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 X 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 X LC)

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

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

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

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

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

Turning effect of force:

Moment = Force X perpendicular distance, m=F X d

Pressure:

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

$$Hydraulic\ system, \qquad Preesure1 = pressure\ 2 \qquad \frac{F1}{A1} = \frac{F2}{A2}$$

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

Pressure and volume, Pressure 1 X volume 1 = Pressure 2 X volume 2, $p1V1 = p2V2$.

Energy Sources and Transfer of Energy

Kinetic energy =½ mass X square of velocity, $Ek = \frac{1}{2}mv^2$

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

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

Work = force × distance moved in the line of action of the force, W = F X d

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

$$Efficiency = \frac{energy\ converted\ to\ te\ required\ form}{total\ energy\ input} \text{ X 100 or}$$

$$Efficiency = \frac{power\ output}{power\ input}\ X\ 100$$

Thermal Properties of Matter

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

Thermal energy = mass × specific latent heat. E = mL

SECTION IV: WAVES

General Wave Properties

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

Velocity = frequency × wavelength. $V = f\lambda$

Light

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

Sound (echo)

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

Static Electricity

$charge = current \times time$ Q=It

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

Potential difference (Voltage) = Current X Rresistance V=IR

Series Circuit,

Resistors, R=R1 + R2 + R3. .

Voltage across resistors, V= V1+V2+V3. .

Current in Circuit, I = I1=I2=I3

Parallel circuit,

Resistors in parallel, $\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3} \ldots$

Voltage across resistors V1=V2=V3..

Current in circuit. I=I1+I2+I3

Practical Electricity

power = voltage × current $P = VI$

energy = voltage × current × time. $E = VIt$

SECTION VI: ATOMIC PHYSICS

Radioactivity:

Alpha decay:

$$^{A}_{Z}X \rightarrow {}^{4}_{2}\alpha + {}^{A-4}_{Z-2}Y$$

Beta decay:

$$^{A}_{Z}X \rightarrow {}^{0}_{-1}\beta + {}^{A}_{Z+1}Y$$

Gamma decay:

$$^{A}_{Z}X \rightarrow {}^{0}_{0}\gamma + {}^{A}_{Z}Y$$