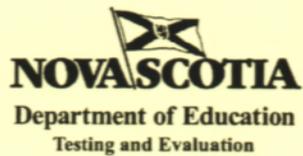


Physics 12
Resource Material
2002



Nova Scotia Examinations Physics 12
Formula Sheet

KINEMATICS	ELECTRICITY AND MAGNETISM
$\vec{v}_{ave} = \frac{\Delta \vec{d}}{t} \quad \Delta \vec{d} = \left(\frac{\vec{v}_f + \vec{v}_i}{2} \right) t$	$F_e = k \frac{q_1 q_2}{r^2} \quad V = IR$
$a = \frac{\vec{v}_f - \vec{v}_i}{t} \quad \Delta \vec{d} = \vec{v}_i t + \frac{1}{2} \vec{a} t^2$	$E = \frac{kq_1}{r^2} \quad P = IV$
$v_f^2 = v_i^2 + 2ad$	$F_m = B_{\perp} I \ell \quad F_m = qvB_{\perp}$
$v_c = \frac{2\pi r}{T} \quad a_c = \frac{v_c^2}{r}$	$\vec{E} = \frac{\vec{F}_e}{q} \quad I = \frac{q}{t}$
DYNAMICS	
$\vec{F} = m\vec{a} \quad \vec{F}_g = m\vec{g} \quad F_f = \mu F_N$	$V = \frac{\Delta E}{q} \quad \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \text{ etc}$
$\vec{F}_s = -k\vec{x} \quad F_c = \frac{mv^2}{r} \quad F_c = \frac{4\pi^2 mr}{T^2}$	$V = \ell v B_{\perp} \quad R_T = R_1 + R_2 + R_3 \text{ etc}$
$F_g = \frac{Gm_1 m_2}{d^2} \quad g = \frac{Gm_1}{d^2} \quad k = \frac{r^3}{T^2}$	$\frac{N_p}{N_s} = \frac{V_p}{V_s} = \frac{I_s}{I_p}$
$T = 2\pi \sqrt{\frac{\ell}{g}} \quad T = 2\pi \sqrt{\frac{m}{k}}$	
<p>torque = length of torque arm × applied force</p>	

MOMENTUM AND ENERGY

$$\vec{p} = m\vec{v}$$

$$W = Fd\cos\theta$$

$$E_p = mgh$$

$$\vec{F}\Delta t = m\Delta\vec{v}$$

$$E_k = \frac{1}{2}mv^2$$

$$E_p = \frac{1}{2}kx^2$$

QUANTUM AND NUCLEAR PHYSICS

$$E_k = hf - hf_0$$

$$E_n = \frac{-13.6}{n^2} \text{eV}$$

$$E_{\text{photon}} = E_f - E_i$$

$$E_{\text{photon}} = hf = \frac{hc}{\lambda}$$

$$\lambda = \frac{h}{mv}$$

$$E = mc^2$$

$$c = f\lambda$$

$$p = \frac{h}{\lambda} = \frac{hf}{c}$$

$$E_{\text{photon}} = pc$$

Some Useful Information

acceleration due to gravity at the Earth's surface..... $g = 9.80 \text{ m/s}^2$

universal gravitation constant..... $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$

Coulomb's law constant..... $k = 9.0 \times 10^9 \text{ Nm}^2/\text{C}^2$

magnitude of the charge on an electron..... $1.60 \times 10^{-19} \text{ C}$

Planck's constant..... $h = 6.626 \times 10^{-34} \text{ J/Hz}$ or $\text{J}\cdot\text{s}$

radius of Earth..... $6.37 \times 10^6 \text{ m}$

radius of Earth orbit..... $1.4957 \times 10^{11} \text{ m}$

mass of Earth..... $5.98 \times 10^{24} \text{ kg}$

speed of light in vacuum..... $c = 3.00 \times 10^8 \text{ m/s}$

mass of an electron..... $9.11 \times 10^{-31} \text{ kg}$

mass of a proton..... $1.6735 \times 10^{-27} \text{ kg}$

atomic mass unit..... $u = 1.6605 \times 10^{-27} \text{ kg}$

rest mass of neutron..... $1.008665 \text{ u} = 1.6749 \times 10^{-27} \text{ kg}$

rest mass of proton..... $1.007823 \text{ u} = 1.6735 \times 10^{-27} \text{ kg}$

1 electron volt..... $\text{eV} = 1.6 \times 10^{-19} \text{ J}$

