1	photoelectric effect	$E_{k\max} = hf - W$
2	photon energy	$E = hf$
3	photon momentum	$p = \frac{h}{\lambda}$
4	de Broglie wavelength	$\lambda = \frac{h}{p}$
5	resistors in series	$R_T = R_1 + R_2$
6	resistors in parallel	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$
7	magnetic force	$F = I\,l\,B$
8	electromagnetic induction	emf : $\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ flux: $\Phi = BA$
9	transformer action	$\frac{V_1}{V_2} = \frac{N_1}{N_2}$
10	AC voltage and current	$V_{\text{RMS}} = \frac{1}{\sqrt{2}}V_{\text{peak}}$ $I_{\text{RMS}} = \frac{1}{\sqrt{2}}I_{\text{peak}}$
11	voltage; power	$V = RI$ $P = VI$
12	transmission losses	$V_{\text{drop}} = I_{\text{line}}\,R_{\text{line}}$ $P_{\text{loss}} = I_{\text{line}}^2\,R_{\text{line}}$
13	mass of the electron	$m_e = 9.11 \times 10^{-31}$ kg
14	charge on the electron	$e = -1.60 \times 10^{-19}$ C
15	Planck's constant	$h = 6.63 \times 10^{-34}$ J s $h = 4.14 \times 10^{-15}$ eV s
16	speed of light	$c = 3.0 \times 10^8$ m s^{-1}

Detailed study 3.1 – Synchrotron and applications

17	energy transformations for electrons in an electron gun (<100 keV)	$\frac{1}{2}\text{m v}^2 = \text{eV}$
18	radius of electron beam	r = p/*e*B
19	force applied to an electron beam	F = *e*vB
20	Bragg's law	$n\lambda = 2d\sin\theta$
21	electric field between charged plates	$E = \frac{\text{V}}{d}$

Detailed study 3.2 – Photonics

22	band gap energy	$E = \frac{hc}{\lambda}$
23	Snell's law	$n_1 \sin i = n_2 \sin r$

Detailed study 3.3 – Sound

24	speed, frequency and wavelength	$v = f\lambda$
25	intensity and levels	sound intensity level (in dB) = $10 \log_{10}\left(\frac{I}{I_0}\right)$ where $I_0 = 1.0 \times 10^{-12}$ W m^{-2}

Prefixes/Units

p = pico = 10^{-12}

n = nano = 10^{-9}

μ = micro = 10^{-6}

m = milli = 10^{-3}

k = kilo = 10^{3}

M = mega = 10^{6}

G = giga = 10^{9}

t = tonne = 10^{3} kg

END OF DATA SHEET