Formula Sheet

(This is only for your study.)

From Chapter 2 – Chapter 4

For constant a_x

$$v_{xf} = v_{xi} + a_x t\,; \qquad \bar{v}_x = \frac{v_{ix} + v_{xf}}{2}\,; \qquad x_f = x_i + \tfrac{1}{2}\left(v_{xi} + v_{xf}\right)\,; \qquad x_f = x_i + v_{xi}t + \tfrac{1}{2}a_x t^2\,;$$

$$v_{xf}^2 = v_{xi}^2 + 2a_x\left(x_f - x_i\right)$$

From Chapter 5 – Chapter 8

$$a_c = \frac{v^2}{r}\,; \qquad T = \frac{2\pi r}{v}\,; \qquad \sum \vec{F} = m\vec{a}\,; \qquad \vec{F}_{12} = -\vec{F}_{21}\,;$$

$$\sum \vec{F} = ma_c = \frac{v^2}{r}\,; \qquad W = F\Delta r\cos\theta\,; \qquad \vec{A}\cdot\vec{B} \equiv AB\cos\theta\,; \qquad W = \int_{x_i}^{x_f} F_x\,dx\,;$$

$$F_s = -kx\,; \qquad \sum W = \tfrac{1}{2}mv_f^2 - \tfrac{1}{2}mv_i^2\,; \qquad K = \tfrac{1}{2}mv^2\,;$$

$$\Delta K = -f_k d + \sum W_{\text{other forces}}\,; \qquad \Delta E_{\text{int}} = f_k d\,; \qquad \wp = \frac{dE}{dt}\,; \qquad \wp = \frac{dW}{dt} = \vec{F}\cdot\frac{d\vec{r}}{dt} = \vec{F}\cdot\vec{v}\,;$$

$$U_g \equiv mgy\,; \qquad U_s \equiv \tfrac{1}{2}kx^2\,; \qquad \Delta E_{\text{mech}} = \Delta K + \Delta U = -f_k d\,; \qquad F_x = -\frac{dU}{dx}\,;$$