DATA FOR THE PHYSICAL SCIENCES PAPER I (PHYSICS) gr11

TABLE 1 PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Approximate magnitude of acceleration due to gravity	g	10 m s^{-2}
Speed of light in a vacuum	c	3,0 x 10^{8} m·s^{-1}
Gravitational Constant	G	6,7 x 10^{-11} N m^{2} kg^{-2}
Magnitude of charge on electron	e^{-}	1,6 x 10^{-19} C
Mass of an electron	m_{e-}	9.1 x 10^{-31} kg
Permittivity of free space	ε_o	8,9 x 10^{-12} F m^{-1}
Molar gas constant	R	8,31 $J.K^{-1}.mol^{-1}$

TABLE 2 FORMULAE FOR MECHANICS

MOTION

$v_f = v_i + a\Delta t$	$\Delta x = \left(\frac{v_i + v_f}{2}\right)\Delta t$
$v_f^2 = v_i^2 + 2a\Delta x$	$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$

FORCE

$F = \frac{Gm_1m_2}{r^2}$	$F = \mu_s F_N$ $F = \mu_k F_N$
$p = mv$	$F_{net} = \frac{\Delta p}{\Delta t}$
$F_{net}\Delta t = m\Delta v$	$F_{net} = ma$ $F_g = mg$
$\tau = F_\perp r$	$MA = \frac{F_L}{F_A}$

WORK ENERGY POWER

$W = Fs$	$E_p = mgh$
$P = \frac{W}{t}$ $P = Fv$	$E_k = \frac{1}{2}mv^2$

GASES

$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2}$	$pV = nRT$

WAVES, LIGHT AND SOUND

$v = f\lambda$	$T = \frac{1}{f}$
$\sin\theta_n = \frac{n\lambda}{w}$	$f' = \left(\frac{V}{V-v}\right)f$ or $f' = \left(\frac{V}{V+v}\right)f$
$E = hf$	$\lambda = \frac{h}{mv}$

ELECTROSTATICS

$F = \frac{kQ_1Q_2}{r^2}$ $(k = 9 \times 10^9\ N m^2 C^{-2})$	$V = \frac{W}{Q}$
$E = \frac{F}{Q}$	$E = \frac{V}{d}$
$E = \frac{kQ}{r^2}$ $(k = 9 \times 10^9\ N.m^2.C^{-2})$	$C = \frac{Q}{V}$
$C = \varepsilon_o \frac{A}{d}$	

ELECTROMAGNETISM

$\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$	$\Phi = BA$
$\frac{V_s}{V_p} = \frac{N_s}{N_p}$	$F = qvB$

CURRENT ELECTRICITY

$Q = I\Delta t$	$R = \frac{V}{I}$
$R = r_1 + r_2 + r_3 + ...$	$\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + ...$
$P = VI = I^2R = \frac{V^2}{R}$	$emf = I(R + r)$

ALTERNATING CURRENT

$I_{rms.} = \frac{I_{max}}{\sqrt{2}}$ and $V_{rms.} = \frac{V_{max}}{\sqrt{2}}$	$X_C = \frac{1}{2\pi fC}$ and $V_{rms} = I_{rms}X_C$
$X_L = 2\pi fL$ and $V_{rms} = I_{rms}X_L$	