

電験どうでしょう管理人
KWG presents

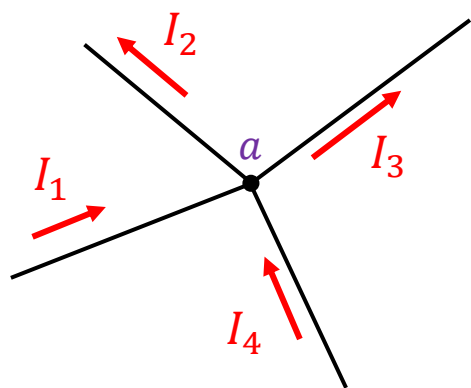
電験オンライン塾

第2回 直流回路
回路の電流

2023.04.15 Sat

キルヒホッフの電流則

回路網中の**任意の接続点**に流れ込む電流の和と流れ出る電流の和の大きさは等しい



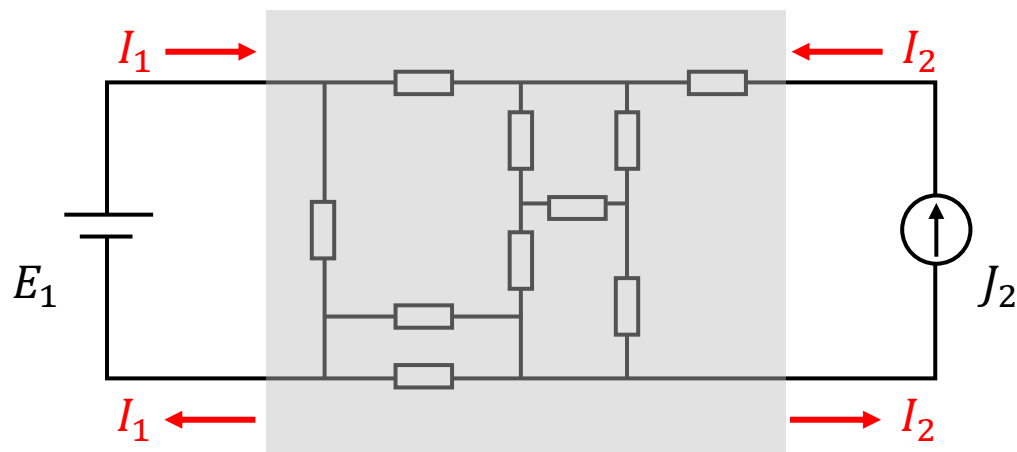
$$I_1 + I_4 = I_2 + I_3$$

(入ってくる電流) = (出ていく電流)

$$I_1 - I_2 - I_3 + I_4 = 0$$

(入ってくる電流)と
(出ていく電流)の総和 = 0

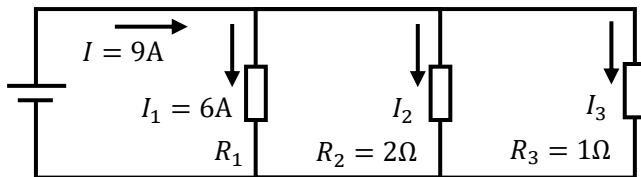
電流は途中で増えたり減ったりしない
(どこかに行ってしまう、減ったように見える)
(合流して、増えたように見える)



電源から出る電流と返ってくる電流は同じ
(行きと帰りの電流の大きさが違うということはありません)

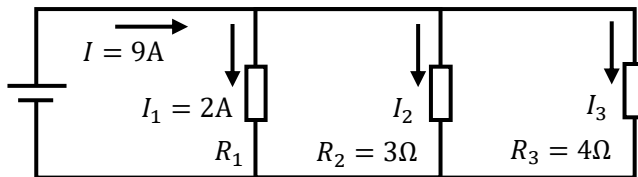
練習問題 I

(1)



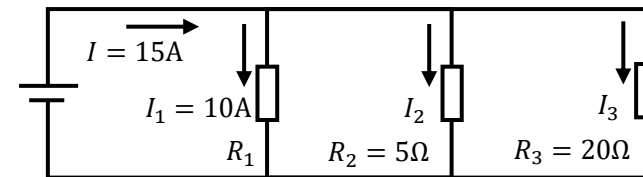
Ans. $I_2 =$ $I_3 =$

(2)



Ans. $I_2 =$ $I_3 =$

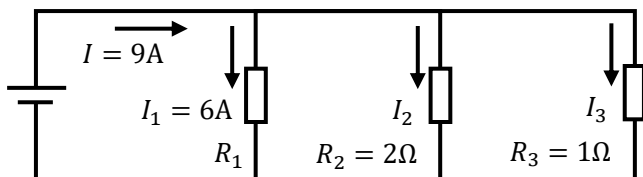
(3)



Ans. $I_2 =$ $I_3 =$

練習問題 I (解説)

(1)

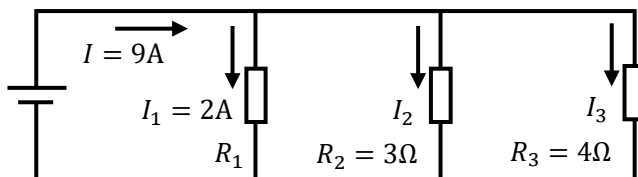


$$I_2 + I_3 = I - I_1 = 9 - 6 = 3A$$

$$I_2 : I_3 = R_3 : R_2 = 1 : 2$$

Ans. $I_2 = 1A$ $I_3 = 2A$

(2)

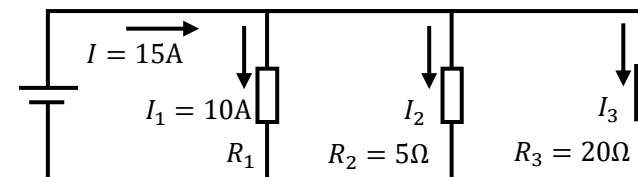


$$I_2 + I_3 = I - I_1 = 9 - 2 = 7A$$

$$I_2 : I_3 = R_3 : R_2 = 4 : 3$$

Ans. $I_2 = 4A$ $I_3 = 3A$

(3)



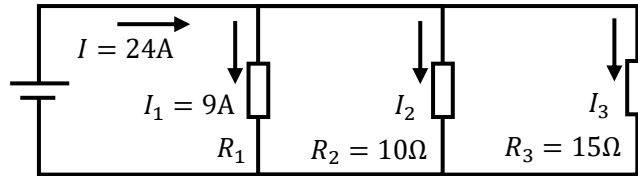
$$I_2 + I_3 = I - I_1 = 15 - 10 = 5A$$

$$I_2 : I_3 = R_3 : R_2 = 20 : 5 = 4 : 1$$

Ans. $I_2 = 4A$ $I_3 = 1A$

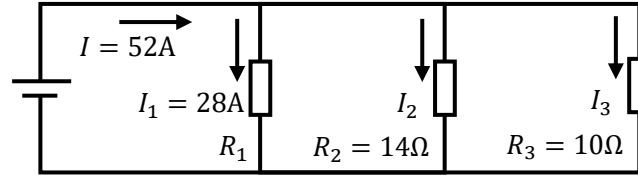
練習問題2

(1)



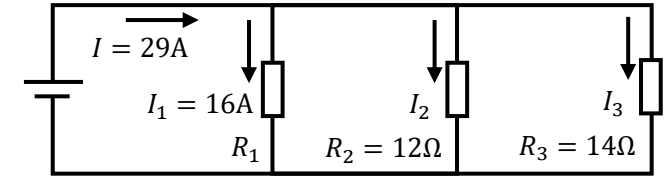
Ans. $I_2 =$ $I_3 =$ $R_1 =$

(2)



Ans. $I_2 =$ $I_3 =$ $R_1 =$

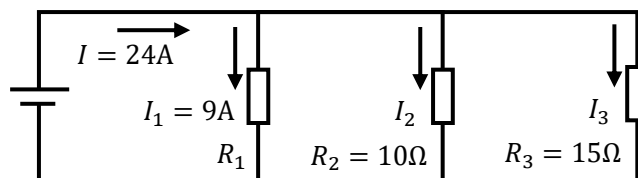
(3)



Ans. $I_2 =$ $I_3 =$ $R_1 =$

練習問題2 (解説)

(1)



$$I_2 + I_3 = I - I_1 = 24 - 9 = 15A$$

$$I_2 : I_3 = R_3 : R_2 = 15 : 10 = 3 : 2 = 9 : 6$$

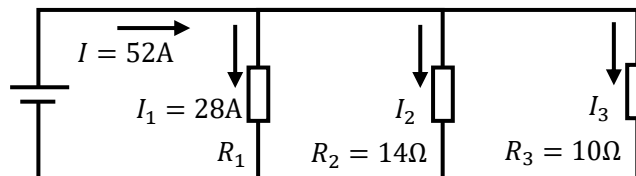
$$\frac{\text{電流 } I}{\text{比の総和}} = \frac{15}{3 + 2} = 3 \quad \times 3$$

$$V = R_2 I_2 = 10 \times 9 = 90V$$

$$R_1 = \frac{V}{I_1} = \frac{90}{9} = 10\Omega$$

Ans. $I_2 = 9A$ $I_3 = 6A$ $R_1 = 10\Omega$

(2)



$$I_2 + I_3 = I - I_1 = 52 - 28 = 24A$$

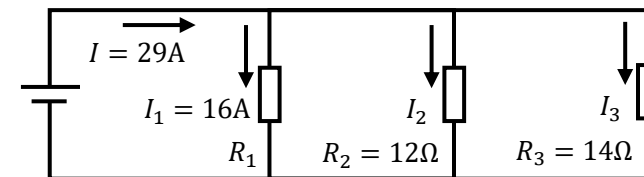
$$I_2 : I_3 = R_3 : R_2 = 10 : 14$$

$$V = R_2 I_2 = 14 \times 10 = 140V$$

$$R_1 = \frac{V}{I_1} = \frac{140}{28} = 5\Omega$$

Ans. $I_2 = 10A$ $I_3 = 14A$ $R_1 = 5\Omega$

(3)



$$I_2 + I_3 = I - I_1 = 29 - 16 = 13A$$

$$I_2 : I_3 = R_3 : R_2 = 14 : 12 = 7 : 6$$

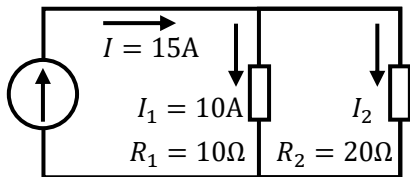
$$V = R_2 I_2 = 12 \times 7 = 84V$$

$$R_1 = \frac{V}{I_1} = \frac{84}{16} = \frac{21}{4}\Omega$$

Ans. $I_2 = 7A$ $I_3 = 6A$ $R_1 = \frac{21}{4}\Omega$

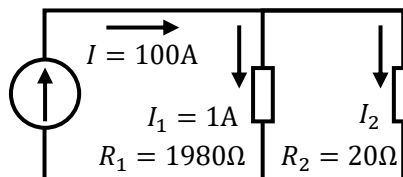
練習問題3

(1)



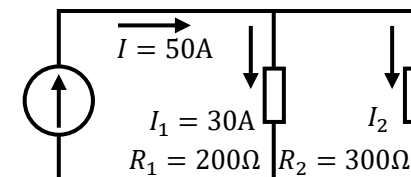
Ans. $I_2 =$ _____

(2)



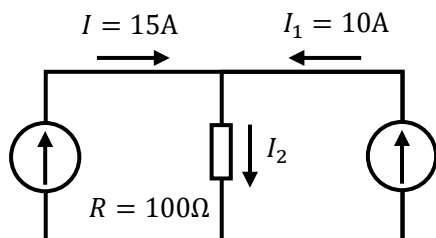
Ans. $I_2 =$ _____

(3)



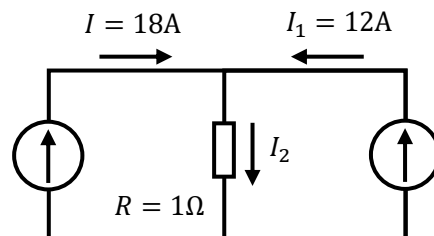
Ans. $I_2 =$ _____

(4)



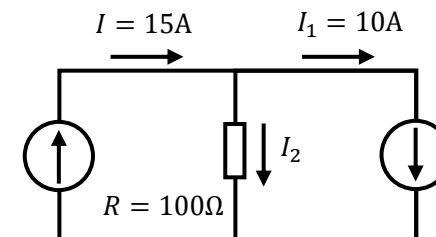
Ans. $I_2 =$ _____

(5)



Ans. $I_2 =$ _____

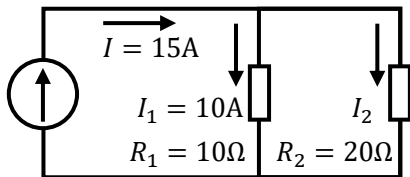
(6)



Ans. $I_2 =$ _____

練習問題3 (解説)

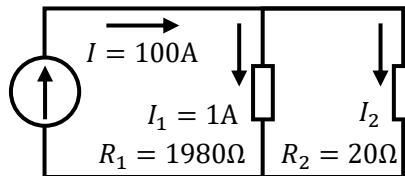
(1)



$$I_2 = I - I_1 = 15 - 10 = 5A$$

Ans. $I_2 = 5A$

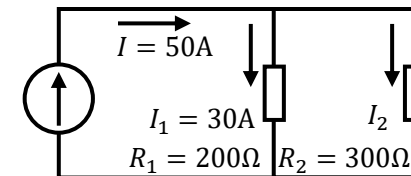
(2)



$$I_2 = I - I_1 = 100 - 1 = 99A$$

Ans. $I_2 = 99A$

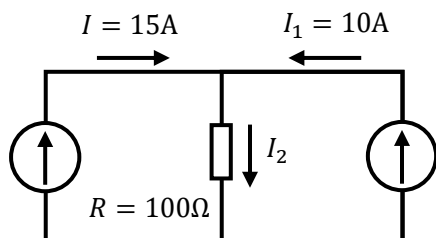
(3)



$$I_2 = I - I_1 = 50 - 30 = 20A$$

Ans. $I_2 = 20A$

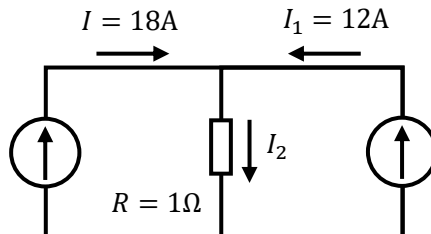
(4)



$$I_2 = I + I_1 = 15 + 10 = 25A$$

Ans. $I_2 = 25A$

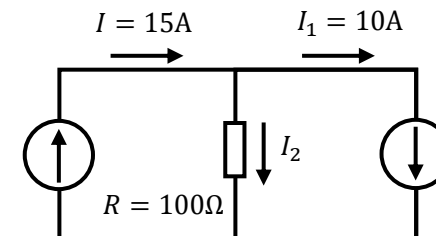
(5)



$$I_2 = I + I_1 = 18 + 12 = 30A$$

Ans. $I_2 = 30A$

(6)

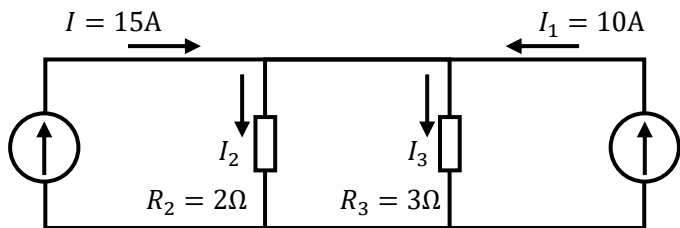


$$I_2 = I - I_1 = 15 - 10 = 5A$$

Ans. $I_2 = 5A$

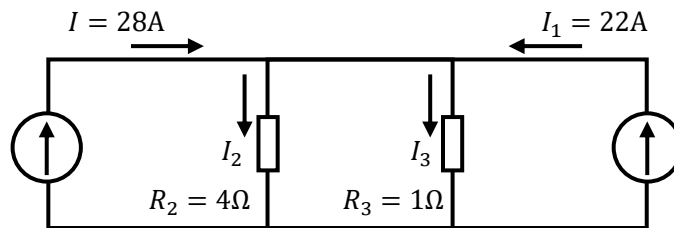
練習問題4

(1)



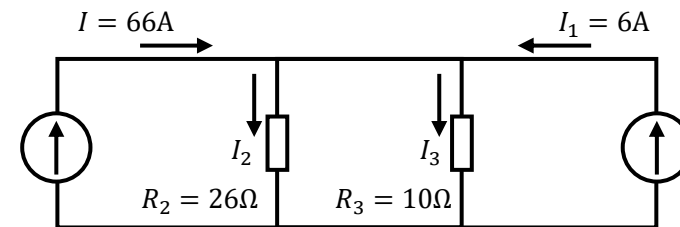
Ans. $I_2 =$ $I_3 =$

(2)



Ans. $I_2 =$ $I_3 =$

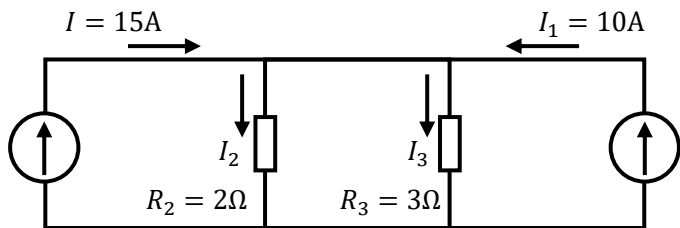
(3)



Ans. $I_2 =$ $I_3 =$

練習問題4 (解説)

(1)



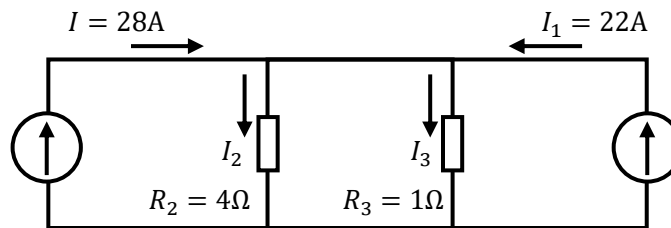
$$I_2 + I_3 = I + I_1 = 15 + 10 = 25A$$

$$I_2 : I_3 = R_3 : R_2 = 3 : 2 = 15 : 10$$

$$\frac{25}{3 + 2} = 5 \quad \times 5$$

Ans. $I_2 = 15A$ $I_3 = 10A$

(2)



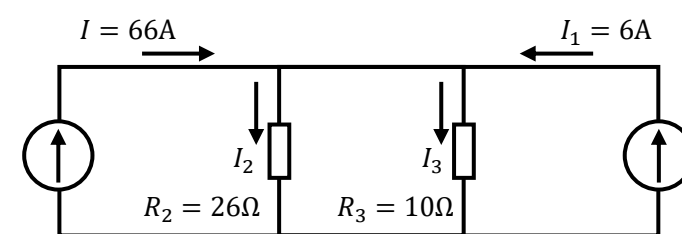
$$I_2 + I_3 = I + I_1 = 28 + 22 = 50A$$

$$I_2 : I_3 = R_3 : R_2 = 1 : 4 = 10 : 40$$

$$\frac{50}{1 + 4} = 10 \quad \times 10$$

Ans. $I_2 = 10A$ $I_3 = 40A$

(3)



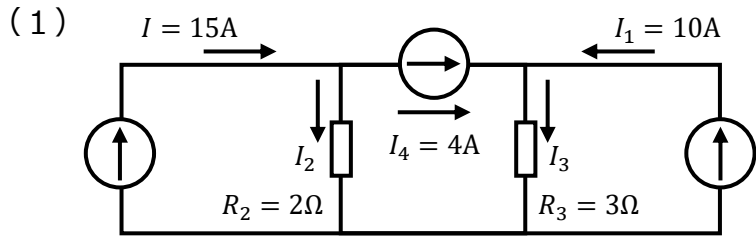
$$I_2 + I_3 = I + I_1 = 66 + 6 = 72A$$

$$I_2 : I_3 = R_3 : R_2 = 10 : 26 = 20 : 52$$

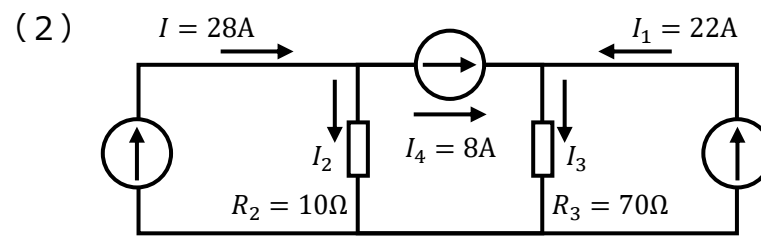
$$\frac{72}{10 + 26} = \frac{72}{36} = 2 \quad \times 2$$

Ans. $I_2 = 20A$ $I_3 = 52A$

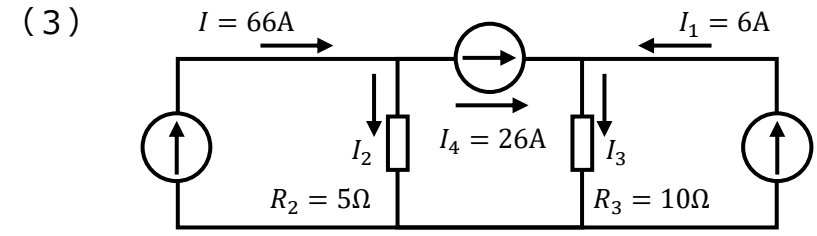
練習問題5



Ans. $I_2 =$ $I_3 =$

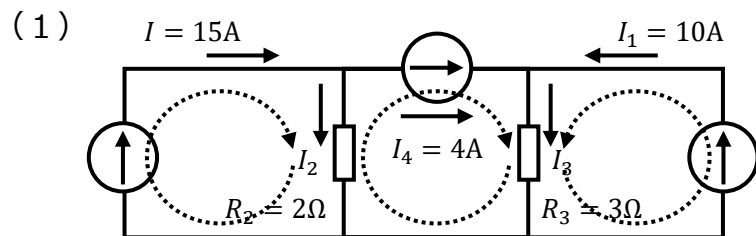


Ans. $I_2 =$ $I_3 =$



Ans. $I_2 =$ $I_3 =$

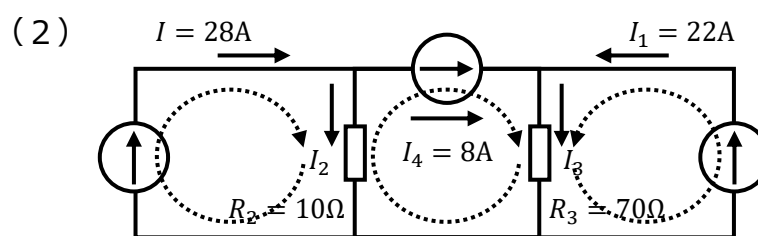
練習問題5 (解説)



$$I_2 = I - I_4 = 15 - 4 = 11\text{A}$$

$$I_3 = I_1 + I_4 = 10 + 4 = 14\text{A}$$

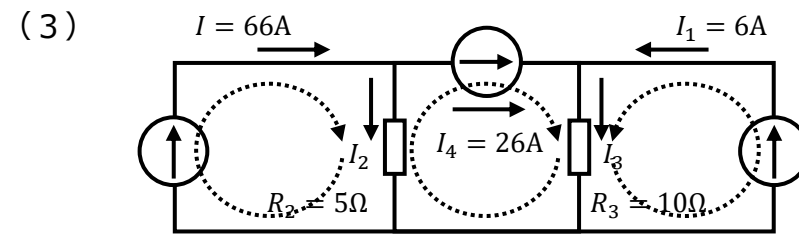
Ans. $I_2 = 11\text{A}$ $I_3 = 14\text{A}$



$$I_2 = I - I_4 = 28 - 8 = 20\text{A}$$

$$I_3 = I_1 + I_4 = 22 + 8 = 30\text{A}$$

Ans. $I_2 = 20\text{A}$ $I_3 = 30\text{A}$



$$I_2 = I - I_4 = 66 - 26 = 40\text{A}$$

$$I_3 = I_1 + I_4 = 6 + 26 = 32\text{A}$$

Ans. $I_2 = 40\text{A}$ $I_3 = 32\text{A}$

ご聴講ありがとうございました
ございました!!