25\ ml} = 1{,}0284\ gr/ml$$

  - Bukaan Valve Penuh (1)

    $$densitas = \frac{(41{,}53 - 15{,}89)gr}{25\ ml} = 1{,}026\ gr/ml$$

- Perhitungan Densitas pada Column Karbon Aktif
  - Bukaan Valve 1/3

    $$densitas = \frac{(41{,}48 - 15{,}89)gr}{25\ ml} = 1{,}024\ gr/ml$$

  - Bukaan Valve 2/3

    $$densitas = \frac{(41{,}62 - 15{,}80)gr}{25\ ml} = 1{,}033\ gr/ml$$

  - Bukaan Valve Penuh (1)

    $$densitas = \frac{(41{,}49 - 15{,}88)gr}{25\ ml} = 1{,}024\ gr/ml$$

3. Perhitungan Molaritas KLor

$$Molaritas\ Cl^{-}\ (M) = \frac{M_{AgNo_3} \times V_{AgNO_3}}{V_{air}}$$

- Perhitungan Molaritas Klor pada Air Awal (Air Laut Marina)

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M \times 13{,}2\ ml}{25\ ml} = 0{,}053\ M$$

- Perhitungan Molaritas Klor pada Column Kation
  - Bukaan Valve 1/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 7{,}3\ ml}{25\ ml} = 0{,}029\ M$$

  - Bukaan Valve 2/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 10\ ml}{25\ ml} = 0{,}04\ M$$

  - Bukaan Valve Penuh (1)

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 11{,}8\ ml}{25\ ml} = 0{,}047\ M$$

- Perhitungan Molaritas Klor pada Column Anion
  - Bukaan Valve 1/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 6{,}8\ ml}{25\ ml} = 0{,}027M$$

  - Bukaan Valve 2/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 9{,}8\ ml}{25\ ml} = 0{,}039\ M$$

  - Bukaan Valve Penuh (1)

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 11{,}2\ ml}{25\ ml} = 0{,}045\ M$$

- Perhitungan Molaritas Klor pada Column Karbon Aktif
  - Bukaan Valve 1/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 6{,}2\ ml}{25\ ml} = 0{,}025\ M$$

  - Bukaan Valve 2/3

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 9\ ml}{25\ ml} = 0{,}036\ M$$

- Bukaan Valve Penuh (1)

$$Molaritas\ Cl^{-}\ (M) = \frac{0{,}1\ M\ \times 11\ ml}{25\ ml} = 0{,}044\ M$$

4. Perhitungan Massa Klor

$$Massa\ Cl^{-}(gr) = M_{Cl^{-}} \times V_{sampel} \times BM_{Cl^{-}}$$

- Perhitungan Massa Klor pada Air Awal (Air Laut Marina)

$$Massa\ Cl^{-} = 0{,}053\ M\ \times 25.10^{-3} L\ \times 35{,}5\ gr/mol = 0{,}047\ gr$$

- Perhitungan Massa Klor pada Column Kation
  - Bukaan Valve 1/3

$$Massa\ Cl^{-} = 0{,}029\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol\ = 0{,}026\ gr$$

  - Bukaan Valve 2/3

$$Massa\ Cl^{-} = 0{,}04\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol = 0{,}036\ gr$$

  - Bukaan Valve Penuh (1)

$$Massa\ Cl^{-} = 0{,}047\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol = 0{,}042\ gr$$

- Perhitungan Massa Klor pada Column Anion
  - Bukaan Valve 1/3

$$Massa\ Cl^{-} = 0{,}027\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol\ = 0{,}024\ gr$$

  - Bukaan Valve 2/3

$$Massa\ Cl^{-} = 0{,}039\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol = 0{,}035\ gr$$

  - Bukaan Valve Penuh (1)

$$Massa\ Cl^{-} = 0{,}045\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol = 0{,}04\ gr$$

- Perhitungan Massa Klor pada Column Karbon Aktif
  - Bukaan Valve 1/3

$$Massa\ Cl^{-} = 0{,}025\ M\ \times\ 25.10^{-3} L\ \times 35{,}5\ gr/mol\ = 0{,}022\ gr$$

- Bukaan Valve 2/3

$$Massa\ Cl^{-} = 0{,}036\ M \times 25.10^{-3} L \times 35{,}5\ gr/mol = 0{,}032\ gr$$

- Bukaan Valve Penuh (1)

$$Massa\ Cl^{-} = 0{,}044\ M \times 25.10^{-3} L \times 35{,}5\ gr/mol = 0{,}039\ gr$$

5. Perhitungan Massa Air Laut

$$Massa\ air\ laut\ (gr) = \rho \times V_{sampel}$$

- Perhitungan Massa Air Laut pada Air Awal (Air Laut Marina)

$$Massa\ air\ laut = 1{,}028\ gr/ml \times 25\ ml = 25{,}7\ gr$$

- Perhitungan Massa Air Laut pada Column Kation
  - Bukaan Valve 1/3

$$Massa\ air\ laut = 1{,}008\ gr/ml \times 25\ ml = 25{,}2\ gr$$

  - Bukaan Valve 2/3

$$Massa\ air\ laut = 1{,}028\ gr/ml \times 25\ ml = 25{,}7\ gr$$

  - Bukaan Valve Penuh (1)

$$Massa\ air\ laut = 1{,}017\ gr/mol \times 25\ ml = 25{,}43\ gr$$

- Perhitungan Massa Air Laut pada Column Anion
  - Bukaan Valve 1/3

$$Massa\ air\ laut = 1{,}022\ gr/ml \times 25\ ml = 25{,}55\ gr$$

  - Bukaan Valve 2/3

$$Massa\ air\ laut = 1{,}0284\ gr/ml \times 25\ ml = 25{,}71\ gr$$

  - Bukaan Valve Penuh (1)

$$Massa\ air\ laut = 1{,}026\ gr/mol \times 25\ ml = 25{,}65\ gr$$

- Perhitungan Massa Air Laut pada Column Karbon Aktif
  - Bukaan Valve 1/3

    $Massa\ air\ laut\ =\ 1{,}024\ gr/ml\ \times\ 25\ ml = 25{,}6\ gr$

  - Bukaan Valve 2/3

    $Massa\ air\ laut =\ 1{,}033\ gr/ml\ \times\ 25\ ml = 25{,}83\ gr$

  - Bukaan Valve Penuh (1)

    $Massa\ air\ laut =\ 1{,}024\ gr/mol\ \times 25\ ml = 25{,}6\ gr$

6. Perhitungan Kadar Klor

$$kadar\ Cl^{-}\ (ppm) = \frac{Massa\ Cl^{-}}{Massa\ air\ laut} \times\ 10^{6}$$

- Perhitungan Kadar Klor pada Air Awal (Air Laut Marina)

$$kadar\ Cl^{-}\ =\ \frac{0{,}047\ gr}{25{,}7\ gr} \times\ 10^{6} = 1830\ ppm$$

- Perhitungan Kadar Klor pada Column Kation
  - Bukaan Valve 1/3

    $$kadar\ Cl^{-}\ =\ \frac{0{,}026\ gr}{25{,}2\ gr} \times\ 10^{6} = 1030\ ppm$$

  - Bukaan Valve 2/3

    $$kadar\ Cl^{-} = \frac{0{,}036\ gr}{25{,}7\ gr} \times\ 10^{6} = 1400\ ppm$$

  - Bukaan Valve Penuh (1)

    $$kadar\ Cl^{-} = \frac{0{,}042\ gr}{25{,}43\ gr} \times\ 10^{6} = 1650\ ppm$$

- Perhitungan Kadar Klor pada Column Anion
  - Bukaan Valve 1/3

    $$kadar\ Cl^{-}\ =\ \frac{0{,}024\ gr}{25{,}55\ gr} \times\ 10^{6} = 940\ ppm$$

- Bukaan Valve 2/3

$$kadar\ Cl^{-} = \frac{0{,}035\ gr}{25{,}71\ gr} \times\ 10^{6} = 1360\ ppm$$

- Bukaan Valve Penuh (1)

$$kadar\ Cl^{-} = \frac{0{,}04\ gr}{25{,}65\ gr} \times\ 10^{6} = 1560\ ppm$$

➢ Perhitungan Kadar Klor pada Column Karbon Aktif

- Bukaan Valve 1/3

$$kadar\ Cl^{-} = \frac{0{,}022\ gr}{25{,}6\ gr} \times\ 10^{6} = 860\ ppm$$

- Bukaan Valve 2/3

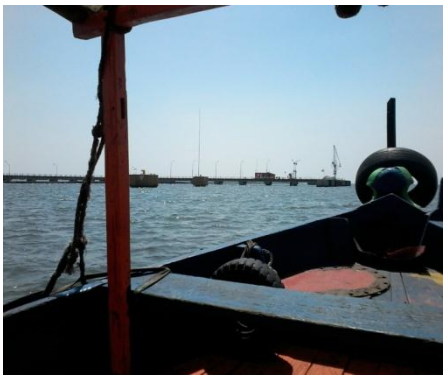
$$kadar\ Cl^{-} = \frac{0{,}032\ gr}{25{,}83\ gr} \times\ 10^{6} = 1240\ ppm$$

- Bukaan Valve Penuh (1)

$$kadar\ Cl^{-} = \frac{0{,}039\ gr}{25{,}6\ gr} \times\ 10^{6} = 1520\ ppm$$

7. Foto Hasil Pengamatan

➢ Air Laut Marina



- Analisa Penurunan Kadar Klor
  - Sebelum titrasi (setelah penambahan indikator K_2CrO_4)

  - Setelah titrasi