Important Angular Momentum and Velocity of Diatomic Molecule Formulas PDF

Formulas Examples with Units

List of 9
Important Angular Momentum and Velocity of Diatomic Molecule Formulas

1) Angular Momentum given Kinetic Energy Formula

Formula

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

Example with Units

$$9.4868 \,{}_{\text{kg*m²/s}} = \sqrt{2 \cdot 1.125 \,{}_{\text{kg·m²}} \cdot 40 \,{}_{\text{J}}}$$

Evaluate Formula

2) Angular Momentum given Moment of Inertia Formula

Formula

$$L1 = I \cdot \omega$$

Example with Units

$$22.5 \,{}_{\text{kg*m²/s}} = 1.125 \,{}_{\text{kg·m²}} \cdot 20 \,{}_{\text{rad/s}}$$

Evaluate Formula

3) Angular Velocity given Angular Momentum and Inertia Formula

Formula

$$\omega2 = \frac{L}{I}$$

Example with Units

$$12.4444 \,{}_{\text{rad/s}} = \frac{14 \,{}_{\text{kg*m²/s}}}{1.125 \,{}_{\text{kg·m²}}}$$

Evaluate Formula

4) Angular Velocity given Inertia and Kinetic Energy Formula

Formula

$$\omega2 = \sqrt{2 \cdot \frac{KE}{I}}$$

Example with Units

$$8.4327 \,{}_{\text{rad/s}} = \sqrt{2 \cdot \frac{40 \,{}_{\text{J}}}{1.125 \,{}_{\text{kg·m²}}}}$$

Evaluate Formula

5) Angular Velocity given Kinetic Energy Formula

Formula

$$\omega3 = \sqrt{2 \cdot \frac{KE}{\left(m_1 \cdot \left(R_1^{\,2}\right)\right) + \left(m_2 \cdot \left(R_2^{\,2}\right)\right)}}$$

Example with Units

$$67.516 \,{}_{\text{rad/s}} = \sqrt{2 \cdot \frac{40 \,{}_{\text{J}}}{\left(14 \,{}_{\text{kg}} \cdot \left(1.5 \,{}_{\text{cm}}^{\,2}\right)\right) + \left(16 \,{}_{\text{kg}} \cdot \left(3 \,{}_{\text{cm}}^{\,2}\right)\right)}}$$

Evaluate Formula

6) Angular Velocity of Diatomic Molecule Formula

Formula

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

Example with Units

$$62.8319 \, \text{rad/s} = 2 \cdot 3.1416 \cdot 10 \, \text{Hz}$$

7) Rotational Frequency given Angular Frequency Formula

Formula

$$\nu_{rot2} = \frac{\omega}{2 \cdot \pi}$$

Example with Units

$$3.1831 \, \text{Hz} = \frac{20 \, \text{rad/s}}{2 \cdot 3.1416}$$

8) Rotational Frequency given Velocity of Particle 1 Formula

Formula

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

Example with Units

$$16.9765 \, \text{Hz} = \frac{1.6 \, \text{m/s}}{2 \cdot 3.1416 \cdot 1.5 \, \text{cm}}$$

9) Rotational Frequency given Velocity of Particle 2 Formula

Formula

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

Example with Units

$$9.5493 \, \text{Hz} = \frac{1.8 \, \text{m/s}}{2 \cdot 3.1416 \cdot 3 \, \text{cm}}$$

Variables used in list of Angular Momentum and Velocity of Diatomic Molecule Formulas above

- **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 in list of Angular Momentum and Velocity of Diatomic Molecule Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **sqrt**, sqrt(Number) *A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.*
- 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* ↪

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