

FORMULAE SHEET

Note: Cambridge O'level 5054 syllabus is divided into 6 sections. Formulae's or equations are written under each topic with specified sub topic.

SECTION I: GENERAL PHYSICS

Vernier Caliper ,

Final Reading = Main scale reading +(Vernier scale reading X least count)

$$F.R = MSR + (VSR \times LC)$$

Least counts are 0.01 for cm and 0.1 for mm

Micrometer screw gauge,

Final Reading = Main scale reading +(thimble scale reading X least count)

$$F.R = MSR + (TSR \times LC)$$

SECTION II: NEWTONIAN MECHANICS

$$\text{Speed} = \frac{\text{distance}}{\text{Time}} \quad V = \frac{s}{t}$$

$$\text{Velocity} = \frac{\text{displacement}}{\text{Time}} \quad V = \frac{s}{t}$$

$$\text{Acceleration} = \frac{\text{Changing Velocity (Final velocity - initial velocity)}}{\text{Time}} \quad a = \frac{V-u}{t}$$

Dynamics:

Force = mass X acceleration, $F=ma$

Stopping distance = Thinking distance + braking distance, $SD = TD + BD$

Mass, Weight and Density:

Weight = mass X gravitational field strength, $W=mg$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \quad \rho = \frac{m}{V}$$

Turning effect of force:

Moment = Force X perpendicular distance, $m = F \times d$

Pressure:

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} \quad P = \frac{F}{A}$$

Hydraulic system, Pressure 1 = pressure 2 $\frac{F_1}{A_1} = \frac{F_2}{A_2}$

Pressure = density X gravitational field strength x height, $p = \rho gh$.

Pressure and volume, Pressure 1 X volume 1 = Pressure 2 X volume 2, $p_1 V_1 = p_2 V_2$.

SECTION III: ENERGY AND THERMAL PHYSICS

Energy Sources and Transfer of Energy

Kinetic energy = $\frac{1}{2}$ mass X square of velocity, $E_k = \frac{1}{2}mv^2$

Potential energy = mass X gravitational field strength X height, $E_p = mgh$

Mass-energy equation, Energy = mass X square of light speed $E = mc^2$.

Work = force \times distance moved in the line of action of the force, $W = F \times d$

$$\text{Power} = \frac{\text{Workdone}}{\text{time}}, \quad P = \frac{W.d}{t}$$

$$\text{Efficiency} = \frac{\text{energy converted to the required form}}{\text{total energy input}} \times 100 \quad \text{or}$$

$$\text{Efficiency} = \frac{\text{power output}}{\text{power input}} \times 100$$

Thermal Properties of Matter

Thermal energy = mass \times specific heat capacity \times change in temperature. $E = mc(Q_2 - Q_1)$

Thermal energy = mass \times specific latent heat. $E = mL$

SECTION IV: WAVES

General Wave Properties

$$\text{frequency} = \frac{1}{\text{time period}} \quad f = \frac{1}{T}$$

$$\text{Velocity} = \text{frequency} \times \text{wavelength. } V = f \lambda$$

Light

$$\text{Refractive index} = \frac{\sin i}{\sin r} \quad n = \frac{\sin i}{\sin r}$$

Sound (echo)

$$\text{speed of sound} = \frac{2 \times \text{distance}}{\text{time}} \quad V = \frac{2S}{t}$$

SECTION V: ELECTRICITY AND MAGNETISM

Static Electricity

charge = current \times time $Q=It$

$$e.m.f = \frac{\text{Workdone}}{\text{charge}} \quad V = \frac{W}{Q}$$

Potential difference (Voltage) = Current \times Resistance $V=IR$

Series Circuit,

Resistors, $R=R_1 + R_2 + R_3 \dots$

Voltage across resistors, $V= V_1+V_2+V_3 \dots$

Current in Circuit, $I = I_1=I_2=I_3$

Parallel circuit,

Resistors in parallel, $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots$

Voltage across resistors $V_1=V_2=V_3 \dots$

Current in circuit. $I=I_1+I_2+I_3$

Practical Electricity

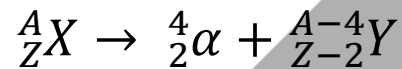
$$\text{power} = \text{voltage} \times \text{current} \quad P = VI$$

$$\text{energy} = \text{voltage} \times \text{current} \times \text{time.} \quad E = VIt$$

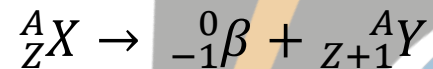
SECTION VI: ATOMIC PHYSICS

Radioactivity:

Alpha decay:



Beta decay:



Gamma decay:

