## PHYSICS EQUATIONS - $\mathbf{1}^{\text {st }}$ SEMESTER

| VELOCITY | $\text { velocity }=\text { final distance -initial distance } \frac{\text { time }}{\text { time }}$ | $v=\underset{t}{\Delta \underline{d}}$ |
| :---: | :---: | :---: |
| ACCELERATION | $\text { acceleration }=\frac{\text { final velocity }- \text { initial velocity }}{\text { time }}$ | $\mathrm{a}=\underset{\mathrm{t}}{\mathrm{~V}_{\mathrm{f}}-\mathrm{V}_{\mathrm{i}}}$ |
| GRAVITATIONAL ACCELERATION | $\begin{gathered} \text { velocity }=\text { acceleration } \cdot \text { time } \\ \text { distance }=1 / 2 \text { acceleration } \cdot \text { time }^{2} \end{gathered}$ | $\begin{aligned} & \mathrm{v}_{\mathrm{y}}=\mathrm{at} \\ & \mathrm{~d}_{\mathrm{y}}=1 / 2 \mathrm{at}^{2} \end{aligned}$ |
| PYTHAGOREAN THEOREM | The square on the hypotenuse is equal to the sum of the squares on the other two sides. | $c^{2}=a^{2}+b^{2}$ |
| NET FORCE | Net Force $=$ mass $\cdot$ acceleration | $\mathrm{F}_{\text {Net }}=\mathrm{ma}$ |
| WEIGHT | Weight = mass $\cdot$ acceleration due to gravity | $\mathrm{W}=\mathrm{mg}$ |
| SLIDING FRICTION | friction force $=$ coefficient of friction $\cdot$ normal force | $\mathrm{F}_{\mathrm{f}}=\mu \mathrm{F}_{\mathrm{n}}$ |
| MOMENTUM | momentum $=$ mass $\cdot$ velocity | $\mathrm{p}=\mathrm{mv}$ |
| IMPULSE | Impulse $=$ force $\cdot$ time $=$ change in momentum | $\mathrm{J}=\mathrm{Ft}=\mathrm{m} \Delta \mathrm{v}=\Delta \mathrm{p}$ |
| CONSERVATION OF MOMENTUM | Sum momentum before = Sum momentum after $\begin{aligned} & \mathrm{m}_{1} \mathrm{v}_{1}+\mathrm{m}_{2} \mathrm{v}_{2}=\mathrm{m}_{1} \mathrm{v}_{1}^{\prime}+\mathrm{m}_{2} \mathrm{v}_{2}^{\prime} \\ & \mathrm{m}_{1} \mathrm{v}_{1}+\mathrm{m}_{2} \mathrm{v}_{2}=\left(\mathrm{m}_{1}+\mathrm{m}_{2}\right) \mathrm{v}^{\prime} \end{aligned}$ | $\Sigma \mathrm{p}_{\text {before }}=\Sigma \mathrm{p}_{\text {after }}$ <br> Elastic collisions <br> Inelastic collisions |
| WORK | Work $=$ force $\cdot$ distance | $\mathrm{W}=\mathrm{F} \cdot \mathrm{d}$ |
| POWER | $\text { power }=\frac{\text { work }}{\text { time }}$ | $P=\frac{W}{t}$ |
| POTENTIAL ENERGY | potential energy $=$ mass $\cdot$ gravity $\cdot$ height | P.E. $=\mathrm{mgh}$ |
| KINETIC ENERGY | kinetic energy $=1 / 2$ mass $\cdot$ velocity $^{2}$ | K.E. $=1 / 2 m v^{2}$ |
| CONSERVATION OF MECHANICAL ENERGY | $\begin{gathered} \text { Energy }_{\text {before }}=\text { Energy }_{\text {after }} \\ \text { Kinetic Energy }_{1}+\underset{\substack{\text { Potential Energy } \\ 1}}{ }+\text { Work }_{\text {Potential Energy }}^{2} \end{gathered}=\text { Kinetic Energy } y_{2}+\text { + }$ | $\begin{gathered} \Sigma \mathrm{E}_{\mathrm{b}}=\Sigma \mathrm{E}_{\mathrm{a}} \\ \mathrm{KE}_{1}+\mathrm{PE}_{1}+\mathrm{W}=\mathrm{KE}_{2}+\mathrm{PE}_{2} \end{gathered}$ |

