

**EXAMINATION DATA SHEET FOR THE PHYSICAL SCIENCES  
(PHYSICS)**

**TABLE 1 PHYSICAL CONSTANTS**

NAME	SYMBOL	VALUE
Acceleration due to gravity on Earth	g	9,8 m·s <sup>-2</sup>
Speed of light in a vacuum	c	3,0 × 10 <sup>8</sup> m·s <sup>-1</sup>
Universal gravitational constant	G	6,7 × 10 <sup>-11</sup> N·m <sup>2</sup> ·kg <sup>-2</sup>
Coulomb's constant	k	9,0 × 10 <sup>9</sup> N·m <sup>2</sup> ·C <sup>-2</sup>
Magnitude of charge on electron	e	1,6 × 10 <sup>-19</sup> C
Mass of an electron	m <sub>e</sub>	9,1 × 10 <sup>-31</sup> kg
Planck's constant	h	6,6 × 10 <sup>-34</sup> J·s
1 electron-volt	eV	1,6 × 10 <sup>-19</sup> J

**TABLE 2 PHYSICS FORMULAE**

**MOTION**

$v = u + at$ or $v_f = v_i + a\Delta t$	$s = \left(\frac{v+u}{2}\right)t$ or $\Delta x = \left(\frac{v_f+v_i}{2}\right)\Delta t$
$v^2 = u^2 + 2as$ or $v_f^2 = v_i^2 + 2a\Delta x$	$s = ut + \frac{1}{2}at^2$ or $\Delta x = v_i\Delta t + \frac{1}{2}a(\Delta t)^2$

**FORCE AND MOMENTUM**

$F_{net} = ma$	$F_{net} = \frac{\Delta p}{\Delta t}$ or $F_{net}\Delta t = m\Delta v$	$J = \Delta p = mv - mu$ or $J = \Delta p = mv_f - mv_i$
$p = mv$	$F_g = mg$	$F_{fs}^{max} = \mu_s F_N$  $F_{fk} = \mu_k F_N$

**WORK, ENERGY AND POWER**

$W = Fs$ or $W = F\Delta x$ or $W = F\Delta x \cos\theta$	$P = \frac{W}{t}$	$P = Fv$
$E_p = mgh$	$E_K = \frac{1}{2}mv^2$	$W_{net} = \Delta E_K$
$\% \text{ efficiency} = \frac{\text{power}_{out}}{\text{power}_{in}} \times 100$		

**GRAVITATIONAL AND ELECTRIC FIELDS**

$F = G \frac{m_1 m_2}{r^2}$	$g = \frac{F}{m}$	$g = G \frac{M}{r^2}$
$F = k \frac{q_1 q_2}{r^2}$	$E = \frac{F}{q}$	$E = k \frac{Q}{r^2}$

**ELECTRIC CIRCUITS**

$I = \frac{q}{t}$	$V = \frac{W}{q}$
$R = \frac{V}{I}$	$emf = I(R_{ext} + r)$ or $emf = V_{load} + V_{internal\ resistance}$
$R_s = R_1 + R_2 + \dots$	$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$
$P = \frac{W}{t}$ or $W = Pt$	
$W = VIt$ or $W = I^2 R t$ or $W = \frac{V^2}{R} t$	
$P = VI$ or $P = I^2 R$ or $P = \frac{V^2}{R}$	

**ELECTRODYNAMICS**

$\Phi = BA \cos \theta$	$emf = -N \frac{\Delta \Phi}{\Delta t}$	$F = IB \ell \sin \theta$
$V_p I_p = V_s I_s$		$\frac{N_s}{N_p} = \frac{V_s}{V_p}$

**PHOTONS AND ELECTRONS**

$c = f \lambda$	$E = hf$ or $E = \frac{hc}{\lambda}$	
$E = W_0 + E_{K(max)}$	$W_0 = hf_0$	$E_{K(max)} = \frac{1}{2} m v_{max}^2$