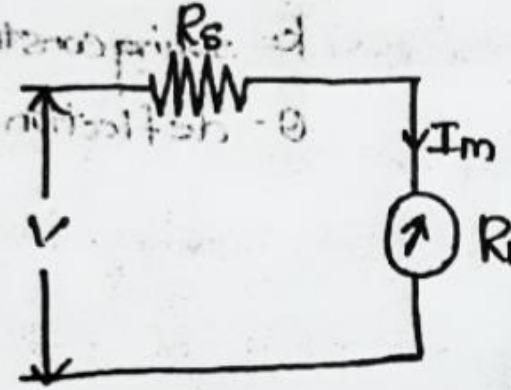
Basic Dc Voltmeter:

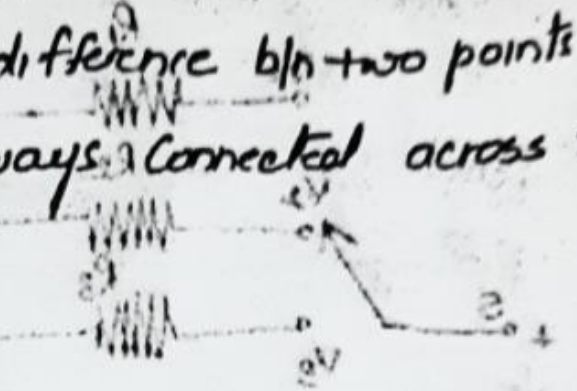


→ A Dc Voltmeter is use to measure the potential difference between 2 points in a dc Circuit (or) ckt Component

→ the basic DArsonval movement is Converted into Voltmeter by using a Series resistor called as Multiplier

→ The function of multipliers is to limit the current through the Basicmeter then the Current doesn't exceeds full Scale deflection Current

→ To Measure the potential difference b/n two points in a DC ckt. the Voltmeter is always Connected across them with proper polarity



$$V = I_m (R_s + R_m)$$

$$R_s + R_m = \frac{V}{I_m}$$

$$\boxed{R_s = \frac{V}{I_m} - R_m}$$

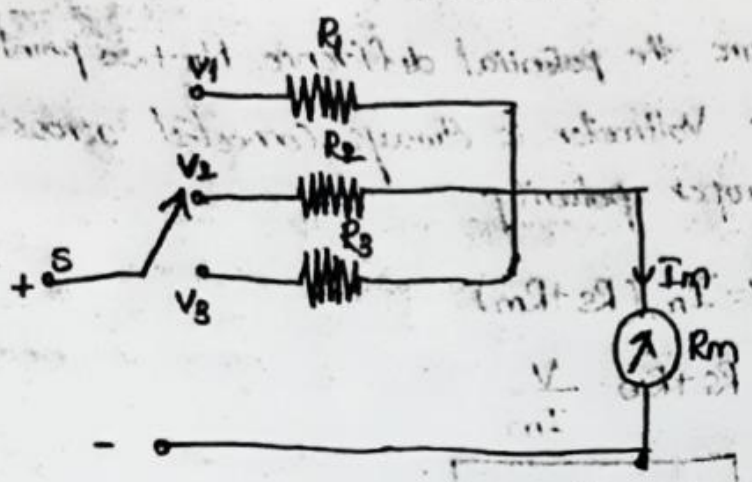
Where $I_m = I_{FSD}$ = full scale deflection of the Current

R_m = internal resistance of a coil

R_s = Series resistance (or) Multiplier resistance (or) Current limiting resistance

V = full range Voltage of the instrument

Multirange Voltmeter :-



→ The DC voltmeter is converted into multirange voltmeter by using number of multipliers and a selector switch as shown in fig.

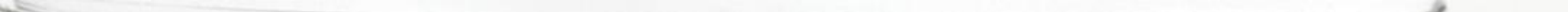
→ Let R_1, R_2, R_3 are multipliers that gives voltage ranges V_1, V_2, V_3

→ The Multiposition switch is used to select the multiplier for required voltage range.

for $V_1 > V_2 > V_3$ then the multipliers $R_1 > R_2 > R_3$ and the multiplier resistors are given by $V_1 = I_m(R_1 + R_m)$

$$R_1 = \frac{V_1}{I_m} - R_m$$

Similarly $R_2 = \frac{V_2}{I_m} - R_m$

$$R_3 = \frac{V_3}{I_m} - R_m$$

→ These voltmeter requires high precision values of multiple resistance, which increases the cost