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Date 21-May-2020

Question # 01

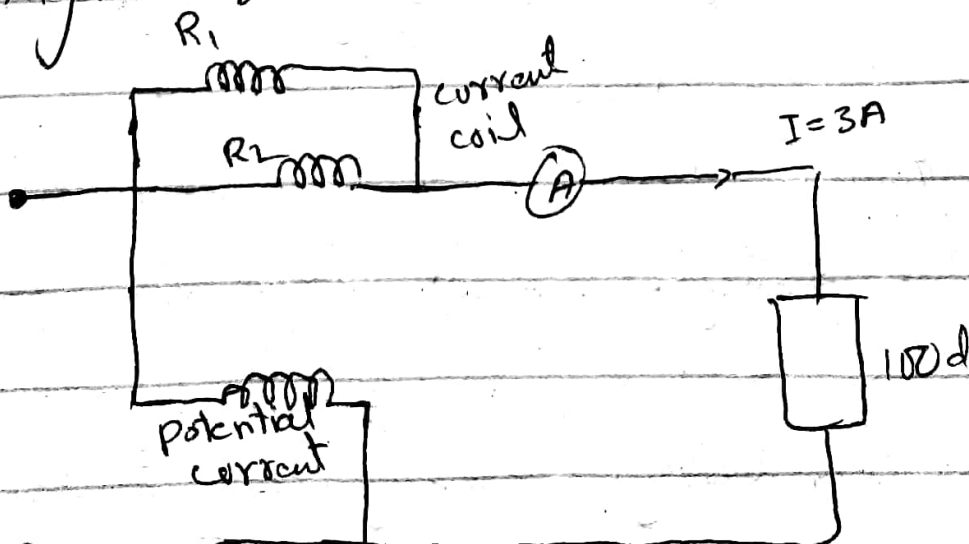
Given data:-

Two current coils Resistance $= R_1 = 0.700$ ALSO $= R_2 = 0.700$ Power $= P = 100W$ Current $= I = 3A$

Required :-

1. power loss in a wattmeter?
2. True load power = ?
3. percentage error due to wattmeter connection = ?

Diagram :-



Solution:-

Effect Resistance of
current coils

$$R_c = \frac{R_1 R_2}{R_1 + R_2} = \frac{0.7 \times 0.7}{0.7 + 0.7} = 0.35 \Omega$$

$$\begin{aligned} 1. \text{ power loss in wattmeter} &= I^2 R_c \\ &= (3)^2 (0.35) \\ &= 3.15 \text{ W} \end{aligned}$$

$$\begin{aligned} 2. \text{ True load power} &= 100 - 3.15 \\ &= 96.85 \text{ W} \end{aligned}$$

$$\begin{aligned} 3. \% \text{ age error} &= \frac{100 - 96.85}{96.85} \times 100 \\ &= 3.25 \% \end{aligned}$$

Question No 02:-

Given data:-

Two voltmeter range $= V = 0-500 \text{ V}$

Internal Resistance $= R_1 = 30 \text{ k}\Omega$

Internal Resistance $= R_2 = 20 \text{ k}\Omega$

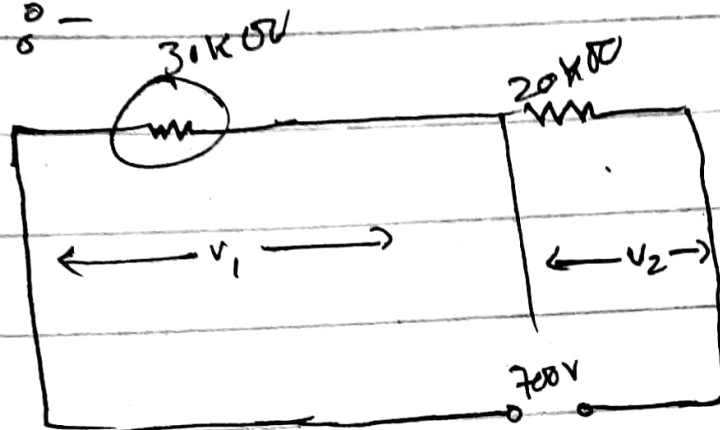
Total voltage across them $= V_T = 200 \text{ V}$

Required:-

voltage reading in 1st voltmeter?

voltage reading in 2nd voltmeter?

Diagram :-



Solution :-

Voltage divider Rule.

$$V_1 = \frac{30k\Omega}{30k\Omega + 20k\Omega} \times 700$$

$$V_1 = 420 \text{ V}$$

$$V_2 = \frac{20k\Omega}{30k\Omega + 20k\Omega} \times 700$$

$$= \underline{\underline{280 \text{ V}}}$$