EXAMINATION DATA SHEET FOR THE PHYSICAL SCIENCES (PHYSICS)

TABLE 1 PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Acceleration due to gravity	g	$9{,}8\ \text{m·s}^{-2}$
Speed of light in a vacuum	c	$3{,}0 \times 10^{8}\ \text{m·s}^{-1}$
Universal gravitational constant	G	$6{,}7 \times 10^{-11}\ \text{N·m}^2\text{·kg}^{-2}$
Coulomb's constant	k	$9{,}0 \times 10^{9}\ \text{N·m}^2\text{·C}^{-2}$
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	$6{,}6 \times 10^{-34}\ \text{J·s}$
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** $W = F\Delta x\cos\theta$	$P = \frac{W}{t}$	$P = Fv$	
$E_p = mgh$	$E_k = \frac{1}{2}mv^2$	$W_{net} = \Delta E_K$	$\text{efficiency} = \frac{\text{power}_{\text{out}}}{\text{power}_{\text{in}}} \times 100$

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** $emf = V_{load} + V_{internal\ resistance}$
$R_S = R_1 + R_2 + ...$	$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + ...$
$P = \frac{W}{t}$ **or** $W = Pt$	
$W = VIt$ **or** $W = I^2Rt$ **or** $W = \frac{V^2}{R}t$	
$P = VI$ **or** $P = I^2R$ **or** $P = \frac{V^2}{R}$	

ELECTRODYNAMICS

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

PHOTONS AND ELECTRONS

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