Electricity :-

① Current (I) = $\frac{\text{Charge flowing (Q)}}{\text{time taken (t)}}$

② SI unit of charge is coleemb (C). and SI unit of time is second.

→ Hence, SI unit of current is columb per second or Cs^{-1}.

→ This unit called ampere represented by symbol A.

③ - Potential difference between two points (V)
- work done (W)
- Charge taken (Q)

→ $V = \frac{W}{Q}$

④ SI unit of work is joule (J).
→ Hence SI unit of potential difference is joule per columb or JC^{-1}

→ This unit is called Volt represented by symbol V.

→ ⑤ Ohm's law :—

Potential difference (V) = current × Resistance

$V = IR$

where, current is I
Resistance is R.

→ SI unit of resistance if Volt per ampere which is called Ohm.

→ It is represented by symbol omega. (Ω)

⑥ Resistance of material is given by

$$R = \rho \frac{l}{A}$$

∴ where, l is length

A is the area of cross section.

And ρ is called resistivity.

→ SI unit is Ωm.

⑦ If n resistors are connected in series, their equivalent resistance is given by -

$$R = R_1 + R_2 + R_3 + \cdots + R_n$$

⑧ If n no of resistors are connected in parallel, their equivalent resistance is -

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots + \frac{1}{R_n}$$

(9) Heat generated in a resistor when current I flows through it for time t is given by H =

$$H = I^2Rt \quad \text{or} \quad H = VIt \quad \text{or}$$

$$H = \frac{V^2}{R}t$$

(10) Power is given by,

$$P = I^2R \quad \text{or} \quad P = VI$$

or,

$$P = \frac{V^2}{R}$$

(11) Relation between kWh and joule : $1\,kWh = 3.6 \times 10^6\,J$

Light :- Reflection

(12) Angle of incidence = angle on reflection

$R = 2f$

R = radius of curvature

f = focal length

(13) Mirror formula

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

(14) Magnification :-

$$m = \frac{h' \text{ image}}{h \text{ object}}$$

also, $m = -\frac{v}{u}$

$$\therefore \frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\rightarrow \frac{v}{v} + \frac{v}{u} = \frac{v}{f}$$

$$\rightarrow \frac{1}{-m} + 1 = \frac{u}{f}$$

$$\rightarrow \frac{1}{m} = 1 - \frac{u}{f}$$

$$\rightarrow m = \frac{f}{f-u}$$

★ Refraction :-

(15) Absolute refractive index :-

$$n_m = \frac{c}{c_m}$$

(16) Relative refractive index :-

$${}_1n_2 = \frac{c_1}{c_2}$$

$$c_1 = v\lambda_1 \quad , \quad c_2 = v\lambda_2$$

$${}_1n_2 = \frac{v\lambda_1}{v\lambda_2} = \frac{\lambda_1}{\lambda_2}$$

Also, $${}_1n_2 = \frac{n_2}{n_1}$$

(17) Snell's law! –

when light goes from medium 1 to medium 2 such that it makes angle i in medium 1 and angle r in medium 2 then,

$$n_1 \sin i = n_2 \sin r$$

where n_1 and n_2 are absolute refractive indices of medium 1 and 2 respectively.

(18) Thin lens formula! –

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

magnification,

$$m = \frac{h \text{ image}}{h \text{ object}} = \frac{v}{u}$$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\rightarrow \frac{1}{m} - 1 = \frac{u}{f}$$

$$\frac{1}{m} = \frac{u}{f} + 1$$

$$m = \frac{f}{f+u}$$

(19) Power of lens :-

$$P = \frac{1}{\text{focal length}}$$

(20) Combination of lens :-

Power of combination :

$$P = P_1 + P_2 + P_3 + \dots$$

Focal length of combination

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} + \frac{1}{f_3} + \cdots$$

Magnification of combination

$$m_2\ m_1 \times m_2 \times m_3 \times \cdots$$

★ Magnetic effects of current :-

Magnetic field at the centre of a current carrying conductor

$$B \propto I$$
$$B \propto \frac{1}{r}$$
$$B \propto N$$

where I is the current in the conductor, N is total number of turns and r is the radius of the conductor.

* Magnetic field due to a straight Conductor! -

$$B \propto I$$
$$B \propto \frac{1}{r}$$

where r is the perpendicular distance of the point from conductor r.

* Magnetic field inside a solenoid! -

$$B \propto I$$
$$B \propto n$$

where n is the number of turns per unit length.

* Force acting on a current carrying Conductor placed in a magnetic field.

$$F \propto I$$
$$F \propto l$$

$F \propto B$

$F \propto \sin\theta$

Force is maximum when conductor is placed perpendicular to magnetic field.

xx X xx

All The Best Kido!