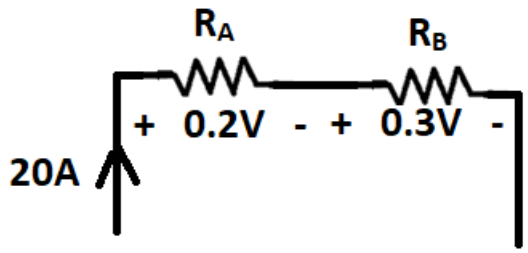
Lecture 5

1. **A current of 20A flows through two ammeters A and B joined in series. Across A the potential difference is 0.2V and across B it is 0.3V. Find how the same current will divide between A and B when they are joined in parallel.**

SOLUTION:

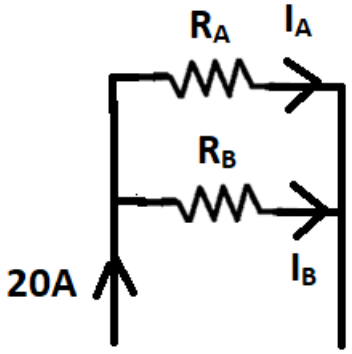
An ideal ammeter has zero resistance. The voltage drop across an ideal ammeter is zero. Since there is potential difference across each ammeter, each of them has some internal resistance.Let R_A and R_B be the internal resistances of Ammeters A & B respectively.

When joined in series,



$R_A = \frac{0.2V}{20A} = 0.01\Omega$; $R_B = \frac{0.3V}{20A} = 0.015\Omega$

When joined in parallel & for same total input current of 20A,



Let I_A & I_B be the currents through R_A & R_B respectively.

By current division rule,

$I_A = 20A*(\frac{R_B}{(R_A+R_B)}) = 12A$; $I_B = 20A*(\frac{R_A}{(R_A+R_B)}) = 8A$