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Angular Momentum and Velocity of Diatomic Molecule Formulas

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List of 9 Angular Momentum and Velocity of Diatomic Molecule Formulas

Angular Momentum and Velocity of Diatomic Molecule 🗗

1) Angular Momentum given Kinetic Energy 🗗

Open Calculator 🗗

fx $\mathrm{Lm1} = \sqrt{2 \cdot I \cdot KE}$

ex $9.486833 \text{kg*m}^2/\text{s} = \sqrt{2 \cdot 1.125 \text{kg·m}^2 \cdot 40\text{J}}$

2) Angular Momentum given Moment of Inertia 🗗

Open Calculator 🗗

fx $\mathrm{L1} = I \cdot \omega$

ex $22.5 \text{kg*m}^2/\text{s} = 1.125 \text{kg·m}^2 \cdot 20\text{rad/s}$

3) Angular Velocity given Angular Momentum and Inertia 🗗

Open Calculator 🗗

fx $\omega 2 = \dfrac{L}{I}$

ex $12.44444 \text{rad/s} = \dfrac{14 \text{kg*m}^2/\text{s}}{1.125 \text{kg·m}^2}$

4) Angular Velocity given Inertia and Kinetic Energy ⤴

fx $\omega 2 = \sqrt{2 \cdot \dfrac{KE}{I}}$

Open Calculator ⬚

ex $8.43274 \text{rad/s} = \sqrt{2 \cdot \dfrac{40J}{1.125 \text{kg·m}^2}}$

5) Angular Velocity given Kinetic Energy ⤴

fx $\omega 3 = \sqrt{2 \cdot \dfrac{KE}{(m_1 \cdot (R_1^2)) + (m_2 \cdot (R_2^2))}}$

Open Calculator ⬚

ex $67.51596 \text{rad/s} = \sqrt{2 \cdot \dfrac{40J}{\left(14 \text{kg} \cdot \left((1.5 \text{cm})^2\right)\right) + \left(16 \text{kg} \cdot \left((3 \text{cm})^2\right)\right)}}$

6) Angular Velocity of Diatomic Molecule ⤴

fx $\omega 3 = 2 \cdot \pi \cdot \nu_{rot}$

Open Calculator ⬚

ex $62.83185 \text{rad/s} = 2 \cdot \pi \cdot 10 \text{Hz}$

7) Rotational Frequency given Angular Frequency ⤴

fx $\nu_{rot2} = \dfrac{\omega}{2 \cdot \pi}$

Open Calculator ⬚

ex $3.183099 \text{Hz} = \dfrac{20 \text{rad/s}}{2 \cdot \pi}$

8) Rotational Frequency given Velocity of Particle 1 ⏏

fx $$\nu_{rot} = \frac{v_1}{2 \cdot \pi \cdot R_1}$$

Open Calculator ⏏

ex $$16.97653 \text{Hz} = \frac{1.6 \text{m/s}}{2 \cdot \pi \cdot 1.5 \text{cm}}$$

9) Rotational Frequency given Velocity of Particle 2 ⏏

fx $$\nu_{rot} = \frac{v_2}{2 \cdot \pi \cdot R_2}$$

Open Calculator ⏏

ex $$9.549297 \text{Hz} = \frac{1.8 \text{m/s}}{2 \cdot \pi \cdot 3 \text{cm}}$$

Variables Used

- **I** Moment of Inertia *(Kilogram Square Meter)*
- **KE** Kinetic Energy *(Joule)*
- **L** Angular Momentum *(Kilogram Square Meter per Second)*
- **L1** Angular Momentum given Moment of Inertia *(Kilogram Square Meter per Second)*
- **Lm1** Angular Momentum1 *(Kilogram Square Meter per Second)*
- **m_1** Mass 1 *(Kilogram)*
- **m_2** Mass 2 *(Kilogram)*
- **R_1** Radius of Mass 1 *(Centimeter)*
- **R_2** Radius of Mass 2 *(Centimeter)*
- **v_1** Velocity of Particle with Mass m1 *(Meter per Second)*
- **v_2** Velocity of Particle with Mass m2 *(Meter per Second)*
- **v_{rot}** Rotational Frequency *(Hertz)*
- **v_{rot2}** Rotational Frequency given Angular Frequency *(Hertz)*
- **ω** Angular Velocity Spectroscopy *(Radian per Second)*
- **ω2** Angular Velocity given Momentum and Inertia *(Radian per Second)*
- **ω3** Angular Velocity of Diatomic Molecule *(Radian per Second)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Length** in Centimeter (cm)
  Length Unit Conversion 📲
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion 📲
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion 📲
- Measurement: **Energy** in Joule (J)
  Energy Unit Conversion 📲
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion 📲
- Measurement: **Angular Velocity** in Radian per Second (rad/s)
  Angular Velocity Unit Conversion 📲
- Measurement: **Moment of Inertia** in Kilogram Square Meter (kg·m²)
  Moment of Inertia Unit Conversion 📲
- Measurement: **Angular Momentum** in Kilogram Square Meter per Second (kg*m²/s)
  Angular Momentum Unit Conversion 📲

Check other formula lists

- **Angular Momentum and Velocity of Diatomic Molecule Formulas** [↗]
- **Bond Length Formulas** [↗]
- **Kinetic Energy for System Formulas** [↗]

- **Moment of Inertia Formulas** [↗]
- **Reduced Mass and Radius of Diatomic Molecule Formulas** [↗]
- **Rotational Energy Formulas** [↗]

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