

Nama : Andri Firman Saputra

Fisika Dasar II

NIM: 201011402125

Kisi-Kisi UAS

No.
Date

1. Sebuah pengering rambut menarik $13,5 \text{ A}$ pada voltase 120 V
- Berapa resistensinya?
 - Berapa muatan yg melaluinya dalam 15 menit?

a. Jiw:

$$I = 13,5 \text{ A}$$

$$V = 120 \text{ V}$$

$$R = V / I$$

$$R = 120 / 13,5$$

$$R = 8,88 \text{ ohm} //$$

b. Jiw:

$$I = 13,5 \text{ A}$$

$$t = 15 \text{ menit} = 900 \text{ detik}$$

$$q = I \times t$$

$$q = 13,5 \times 900$$

$$q = 12.150 \text{ Coulomb} //$$

2. Suatu pemanas listrik memiliki hambatan 25 ohm dihubungkan dgn sumber tegangan 250 Volt dan bekerja selama 24 jam, maka:

a. Arus yg mengalir dalam pemanasan 10 Ampere

b. Daya pemanas sebesar $2,5 \text{ kW}$

c. Jika tarif listrik $\text{Rp } 50,00 / \text{kWh}$, selama waktu tsb diperlukan biaya $\text{Rp } 3000,00$

Manakah pernyataan yg benar?

Semua benar

Dik:

$$R = 25 \text{ ohm}$$

$$V = 250 \text{ Volt}$$

$$t = 24 \text{ jam}$$

$$\text{tarif listrik} = \text{Rp } 50,00 / \text{kWh}$$

$$a. I = \frac{W}{Vt}$$

$$= \frac{60.000}{(250) \cdot (24)}$$

$$= \frac{60.000}{6000}$$

$$= 10 \text{ Ampere //$$

$$b. P = \frac{W}{t}$$

$$= \frac{60.000}{24}$$

$$= 2.500 \text{ watt}$$

$$= 2,5 \text{ kW //$$

$$c. W = \frac{V^2}{R} \times t$$

$$= \frac{250^2}{25} \times 24$$

$$= 60.000 \text{ watt/jam}$$

$$= 60 \text{ kWh}$$

$$\text{tarif} = 60 \text{ kWh} \times \text{Rp } 50,00 / \text{kWh}$$

$$= \text{Rp } 3.000,00 //$$

3. Dua buah lampu bertulisan $40\text{ W} - 60\text{ V}$ di pasang secara seri, kemudian dihubungkan dgn sumber listrik 60 V yg hanya mampu memasok arus listrik $0,5\text{ A}$. Berapakah besar daya efektif lampu tersebut?

dik:

$$Jml \text{ lampu} = 2$$

rangkain = seri

$$P = 40\text{ W}$$

$$V = 60\text{ V}$$

$$I = 0,5\text{ A}$$

Daya efektif?

- Cari hambatan lampu

$$R = V^2 / P$$

$$R = 60^2 / 40$$

$$R = 3600 / 40$$

$$R = 90\text{ ohm}$$

- Cari total hambatan seri

$$R_s = n \cdot R$$

$$R_s = 2 \cdot 90$$

$$R_s = 180\text{ ohm}$$

- Arus pada lampu seri

$$I = V / R_s$$

$$I = 60 / 180$$

$$I = 0,33334\text{ A}$$

- Daya efektif

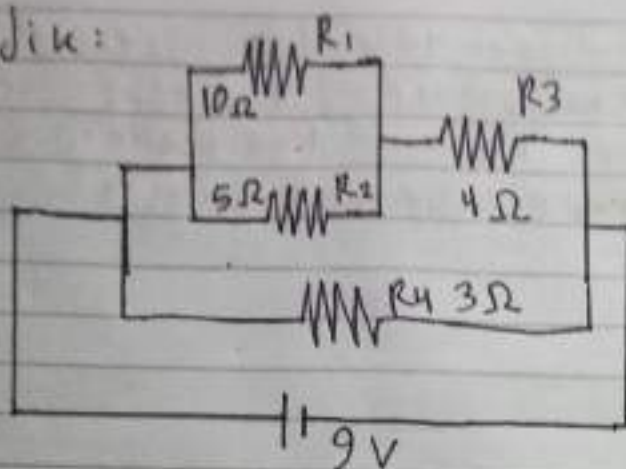
$$P_{ef} = V \cdot I$$

$$P_{ef} = 60 \cdot 0,33$$

$$P_{ef} = 19,98\text{ W}$$

$$P_{ef} = 20\text{ watt},$$

4. Jik:



a. Berapakah arus total yg mengalir dlm rangkaian?

$$\frac{1}{r_1} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{r_1} = \frac{1}{10} + \frac{1}{5} = \frac{1+2}{10} = \frac{3}{10}$$

$$r_1 = \frac{10}{3} + 4 = \frac{10+12}{3} = \frac{22}{3} \text{ ohm} = 7,334 \text{ ohm}$$

$$\frac{1}{r_2} = \frac{1}{7,334} + \frac{1}{3} = 0,334 \text{ ohm}$$

$$I = \frac{V}{r}$$

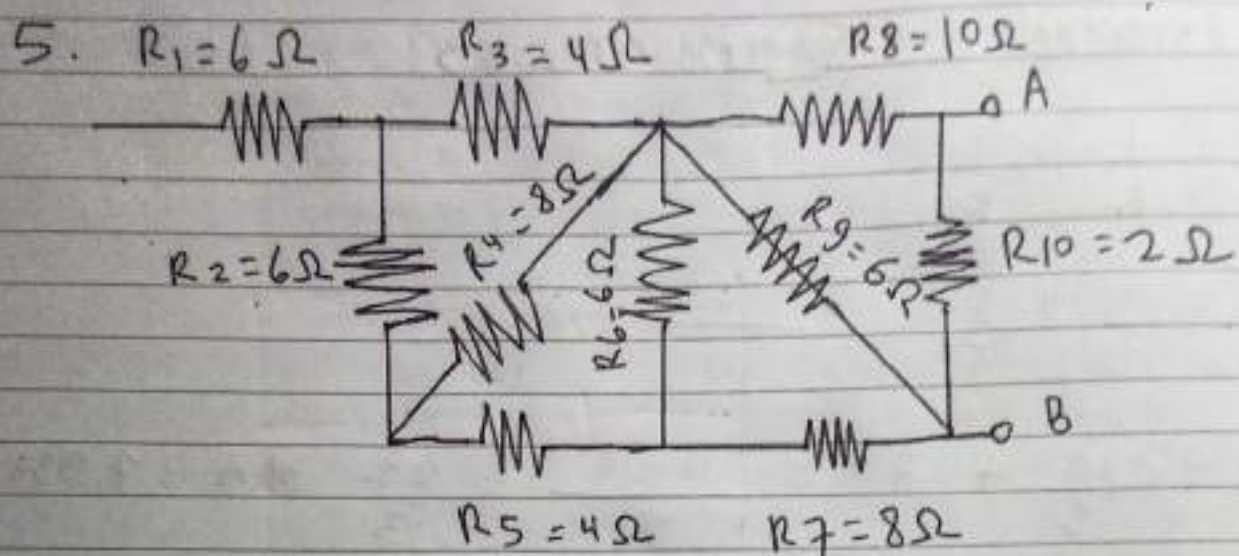
$$I = \frac{9}{0,334}$$

$$I = 26,946 \text{ A}$$

b. Berapakah arus yg mengalir pada R_3 ?

$$\text{Arus total} = R_3$$

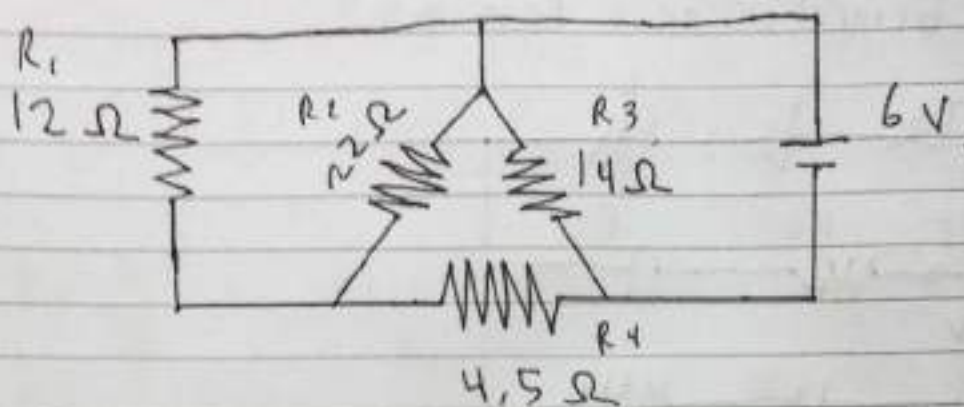
$$R_3 = 26,946 \text{ A}$$



Berapakah hambatan total pada Titik AB?

$$\begin{aligned}
 R_s &= R_1 + R_2 + R_3 + R_4 + R_5 + R_6 + R_7 + R_8 + R_9 + R_{10} \\
 &= 6 + 6 + 4 + 8 + 4 + 6 + 8 + 10 + 6 + 2 \\
 &= 60\Omega
 \end{aligned}$$

6. Dik:



- Berapakah R_{total} ?
- Berapakah arus pada resistor 14Ω ?
- Berapakah arus pada resistor 22Ω ?

$$\begin{aligned} a. R_t &= R_1 + R_2 + R_3 + R_4 \\ &= 12 + 22 + 14 + 4,5 \\ &= 52,5 \Omega // \end{aligned}$$

$$b. I = \frac{V}{R} = \frac{6}{52,5} = 0,114 A$$

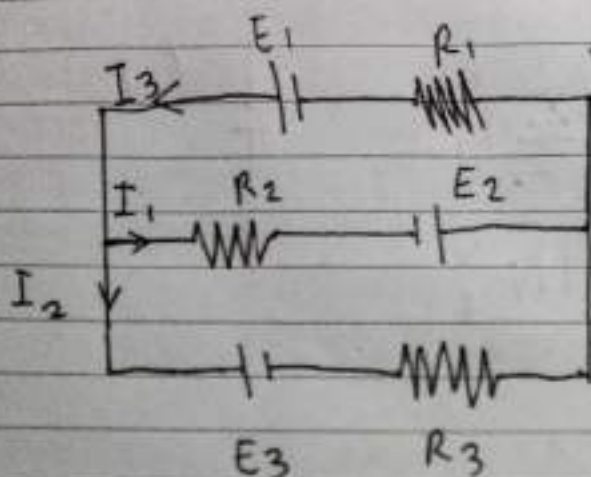
$$\begin{aligned} R_3 &= 0,114 \times 14 \\ &= 1,596 V // \end{aligned}$$

$$\begin{aligned} c. R_2 &= 0,114 \times 22 \\ &= 2,508 V // \end{aligned}$$

7. Dik: $E_1 = 16V$, $E_2 = 8V$, $E_3 = 10V$

$R_1 = 12\Omega$, $R_2 = 6\Omega$, $R_3 = 6\Omega$

Dit: Berapakah arus pada R_2 ?



$$I_1 = (V - 16) / 12$$

$$= \frac{10,4 - 16}{12}$$

$$= \frac{-5,6}{12} = -0,4667 \text{ A} //$$

$$I_2 = (V - 8) / 6$$

$$= \frac{10,4 - 8}{6}$$

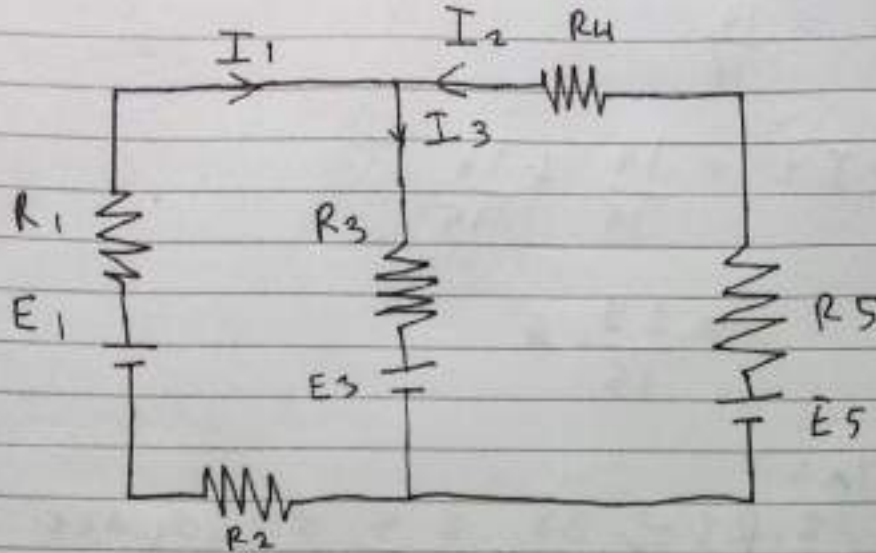
$$= \frac{2,4}{6} = 0,4 \text{ A}$$

$$I_3 = \frac{(V - 10)}{6} = \frac{(10,4 - 10)}{6}$$

$$= \frac{0,4}{6} = 0,067 \text{ A}$$

$$R_2 = -0,4667 \text{ A} //$$

8. Dik: $E_1 = 10V$, $E_2 = 10V$, $E_3 = 4V$, $R_1 = 5\Omega$,
 $R_2 = 1\Omega$, $R_3 = 3\Omega$, $R_4 = 1\Omega$, $R_5 = 5\Omega$.
 Dit: Daya pada R_3 ?



$$(I) \sum E + \sum I \cdot R = 0$$

$$E_1 + E_3 + (R_1 + R_2)I_1 + R_3 \cdot I_3 = 0$$

$$10 + 4 + (5 + 1)I_1 + 3 \cdot I_3 = 0$$

$$14 + 6I_1 + 3(I_1 + I_2) = 0$$

$$14 + 9I_1 + 3I_2 = 0$$

$$9I_1 + 3I_2 = -14$$

$$(II) E_2 + E_3 + (R_4 + R_5)I_2 + R_3 \cdot I_3 = 0$$

$$10 + 4 + (1 + 5)I_2 + 3 \cdot I_3 = 0$$

$$14 + 6I_2 - 3I_1 = 0$$

$$-3I_1 + 6I_2 = -14$$

$$\begin{array}{r|l} 9I_1 + 3I_2 = 14 & \times -3 \\ -3I_1 + 6I_2 = -14 & \times 1 \end{array}$$

$$-27I_1 + 9I_2 = 42$$

$$-27I_1 + 8I_2 = 126$$

$$-90I_2 = -84$$

$$I_2 = \frac{-84}{-90} = \frac{28}{30} = \frac{14}{15}$$

$$\begin{array}{r}
 81I_1 + 27I_2 = 126 \\
 -9I_1 + 27I_2 = 42 \quad - \\
 \hline
 90I_1 = 84 \\
 I_1 = \frac{14}{15}
 \end{array}$$

$$\begin{aligned}
 I_3 &= I_1 + I_2 = \frac{14}{15} + \frac{14}{15} \\
 &= \frac{28}{15} \text{ A}
 \end{aligned}$$

Jadi daya:

$$P = I_3 \cdot 2 \cdot R_3 \Rightarrow \frac{28}{15} \cdot 2 \cdot \frac{5}{3} = 280 \text{ watt}$$