

EXAMINATION DATA SHEET FOR THE PHYSICAL SCIENCES (PHYSICS)

TABLE 1 PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Acceleration due to gravity	g	$9,8 \text{ m}\cdot\text{s}^{-2}$
Speed of light in a vacuum	c	$3,0 \times 10^8 \text{ m}\cdot\text{s}^{-1}$
Universal gravitational constant	G	$6,7 \times 10^{-11} \text{ N}\cdot\text{m}^2\cdot\text{kg}^{-2}$
Coulomb's constant	k	$9,0 \times 10^9 \text{ N}\cdot\text{m}^2\cdot\text{C}^{-2}$
Magnitude of charge on electron	e	$1,6 \times 10^{-19} \text{ C}$
Mass of an electron	m_e	$9,1 \times 10^{-31} \text{ kg}$
Planck's constant	h	$6,6 \times 10^{-34} \text{ J}\cdot\text{s}$
1 electron volt	eV	$1,6 \times 10^{-19} \text{ J}$

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

GRAVITATIONAL AND ELECTRIC FIELDS

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

ELECTRIC CIRCUITS

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

ELECTRODYNAMICS

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

PHOTONS AND ELECTRONS

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