https://www.farmingdale.edu/faculty/peter-nolan/pdf/E_MTOC2-Ed.pdf

Summary of Important Equations Physics data

Planck's relation $E = nh\nu$

Einstein's photoelectric equation $KE_{max} = h\nu - W_0$

The work function $W_0 = h\nu_0$

Properties of the photon

Rest mass $m_0 = 0$

Energy $E = h\nu$

Relativistic mass $m = \dfrac{E}{c^2} = \dfrac{h\nu}{c^2}$

Momentum $p = \dfrac{E}{c} = \dfrac{h\nu}{c} = \dfrac{h}{\lambda}$

Momentum of any particle $p = \dfrac{\sqrt{E^2 - E_0^2}}{c}$

Compton scattering formula $(\lambda' - \lambda) = \dfrac{h}{m_0 c}(1 - \cos\phi)$

de Broglie relation $\lambda = \dfrac{h}{p}$

The uncertainty principle

$$\Delta p\, \Delta x \geq \hbar$$
$$\Delta\theta\, \Delta L \geq \hbar$$
$$\Delta E\, \Delta t \geq \hbar$$

Angular momentum of a particle

$$L = rp \sin\theta$$
$$L = rp$$

Payback time for a virtual particle $\Delta t = \dfrac{\hbar}{(\Delta m)c^2}$

Gravitational red shift

$$\nu_f = \nu_g\left(1 - \frac{gy}{c^2}\right)$$
$$T_f = T_g\left(1 + \frac{gy}{c^2}\right)$$

Slowing down of a clock in a gravitational field

$$\Delta t_f = \Delta t_g\left(1 + \frac{gy}{c^2}\right)$$

Slowing down of an accelerated clock

$$\Delta t_f = \Delta t_a\left(1 + \frac{ay}{c^2}\right)$$
$$\Delta t = \frac{\Delta t_a}{\sqrt{1 - v^2/c^2}}$$

Length contraction in a gravitational field $\lambda_f = \left(1 + \dfrac{gy}{c^2}\right)\lambda_g$

Length contraction in an acceleration $\lambda_0 = \left(1 + \dfrac{ay}{c^2}\right)\lambda_a$

$$L = L_0\sqrt{1 - v^2/c^2}$$