

電験

どうでしょう

Let me inject Energy to you!

電気回路のための

方程式習得 ドリル

電験どうでしょうの管理人KWG（カワジ）です。

このテキストでは、Twitterで毎日配信している朝活問題で取り上げた文字と式、方程式、連立方程式、二次方程式といった方程式に関する項目をまとめています。

電験に限らず資格試験の計算問題では方程式に関する問題が必ずと言っていいほど出題されます。そして、資格試験のための問題集や参考書では方程式に関する様々な解説が取り上げられています。

しかし解説を読んでもいまいち理解ができない。解説を見ながら計算を進めても一行一行ペンが止まってしまう。という方もいるのではないのでしょうか？これは問題集や参考書の「作者が教えたこと」と、「読者の知りたいこと」がずれていることが原因だと私は思っています。

方程式を解くためには2つの作業が必要になります。

1つ目は「問題を読んで方程式を立てる」

2つ目は「方程式を解く」

実は多くの問題集や参考書では「方程式を立てる」ことについて重点を置き、解説が作られています。そして、「方程式を解く」ことについては読者の力量に依存してしまう傾向があります。

本書はドリル形式の問題集になっており、「方程式を解く」という部分に焦点を当てて300問以上の問題を掲載しています。さらに全ての問題が電気回路や電磁気学に関連する問題となっています。

このドリルを解き進めることで、「方程式を解く」能力が身についていきます。方程式を立てて、「今からこの方程式を解かないといけなにかあ」と感じていたあなたは、「よし、あとは方程式を解くだけだ！」と感じられるようになります。

このテキストをやり切ることで、あなたの数学レベルを一つ上のステージに高めることを約束します。どうか最後まであきらめずに完走いただくことを切に願っています。

2020年7月22日 KWG

文字と式（１）



次の式を，文字式の表し方に従って書きなさい。

(1) $3 \times R_1 \times I_1$

(5) $4 \times R_1 \times (I_1 + I_2)$

Ans. _____

(2) $2 \times V_1 \div R_1$

Ans. _____

(6) $10 \times R_1 \times R_2 \div (R_1 + R_2)$

Ans. _____

(3) $5 \times R_2 \times I_2 \times I_2$

Ans. _____

(7) $j \times \omega \times L + 1 \div j \div \omega \div C$

Ans. _____

(4) $8 \div R_3 \times V_2 \times V_2$

Ans. _____

(8) $Q_1 \times Q_2 \div (a \times a + x \times x)$

Ans. _____

Ans. _____

文字と式（１）



次の式を，文字式の表し方に従って書きなさい。

(1) $3 \times R_1 \times I_1$

(5) $4 \times R_1 \times (I_1 + I_2)$

Ans. $\frac{3R_1 I_1}{}$

Ans. $\frac{4R_1 (I_1 + I_2)}{}$

(2) $2 \times V_1 \div R_1$

(6) $10 \times R_1 \times R_2 \div (R_1 + R_2)$

Ans. $\frac{2V_1}{R_1}$

Ans. $\frac{10R_1 R_2}{R_1 + R_2}$

(3) $5 \times R_2 \times I_2 \times I_2$

(7) $j \times \omega \times L + 1 \div j \div \omega \div C$

Ans. $\frac{5R_2 I_2^2}{}$

Ans. $\frac{j\omega L + \frac{1}{j\omega C}}{}$

(4) $8 \div R_3 \times V_2 \times V_2$

(8) $Q_1 \times Q_2 \div (a \times a + x \times x)$

Ans. $\frac{8V_2^2}{R_3}$

Ans. $\frac{Q_1 Q_2}{a^2 + x^2}$

文字と式（２）



次の式を，文字式の表し方に従って書きなさい。

(1) $\sqrt{3} \times V_l \times I_l$

(5) $\sqrt{2 \times g \times H}$

Ans. _____

Ans. _____

(2) $V \div \sqrt{2} \times \cos(\omega \times t + \pi \div 2)$

(6) $1 \div 2 \times \rho \times V \times v \times v$

Ans. _____

Ans. _____

(3) $N \times I \div 2 \div \pi \div a$

(7) $9.8 \times Q \times H \times \eta$

Ans. _____

Ans. _____

(4) $I \times \sin\theta \div 4 \div \pi \div r \div r$

(8) $1 \div 2 \times C_p \times \rho \times V \times V \times V \times A$

Ans. _____

Ans. _____

文字と式（２）



次の式を，文字式の表し方に従って書きなさい。

(1) $\sqrt{3} \times V_l \times I_l$

(5) $\sqrt{2 \times g \times H}$

Ans. $\sqrt{3}V_l I_l$

Ans. $\sqrt{2gH}$

(2) $V \div \sqrt{2} \times \cos(\omega \times t + \pi \div 2)$

(6) $1 \div 2 \times \rho \times V \times v \times v$

Ans. $\frac{V}{\sqrt{2}} \cos\left(\omega t + \frac{\pi}{2}\right)$

Ans. $\frac{1}{2}\rho V v^2$

(3) $N \times I \div 2 \div \pi \div a$

(7) $9.8 \times Q \times H \times \eta$

Ans. $\frac{NI}{2\pi a}$

Ans. $9.8QH\eta$

(4) $I \times \sin\theta \div 4 \div \pi \div r \div r$

(8) $1 \div 2 \times C_p \times \rho \times V \times V \times V \times A$

Ans. $\frac{I \sin\theta}{4\pi r^2}$

Ans. $\frac{1}{2}C_p \rho V^3 A$

文字と式（3）



次の文章に従い，文字式を書きなさい。

（1）電圧 V は抵抗 R と電流 I に比例する

Ans. $V = RI$

（2）抵抗 R は抵抗率 ρ と導体の長さ l に比例し、導体の断面積 S に反比例する

Ans. $R =$

（3）電力 P は抵抗 R に比例し、電流 I の二乗に比例する

Ans. $P =$

（4）周波数 f の逆数は周期 T となる

Ans. $T =$

文字と式（3）



次の文章に従い，文字式を書きなさい。

- （1）電圧 V は抵抗 R と電流 I に比例する

Ans. $V = RI$

- （2）抵抗 R は抵抗率 ρ と導体の長さ l に比例し、導体の断面積 S に反比例する

Ans. $R = \rho \frac{l}{S}$

- （3）電力 P は抵抗 R に比例し、電流 I の二乗に比例する

Ans. $P = RI^2$

- （4）周波数 f の逆数は周期 T となる

Ans. $T = \frac{1}{f}$

文字と式（４）



次の文章に従い，文字式を書きなさい。

- (1) クーロン力 F は2つの電荷 Q_1 と Q_2 に比例し、距離の2乗に反比例する

Ans. $F = \frac{1}{4\pi\epsilon_0} \frac{Q_1 Q_2}{r^2}$

- (2) インダクタンス L は透磁率 μ と断面積 S と巻数 N の二乗に比例し、長さ l に反比例する

Ans. $L =$

- (3) 磁界の強さ H は電流 I に比例し、コイルの半径 a の2倍に反比例する

Ans. $H =$

- (4) 平行板の静電容量 C は、誘電率 ϵ と断面積 S に比例し、平板間距離 d に反比例する

Ans. $C =$

文字と式（４）



次の文章に従い，文字式を書きなさい。

- (1) クーロン力 F は2つの電荷 Q_1 と Q_2 に比例し、距離の2乗に反比例する

$$\text{Ans. } F = \frac{1}{4\pi\epsilon_0} \frac{Q_1 Q_2}{r^2}$$

- (2) インダクタンス L は透磁率 μ と断面積 S と巻数 N の二乗に比例し、長さ l に反比例する

$$\text{Ans. } L = \frac{\mu S N^2}{l}$$

- (3) 磁界の強さ H は電流 I に比例し、コイルの半径 a の2倍に反比例する

$$\text{Ans. } H = \frac{I}{2a}$$

- (4) 平行板の静電容量 C は、誘電率 ϵ と断面積 S に比例し、平板間距離 d に反比例する

$$\text{Ans. } C = \frac{\epsilon S}{d}$$

文字と式 (5)

次の式を変形しなさい。



(1) $V = RI$

(5) $I = I_1 + I_2 + I_3$

Ans. $I = \frac{V}{R}$

Ans. $I_2 =$

(2) $f = \frac{1}{T}$

(6) $\omega = 2\pi f$

Ans. $T =$

Ans. $f =$

(3) $V = R_1 I + R_2 I$

(7) $C = \epsilon_0 \frac{S}{d}$

Ans. $I =$

Ans. $S =$

(4) $R_1 R_4 = R_2 R_3$

(8) $\frac{V_1}{V_2} = \frac{n_1}{n_2}$

Ans. $\frac{R_1}{R_2} =$

Ans. $V_2 =$

文字と式 (5)



次の式を変形しなさい。

(1) $V = RI$

(5) $I = I_1 + I_2 + I_3$

Ans. $I = \frac{V}{R}$

Ans. $I_2 = I - I_1 - I_3$

(2) $f = \frac{1}{T}$

(6) $\omega = 2\pi f$

Ans. $T = \frac{1}{f}$

Ans. $f = \frac{\omega}{2\pi}$

(3) $V = R_1 I + R_2 I$

(7) $C = \epsilon_0 \frac{S}{d}$

Ans. $I = \frac{V}{R_1 + R_2}$

Ans. $S = \frac{d}{\epsilon_0 C}$

(4) $R_1 R_4 = R_2 R_3$

(8) $\frac{V_1}{V_2} = \frac{n_1}{n_2}$

Ans. $\frac{R_1}{R_2} = \frac{R_3}{R_4}$

Ans. $V_2 = \frac{n_2}{n_1} V_1$

文字と式 (6)



次の式を変形しなさい。

(1) $V = V_1 + V_2 + V_3$

(5) $\omega L = \frac{1}{\omega C}$

Ans. $V_2 =$ _____

Ans. $\omega =$ _____

(2) $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$

(6) $P = VI \cos \theta$

Ans. $R =$ _____

Ans. $\cos \theta =$ _____

(3) $N = N_s(1 - s)$

(7) $P = \frac{E_s E_r}{X} \sin \theta$

Ans. $s =$ _____

Ans. $\sin \theta =$ _____

(4) $\frac{1}{2}mv^2 = mgh$

(8) $L = \frac{\mu S N^2}{l}$

Ans. $v =$ _____

Ans. $N =$ _____

文字と式 (6)

次の式を変形しなさい。



$$(1) V = V_1 + V_2 + V_3$$

$$(5) \omega L = \frac{1}{\omega C}$$

$$\text{Ans. } V_2 = V - V_1 - V_3$$

$$\text{Ans. } \omega = \frac{1}{\sqrt{LC}}$$

$$(2) \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$(6) P = VI \cos \theta$$

$$\text{Ans. } R = \frac{R_1 R_2}{R_1 + R_2}$$

$$\text{Ans. } \cos \theta = \frac{P}{VI}$$

$$(3) N = N_s(1 - s)$$

$$(7) P = \frac{E_s E_r}{X} \sin \theta$$

$$\text{Ans. } s = \frac{N_s - N}{N_s}$$

$$\text{Ans. } \sin \theta = \frac{PX}{E_s E_r}$$

$$(4) \frac{1}{2}mv^2 = mgh$$

$$(8) L = \frac{\mu S N^2}{l}$$

$$\text{Ans. } v = \sqrt{2gh}$$

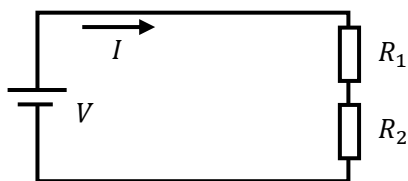
$$\text{Ans. } N = \sqrt{\frac{lL}{\mu S}}$$

文字と式（7）

次の式を変形しなさい。



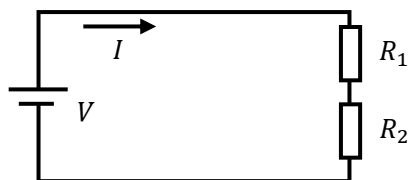
(1)



$$V = R_1 I + R_2 I$$

Ans. $R_1 I =$ _____

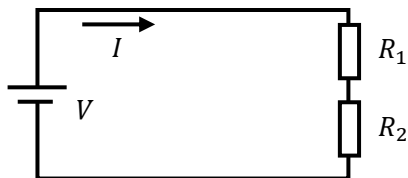
(2)



$$V = R_1 I + R_2 I$$

Ans. $I =$ _____

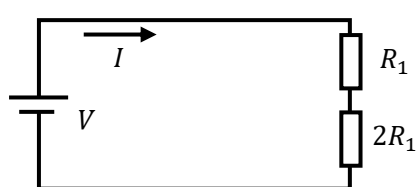
(3)



$$V = R_1 I + R_2 I$$

Ans. $R_2 =$ _____

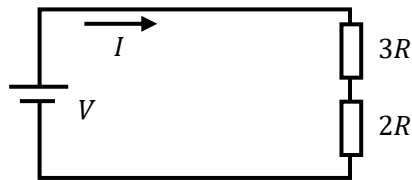
(4)



$$V = R_1 I + 2R_1 I$$

Ans. $V =$ _____

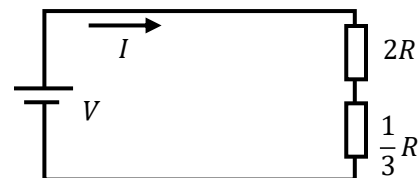
(5)



$$V = 3RI + 2RI$$

Ans. $I =$ _____

(6)



$$V = 2RI + \frac{1}{3}RI$$

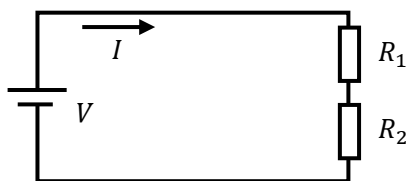
Ans. $I =$ _____

文字と式 (7)

次の式を変形しなさい。



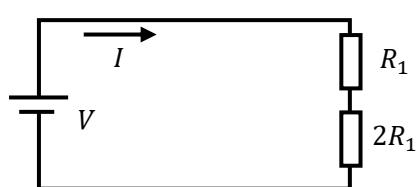
(1)



$$V = R_1 I + R_2 I$$

Ans. $R_1 I = V - R_2 I$

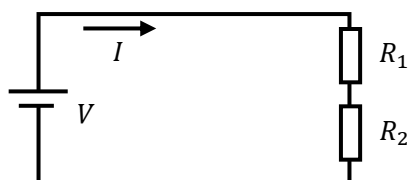
(4)



$$V = R_1 I + 2R_1 I$$

Ans. $V = 3R_1 I$

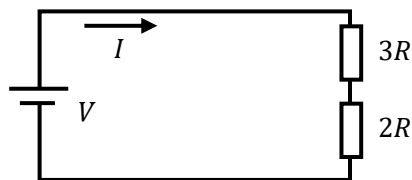
(2)



$$\begin{aligned} V &= R_1 I + R_2 I \\ &= (R_1 + R_2) I \\ \frac{V}{R_1 + R_2} &= I \end{aligned}$$

Ans. $I = \frac{V}{R_1 + R_2}$

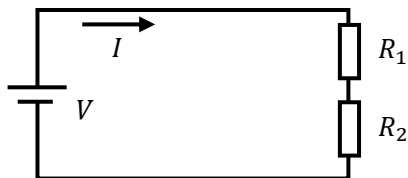
(5)



$$\begin{aligned} V &= 3RI + 2RI \\ &= 5RI \\ \frac{V}{5R} &= I \end{aligned}$$

Ans. $I = \frac{V}{5R}$

(3)

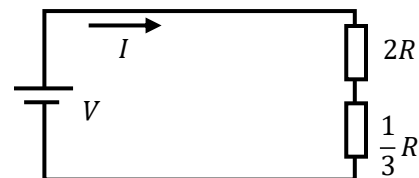


$$\begin{aligned} V &= R_1 I + R_2 I \\ &= (R_1 + R_2) I \\ \frac{V}{I} &= R_1 + R_2 \end{aligned}$$

$$\frac{V}{I} - R_1 = R_2$$

Ans. $R_2 = \frac{V}{I} - R_1$

(6)



$$\begin{aligned} V &= 2RI + \frac{1}{3}RI \\ &= \frac{7}{3}RI \\ \frac{3V}{7R} &= I \end{aligned}$$

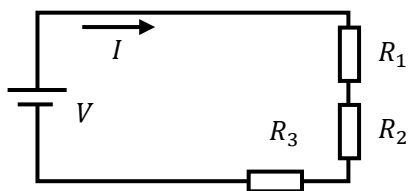
Ans. $I = \frac{3V}{7R}$

文字と式 (8)

次の式を変形しなさい。



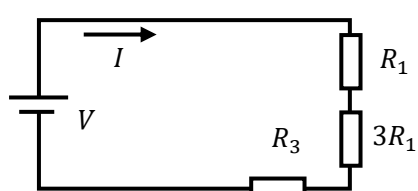
(1)



$$V = R_1 I + R_2 I + R_3 I$$

Ans. $I =$ _____

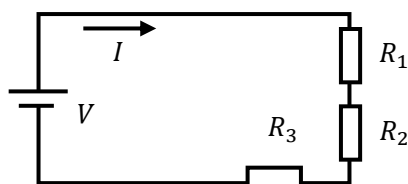
(4)



$$V = R_1 I + 3R_1 I + R_3 I$$

Ans. $V =$ _____

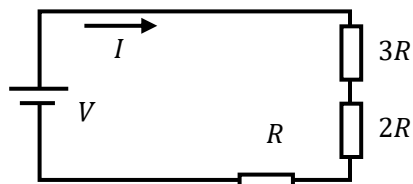
(2)



$$V = R_1 I + R_2 I + R_3 I$$

Ans. $\frac{V}{I} =$ _____

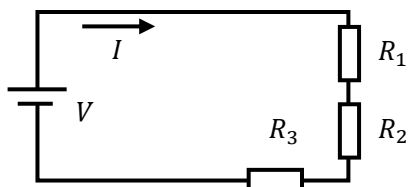
(5)



$$V = 3RI + 2RI + RI$$

Ans. $I =$ _____

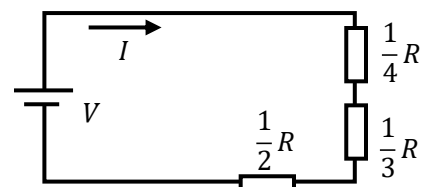
(3)



$$V = R_1 I + R_2 I + R_3 I$$

Ans. $R_2 =$ _____

(6)



$$V = \frac{1}{4}RI + \frac{1}{3}RI + \frac{1}{2}RI$$

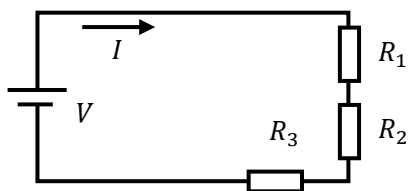
Ans. $I =$ _____

文字と式 (8)

次の式を変形しなさい。



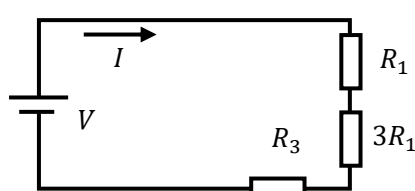
(1)



$$\begin{aligned} V &= R_1 I + R_2 I + R_3 I \\ &= (R_1 + R_2 + R_3) I \\ \frac{V}{R_1 + R_2 + R_3} &= I \end{aligned}$$

Ans. $I = \frac{V}{R_1 + R_2 + R_3}$

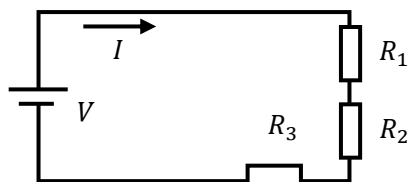
(4)



$$\begin{aligned} V &= R_1 I + 3R_1 I + R_3 I \\ &= (R_1 + 3R_1 + R_3) I \\ &= (4R_1 + R_3) I \end{aligned}$$

Ans. $V = (4R_1 + R_3) I$

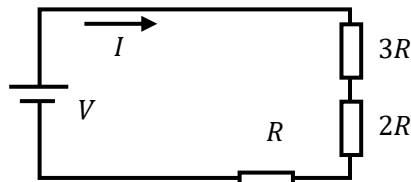
(2)



$$\begin{aligned} V &= R_1 I + R_2 I + R_3 I \\ &= (R_1 + R_2 + R_3) I \\ \frac{V}{I} &= R_1 + R_2 + R_3 \end{aligned}$$

Ans. $\frac{V}{I} = R_1 + R_2 + R_3$

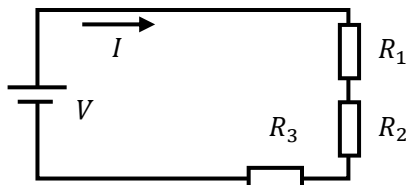
(5)



$$\begin{aligned} V &= 3R I + 2R I + R I \\ &= 6R I \\ \frac{V}{6R} &= I \end{aligned}$$

Ans. $I = \frac{V}{6R}$

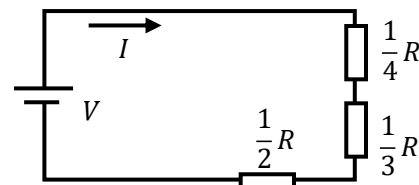
(3)



$$\begin{aligned} V &= R_1 I + R_2 I + R_3 I \\ &= (R_1 + R_2 + R_3) I \\ \frac{V}{I} &= R_1 + R_2 + R_3 \end{aligned}$$

Ans. $R_2 = \frac{V}{I} - R_1 - R_3$

(6)



$$\begin{aligned} V &= \frac{1}{4} R I + \frac{1}{3} R I + \frac{1}{2} R I \\ &= \left(\frac{1}{4} + \frac{1}{3} + \frac{1}{2} \right) R I \\ V &= \frac{13}{12} R I \end{aligned}$$

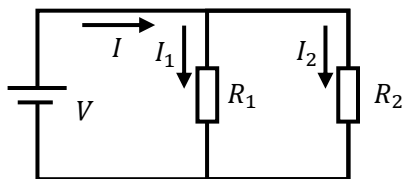
Ans. $I = \frac{12V}{13R}$

文字と式（9）

次の式を変形しなさい。



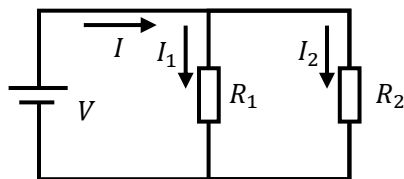
(1)



$$V = R_1 I_1$$

Ans. $I_1 =$ _____

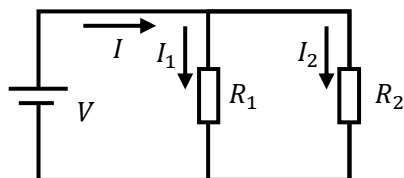
(4)



$$I = \frac{V}{R_1} + I_2$$

Ans. $V =$ _____

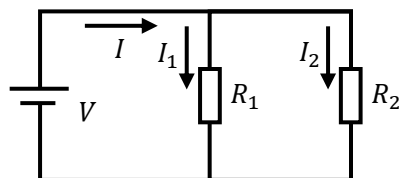
(2)



$$R_1 I_1 = R_2 I_2$$

Ans. $I_2 =$ _____

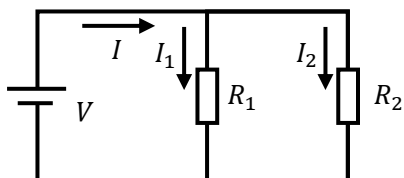
(5)



$$I = I_1 + \frac{V}{R_2}$$

Ans. $R_2 =$ _____

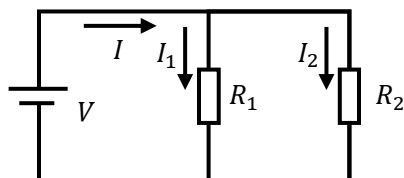
(3)



$$I = I_1 + I_2$$

Ans. $I_1 =$ _____

(6)



$$I = \frac{V}{R_1} + \frac{V}{R_2}$$

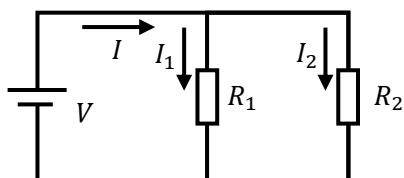
Ans. $\frac{V}{I} =$ _____

文字と式 (9)

次の式を変形しなさい。



(1)

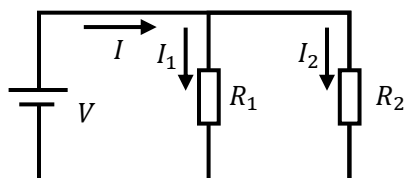


$$V = R_1 I_1$$

$$\frac{V}{R_1} = I_1$$

Ans. $I_1 = \frac{V}{R_1}$

(4)



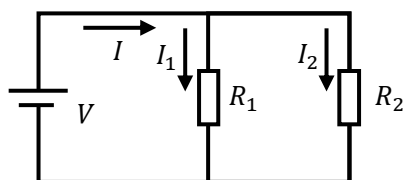
$$I = \frac{V}{R_1} + I_2$$

$$I - I_2 = \frac{V}{R_1}$$

$$V = R_1(I - I_2)$$

Ans. $V = R_1(I - I_2)$

(2)

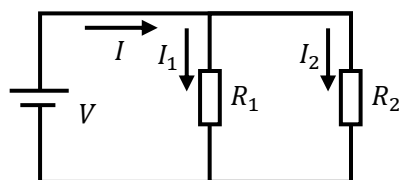


$$R_1 I_1 = R_2 I_2$$

$$\frac{R_1}{R_2} I_1 = I_2$$

Ans. $I_2 = \frac{R_1}{R_2} I_1$

(5)



$$I = I_1 + \frac{V}{R_2}$$

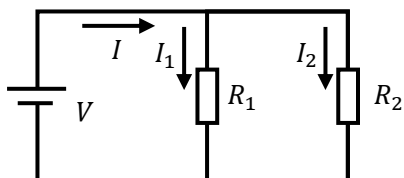
$$\frac{V}{I - I_1} = R_2$$

$$I - I_1 = \frac{V}{R_2}$$

$$\frac{I - I_1}{V} = \frac{1}{R_2}$$

Ans. $R_2 = \frac{V}{I - I_1}$

(3)

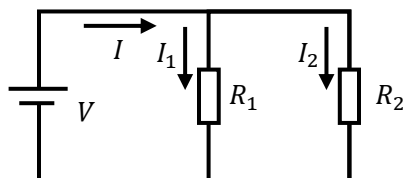


$$I = I_1 + I_2$$

$$I - I_2 = I_1$$

Ans. $I_1 = I - I_2$

(6)



$$I = \frac{V}{R_1} + \frac{V}{R_2}$$

$$I = \left(\frac{1}{R_1} + \frac{1}{R_2} \right) V$$

$$\frac{I}{V} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{I}{V} = \frac{R_1 + R_2}{R_1 R_2}$$

$$\frac{V}{I} = \frac{R_1 R_2}{R_1 + R_2}$$

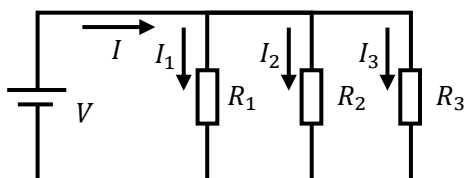
Ans. $\frac{V}{I} = \frac{R_1 R_2}{R_1 + R_2}$

文字と式 (10)

次の式を変形しなさい。



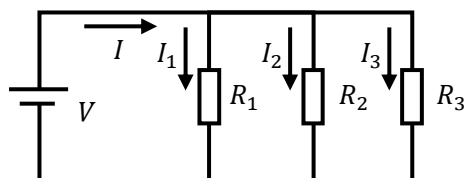
(1)



$$I = I_1 + I_2 + I_3$$

Ans. $I_1 =$ _____

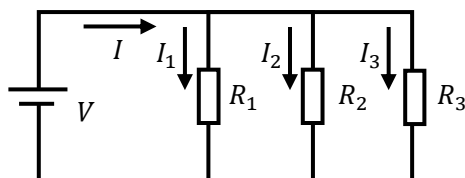
(4)



$$I = \frac{V}{R_1} + I_2 + I_3$$

Ans. $V =$ _____

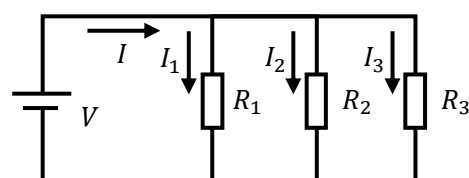
(2)



$$R_2 I_2 = R_3 I_3$$

Ans. $R_3 =$ _____

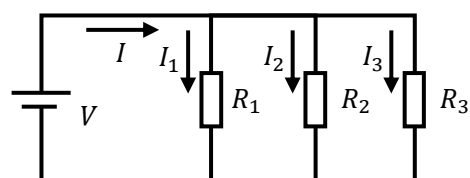
(5)



$$I = I_1 + I_2 + \frac{V}{R_3}$$

Ans. $R_3 =$ _____

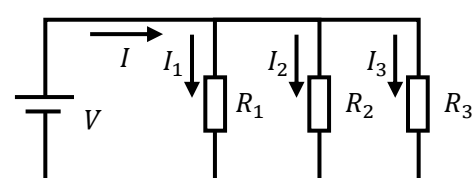
(3)



$$I = I_1 + \frac{V}{R_2} + \frac{V}{R_3}$$

Ans. $V =$ _____

(6)



$$I = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$$

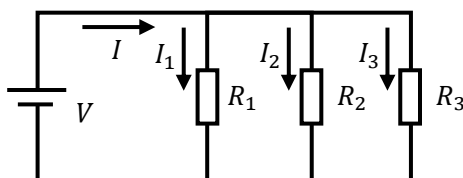
Ans. $\frac{V}{I} =$ _____

文字と式 (10)

次の式を変形しなさい。



(1)

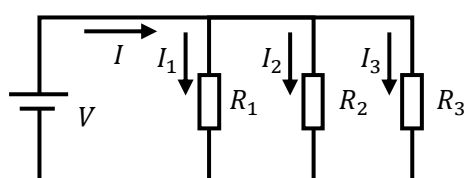


$$I = I_1 + I_2 + I_3$$

$$I - I_2 - I_3 = I_1$$

Ans. $I_1 = I - I_2 - I_3$

(4)



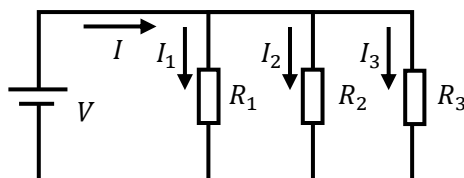
$$I = \frac{V}{R_1} + I_2 + I_3$$

$$I - I_2 - I_3 = \frac{V}{R_1}$$

$$V = R_1(I - I_2 - I_3)$$

Ans. $V = R_1(I - I_2 - I_3)$

(2)

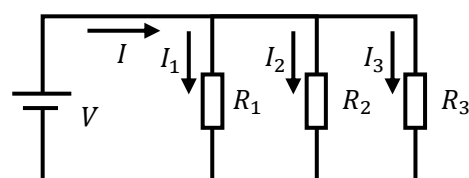


$$R_2 I_2 = R_3 I_3$$

$$\frac{R_2 I_2}{I_3} = R_3$$

Ans. $R_3 = \frac{R_2 I_2}{I_3}$

(5)



$$I = I_1 + I_2 + \frac{V}{R_3}$$

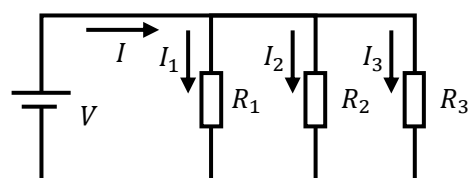
$$I - I_1 - I_2 = \frac{V}{R_3}$$

$$\frac{I - I_1 - I_2}{V} = \frac{1}{R_3}$$

$$\frac{V}{I - I_1 - I_2} = R_3$$

Ans. $R_3 = \frac{V}{I - I_1 - I_2}$

(3)



$$I = I_1 + \frac{V}{R_2} + \frac{V}{R_3}$$

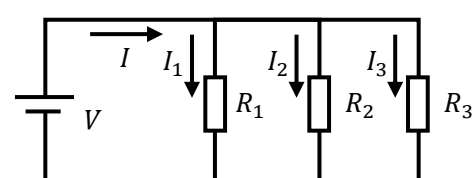
$$I - I_1 = \left(\frac{1}{R_2} + \frac{1}{R_3} \right) V$$

$$I - I_1 = \left(\frac{R_2 + R_3}{R_2 R_3} \right) V$$

$$\frac{(I - I_1) R_2 R_3}{R_2 + R_3} = V$$

Ans. $V = \frac{(I - I_1) R_2 R_3}{R_2 + R_3}$

(6)



$$I = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$$

$$I = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right) V$$

$$\frac{I}{V} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

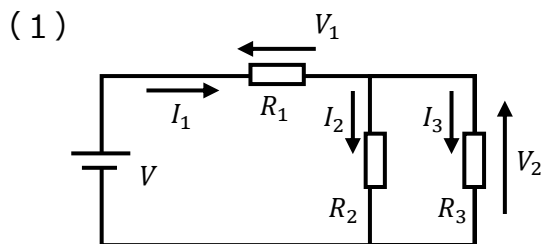
$$\frac{I}{V} = \frac{R_2 R_3 + R_1 R_3 + R_1 R_2}{R_1 R_2 R_3}$$

$$\frac{V}{I} = \frac{R_1 R_2 R_3}{R_2 R_3 + R_1 R_3 + R_1 R_2}$$

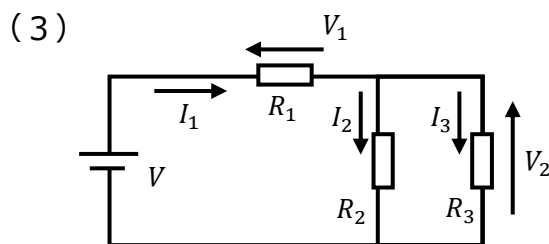
Ans. $\frac{V}{I} = \frac{R_1 R_2 R_3}{R_2 R_3 + R_1 R_3 + R_1 R_2}$

文字と式 (1 1)

次の式を変形しなさい。

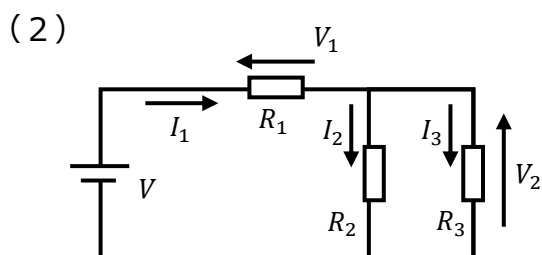


$$\frac{V_1}{R_1} = I_2 + \frac{V_2}{R_3}$$



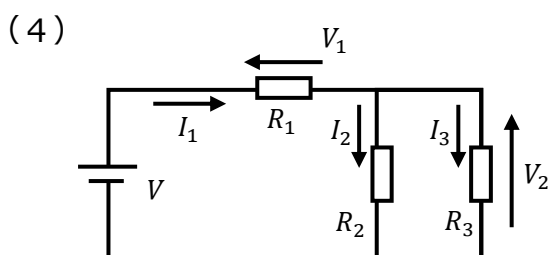
$$\frac{V - V_2}{R_1} = \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

Ans. $V_2 =$ _____



$$\frac{V_1}{R_1} = \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

Ans. $V_2 =$ _____



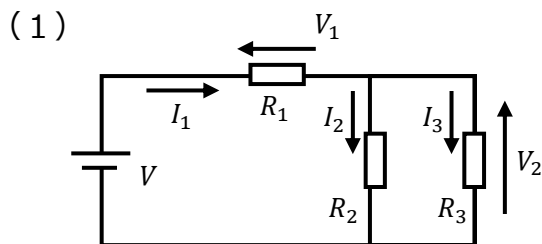
$$\frac{V}{I_1} = R_1 + \frac{1}{\frac{1}{R_2} + \frac{1}{R_3}}$$

Ans. $V_2 =$ _____

Ans. $I_1 =$ _____

文字と式 (1 1)

次の式を変形しなさい。

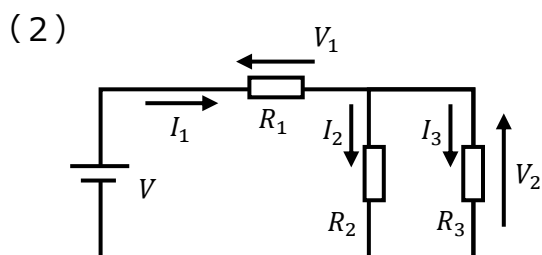


$$\frac{V_1}{R_1} = I_2 + \frac{V_2}{R_3}$$

$$\frac{V_1}{R_1} - I_2 = \frac{V_2}{R_3}$$

$$\left(\frac{V_1}{R_1} - I_2\right) R_3 = V_2$$

Ans. $V_2 = \left(\frac{V_1}{R_1} - I_2\right) R_3$



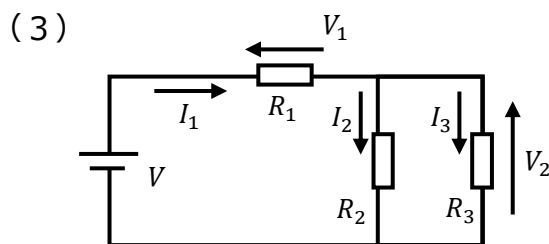
$$\frac{V_1}{R_1} = \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

$$\frac{V_1}{R_1} = \left(\frac{1}{R_2} + \frac{1}{R_3}\right) V_2$$

$$\frac{V_1}{R_1 \left(\frac{1}{R_2} + \frac{1}{R_3}\right)} = V_2$$

$$\frac{V_1}{R_1 \left(\frac{R_3 + R_2}{R_2 R_3}\right)} = V_2$$

Ans. $V_2 = \frac{R_2 R_3 V_1}{R_1 (R_3 + R_2)}$



$$\frac{V - V_2}{R_1} = \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

$$\frac{V}{R_1} - \frac{V_2}{R_1} = \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

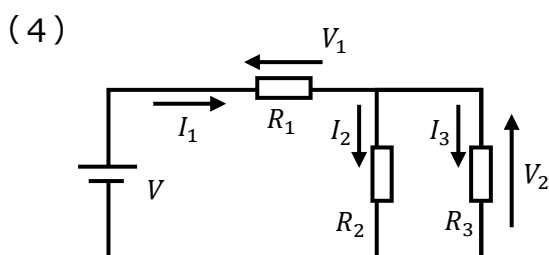
$$\frac{V}{R_1} = \frac{V_2}{R_1} + \frac{V_2}{R_2} + \frac{V_2}{R_3}$$

$$\frac{V}{R_1} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right) V_2$$

$$\frac{V}{R_1 \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)} = V_2$$

$$\begin{aligned} V_2 &= \frac{V}{R_1 \left(\frac{R_2 R_3 + R_1 R_3 + R_1 R_2}{R_1 R_2 R_3}\right)} \\ &= \frac{R_1 R_2 R_3 V}{R_1 (R_2 R_3 + R_1 R_3 + R_1 R_2)} \\ &= \frac{R_2 R_3 V}{R_2 R_3 + R_1 R_3 + R_1 R_2} \end{aligned}$$

Ans. $V_2 = \frac{R_2 R_3 V}{R_2 R_3 + R_1 R_3 + R_1 R_2}$



$$\frac{V}{I_1} = R_1 + \frac{1}{\frac{1}{R_2} + \frac{1}{R_3}}$$

$$\frac{V}{I_1} = R_1 + \frac{1}{\frac{R_3 + R_2}{R_2 R_3}}$$

$$\frac{V}{I_1} = R_1 + \frac{R_2 R_3}{R_2 + R_3}$$

$$\frac{V}{I_1} = \frac{R_1 (R_2 + R_3) + R_2 R_3}{R_2 + R_3}$$

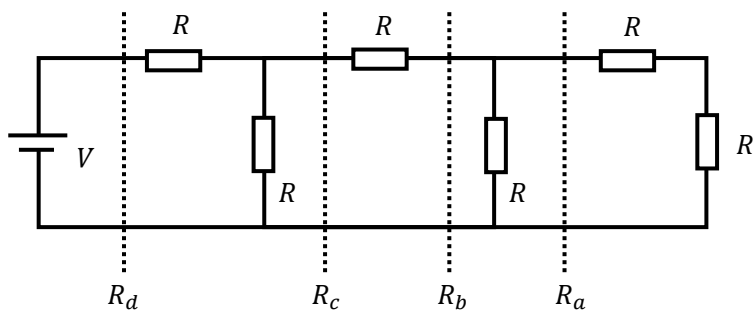
$$\frac{1}{I_1} = \frac{R_1 (R_2 + R_3) + R_2 R_3}{(R_2 + R_3) V}$$

$$I_1 = \frac{(R_2 + R_3) V}{R_1 R_2 + R_1 R_3 + R_2 R_3}$$

Ans. $I_1 = \frac{(R_2 + R_3) V}{R_1 R_2 + R_1 R_3 + R_2 R_3}$

文字と式（１２）

各問に答えなさい。



(１) 合成抵抗 R_a を求めよ

$$R_a = R + R$$

(３) 合成抵抗 R_c を求めよ

$$R_c = R + R_b$$

Ans. $R_a =$

Ans. $R_c =$

(２) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a R}{R_a + R}$$

(４) 合成抵抗 R_d を求めよ

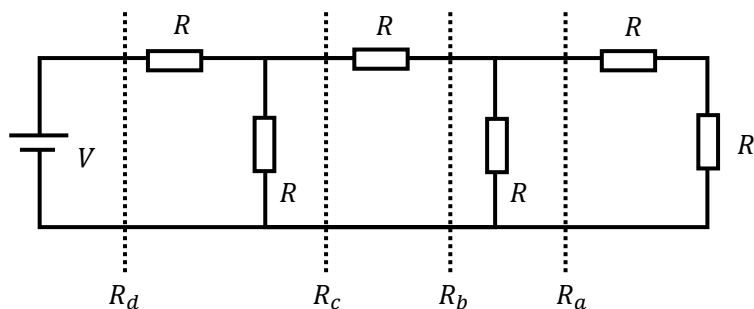
$$R_d = R + \frac{R_c R}{R_c + R}$$

Ans. $R_b =$

Ans. $R_d =$

文字と式 (12)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = R + R$$

$$R_a = 2R$$

(3) 合成抵抗 R_c を求めよ

$$R_c = R + R_b$$

$$R_c = R + \frac{2}{3}R = \frac{5}{3}R$$

Ans. $R_a = 2R$

Ans. $R_c = \frac{5}{3}R$

(2) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a R}{R_a + R}$$

$$R_b = \frac{2R \cdot R}{2R + R} = \frac{2R^2}{3R} = \frac{2}{3}R$$

(4) 合成抵抗 R_d を求めよ

$$R_d = R + \frac{R_c R}{R_c + R}$$

$$R_d = R + \frac{\frac{5}{3}R \cdot R}{\frac{5}{3}R + R} = R + \frac{\frac{5}{3}R^2}{\frac{8}{3}R}$$

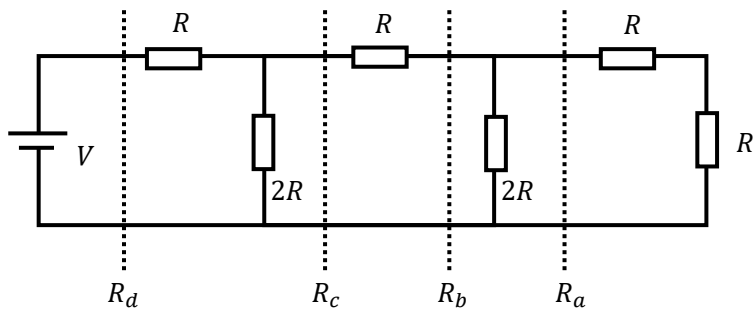
$$R_d = R + \frac{5}{8}R = \frac{13}{8}R$$

Ans. $R_b = \frac{2}{3}R$

Ans. $R_d = \frac{13}{8}R$

文字と式 (13)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = R + R$$

(3) 合成抵抗 R_c を求めよ

$$R_c = R + R_b$$

Ans. $R_a =$ _____

Ans. $R_c =$ _____

(2) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a \cdot 2R}{R_a + 2R}$$

(4) 合成抵抗 R_d を求めよ

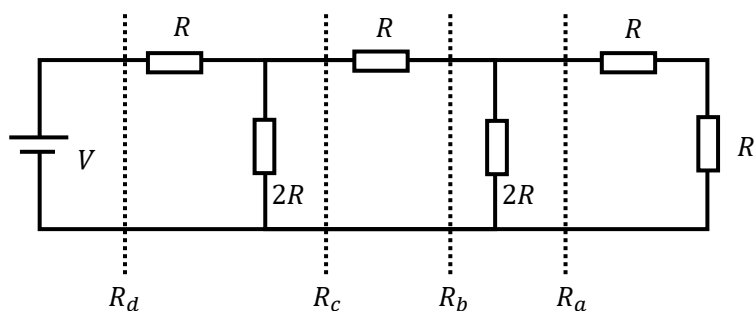
$$R_d = R + \frac{R_c \cdot 2R}{R_c + 2R}$$

Ans. $R_b =$ _____

Ans. $R_d =$ _____

文字と式 (13)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = R + R$$

$$R_a = 2R$$

(3) 合成抵抗 R_c を求めよ

$$R_c = R + R_b$$

$$R_c = R + R = 2R$$

Ans. $R_a = 2R$

Ans. $R_c = 2R$

(2) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a \cdot 2R}{R_a + 2R}$$

$$R_b = \frac{2R \cdot 2R}{2R + 2R} = \frac{4R^2}{4R} = R$$

(4) 合成抵抗 R_d を求めよ

$$R_d = R + \frac{R_c \cdot 2R}{R_c + 2R}$$

$$R_d = R + \frac{2R \cdot 2R}{2R + 2R} = R + \frac{4R^2}{4R}$$

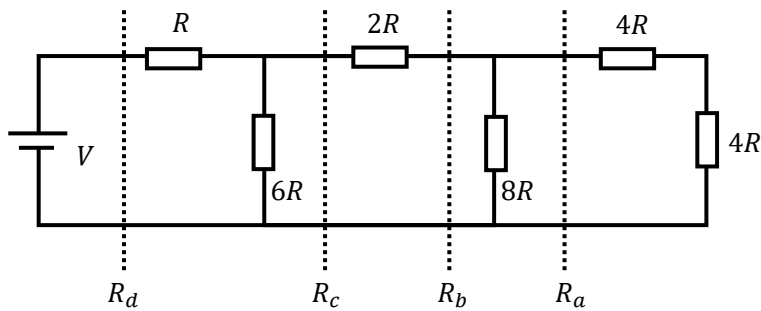
$$R_d = R + R = 2R$$

Ans. $R_b = R$

Ans. $R_d = 2R$

文字と式（14）

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = 4R + 4R$$

(3) 合成抵抗 R_c を求めよ

$$R_c = 2R + R_b$$

Ans. $R_a =$ _____

Ans. $R_c =$ _____

(2) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a \cdot 8R}{R_a + 8R}$$

(4) 合成抵抗 R_d を求めよ

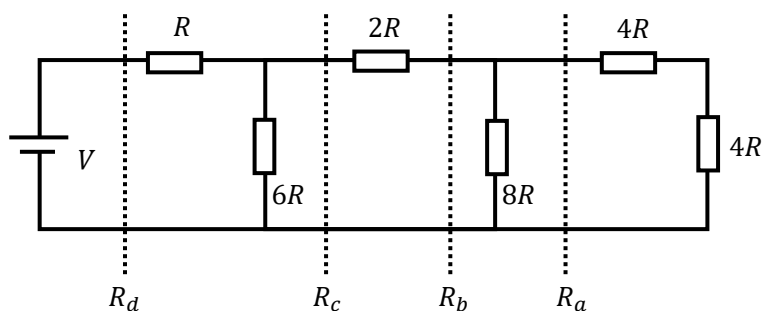
$$R_d = R + \frac{R_c \cdot 6R}{R_c + 6R}$$

Ans. $R_b =$ _____

Ans. $R_d =$ _____

文字と式 (14)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = 4R + 4R$$

$$R_a = 8R$$

(3) 合成抵抗 R_c を求めよ

$$R_c = 2R + R_b$$

$$R_c = 2R + 4R = 6R$$

Ans. $R_a = 8R$

Ans. $R_c = 6R$

(2) 合成抵抗 R_b を求めよ

$$R_b = \frac{R_a \cdot 8R}{R_a + 8R}$$

$$R_b = \frac{8R \cdot 8R}{8R + 8R} = \frac{64R^2}{16R} = 4R$$

(4) 合成抵抗 R_d を求めよ

$$R_d = R + \frac{R_c \cdot 6R}{R_c + 6R}$$

$$R_d = R + \frac{6R \cdot 6R}{6R + 6R} = R + \frac{36R^2}{12R}$$

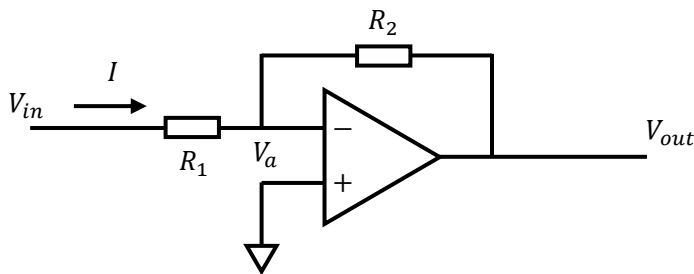
$$R_d = R + 3R = 4R$$

Ans. $R_b = 4R$

Ans. $R_d = 4R$

文字と式 (15)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{-V_{out}}{R_2}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_a - V_{out} = R_2 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

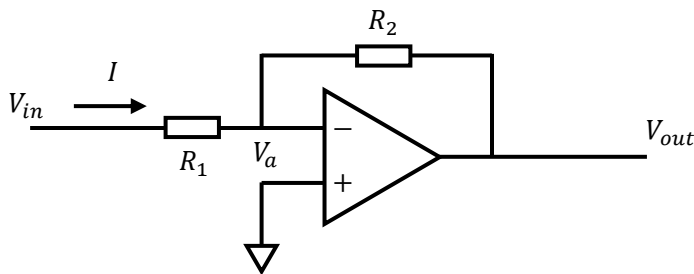
$$-\frac{R_2}{R_1} V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (15)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

$$\frac{V_{in} - V_a}{R_1} = I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{-V_{out}}{R_2}$$

$$\frac{V_{in}}{R_1} R_2 = -V_{out}$$

$$-\frac{R_2}{R_1} V_{in} = V_{out}$$

Ans. $I = \frac{V_{in} - V_a}{R_1}$

Ans. $V_{out} = -\frac{R_2}{R_1} V_{in}$

(2) 電流 I を求めよ

$$V_a - V_{out} = R_2 I$$

$$\frac{V_a - V_{out}}{R_2} = I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$-\frac{R_2}{R_1} V_{in} = V_{out}$$

$$-\frac{R_2}{R_1} = \frac{V_{out}}{V_{in}}$$

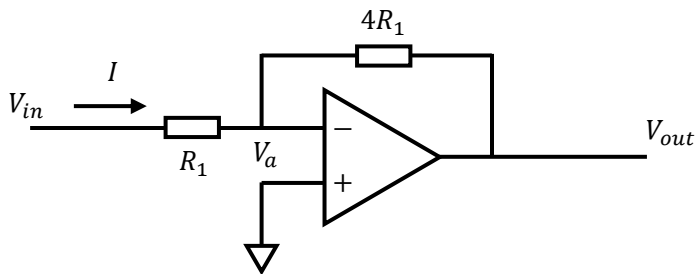
$$A_V = \frac{V_{out}}{V_{in}} = -\frac{R_2}{R_1}$$

Ans. $I = \frac{V_a - V_{out}}{R_2}$

Ans. $A_V = -\frac{R_2}{R_1}$

文字と式（１６）

各問に答えなさい。



(１) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

(３) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{-V_{out}}{4R_1}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(２) 電流 I を求めよ

$$V_a - V_{out} = 4R_1 I$$

(４) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

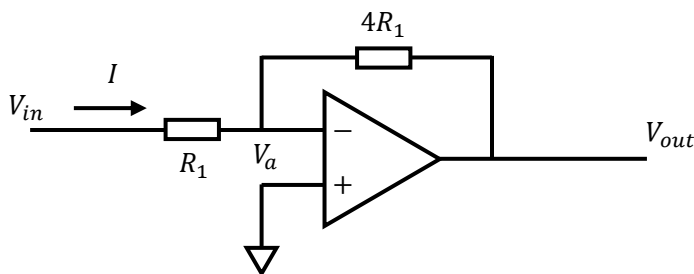
$$-\frac{4R_1}{R_1} V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (16)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

$$\frac{V_{in} - V_a}{R_1} = I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{-V_{out}}{4R_1}$$

$$\frac{V_{in}}{R_1} 4R_1 = -V_{out}$$

$$-4V_{in} = V_{out}$$

Ans. $I = \frac{V_{in} - V_a}{R_1}$

Ans. $V_{out} = -4V_{in}$

(2) 電流 I を求めよ

$$V_a - V_{out} = 4R_1 I$$

$$\frac{V_a - V_{out}}{4R_1} = I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$-\frac{4R_1}{R_1} V_{in} = V_{out}$$

$$-4 = \frac{V_{out}}{V_{in}}$$

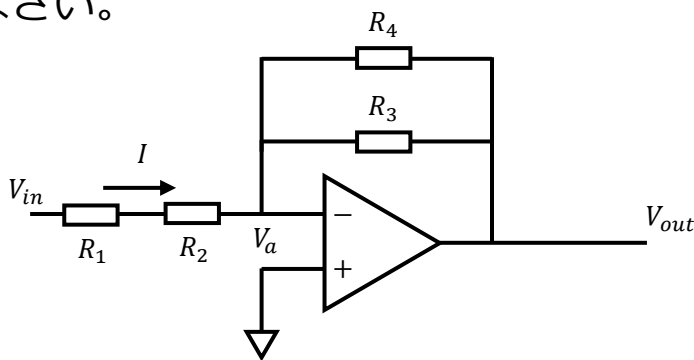
$$A_V = \frac{V_{out}}{V_{in}} = -4$$

Ans. $I = \frac{V_a - V_{out}}{4R_1}$

Ans. $A_V = -4$

文字と式 (17)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I + R_2 I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1 + R_2} = -\frac{(R_3 + R_4)}{R_3 R_4} V_{out}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_a - V_{out} = \frac{R_3 R_4}{R_3 + R_4} I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

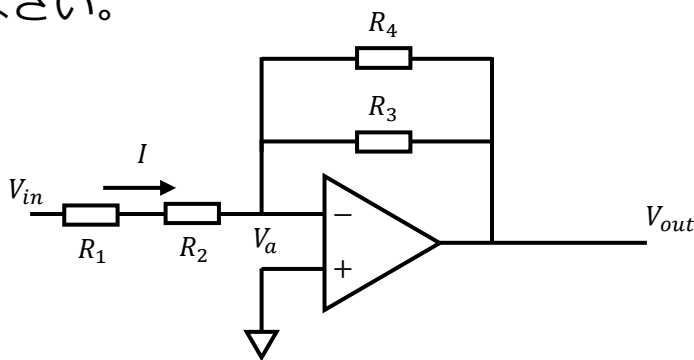
$$-\frac{R_3 R_4 V_{in}}{(R_1 + R_2)(R_3 + R_4)} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (17)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I + R_2 I$$

$$V_{in} - V_a = (R_1 + R_2) I$$

$$\frac{V_{in} - V_a}{R_1 + R_2} = I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1 + R_2} = -\frac{(R_3 + R_4)}{R_3 R_4} V_{out}$$

$$-\frac{R_3 R_4 V_{in}}{(R_1 + R_2)(R_3 + R_4)} = V_{out}$$

Ans. $I = \frac{V_{in} - V_a}{R_1 + R_2}$

Ans. $V_{out} = -\frac{R_3 R_4 V_{in}}{(R_1 + R_2)(R_3 + R_4)}$

(2) 電流 I を求めよ

$$V_a - V_{out} = \frac{R_3 R_4}{R_3 + R_4} I$$

$$\frac{(R_3 + R_4)(V_a - V_{out})}{R_3 R_4} = I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$-\frac{R_3 R_4 V_{in}}{(R_1 + R_2)(R_3 + R_4)} = V_{out}$$

$$-\frac{R_3 R_4}{(R_1 + R_2)(R_3 + R_4)} = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = -\frac{R_3 R_4}{(R_1 + R_2)(R_3 + R_4)}$$

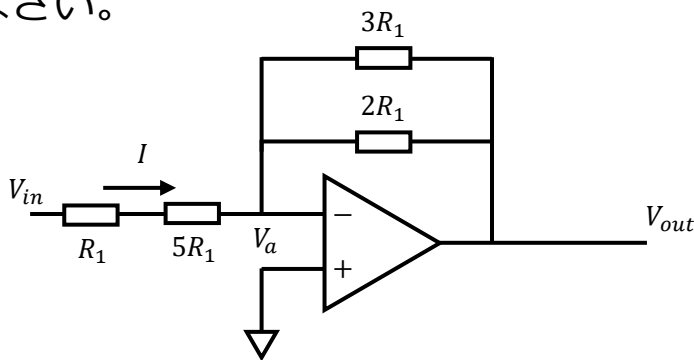
Ans. $I = \frac{(R_3 + R_4)(V_a - V_{out})}{R_3 R_4}$

Ans. $A_V = -\frac{R_3 R_4}{(R_1 + R_2)(R_3 + R_4)}$

文字と式 (18)



各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I + 5R_1 I$$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in} - 0}{6R_1} = \frac{5(0 - V_{out})}{6R_1}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_a - V_{out} = \frac{2R_1 3R_1}{2R_1 + 3R_1} I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

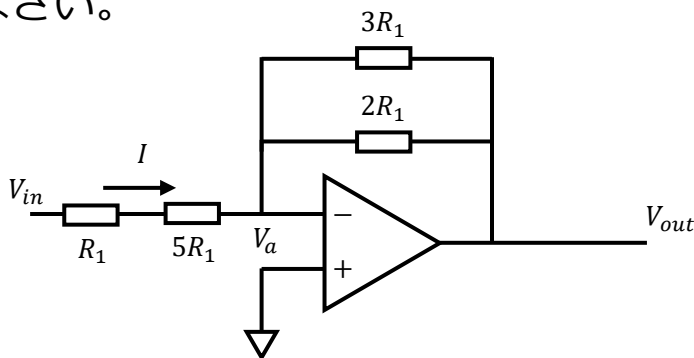
$$-\frac{V_{in}}{5} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (18)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I + 5R_1 I$$

$$V_{in} - V_a = 6R_1 I$$

$$\frac{V_{in} - V_a}{6R_1} = I$$

Ans. $I = \frac{V_{in} - V_a}{6R_1}$

(3) $V_a = 0$ として、電圧 V_{out} を求めよ

$$\frac{V_{in} - 0}{6R_1} = \frac{5(0 - V_{out})}{6R_1}$$

$$\frac{V_{in}}{6R_1} = -\frac{5}{6R_1} V_{out}$$

$$V_{in} = -5V_{out}$$

$$-\frac{V_{in}}{5} = V_{out}$$

Ans. $V_{out} = -\frac{V_{in}}{5}$

(2) 電流 I を求めよ

$$V_a - V_{out} = \frac{2R_1 3R_1}{2R_1 + 3R_1} I$$

$$V_a - V_{out} = \frac{6R_1^2}{5R_1} I = \frac{6R_1}{5} I$$

$$\frac{5(V_a - V_{out})}{6R_1} = I$$

Ans. $I = \frac{5(V_a - V_{out})}{6R_1}$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$-\frac{V_{in}}{5} = V_{out}$$

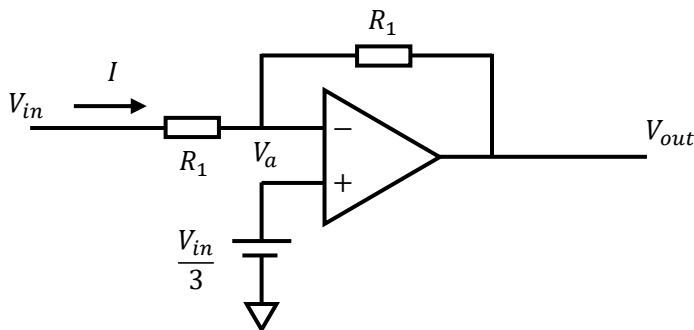
$$-\frac{1}{5} = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = -\frac{1}{5}$$

Ans. $A_V = -\frac{1}{5}$

文字と式（19）

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

(3) $V_a = V_{in}/3$ として、電圧 V_{out} を求めよ

$$\frac{V_{in} - \frac{V_{in}}{3}}{R_1} = \frac{\frac{V_{in}}{3} - V_{out}}{R_1}$$

Ans. $I =$

Ans. $V_{out} =$

(2) 電流 I を求めよ

$$V_a - V_{out} = R_1 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

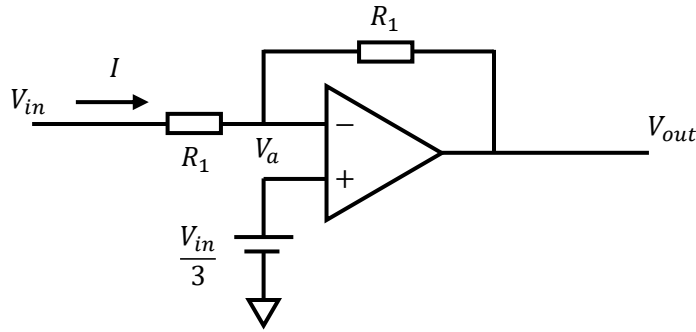
$$-\frac{V_{in}}{3} = V_{out}$$

Ans. $I =$

Ans. $A_V =$

文字と式 (19)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - V_a = R_1 I$$

$$\frac{V_{in} - V_a}{R_1} = I$$

(3) $V_a = V_{in}/3$ として、電圧 V_{out} を求めよ

$$\frac{V_{in} - \frac{V_{in}}{3}}{R_1} = \frac{\frac{V_{in}}{3} - V_{out}}{R_1} \quad \left| \quad \frac{V_{in}}{3} = -V_{out} \right.$$

$$V_{in} - \frac{V_{in}}{3} = \frac{V_{in}}{3} - V_{out} \quad \left| \quad -\frac{V_{in}}{3} = V_{out} \right.$$

$$V_{in} - \frac{V_{in}}{3} - \frac{V_{in}}{3} = -V_{out}$$

Ans. $I = \frac{V_{in} - V_a}{R_1}$

Ans. $V_{out} = -\frac{V_{in}}{3}$

(2) 電流 I を求めよ

$$V_a - V_{out} = R_1 I$$

$$\frac{V_a - V_{out}}{R_1} = I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$-\frac{V_{in}}{3} = V_{out}$$

$$-\frac{1}{3} = \frac{V_{out}}{V_{in}}$$

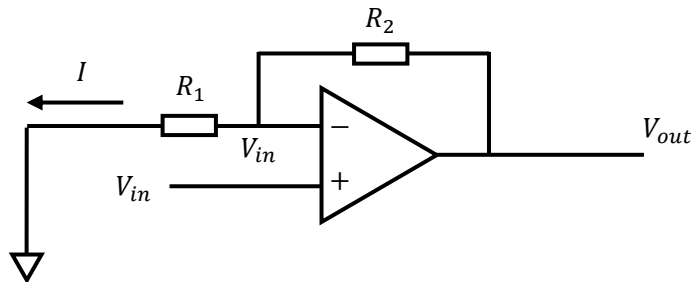
$$A_V = \frac{V_{out}}{V_{in}} = -\frac{1}{3}$$

Ans. $I = \frac{V_a - V_{out}}{R_1}$

Ans. $A_V = -\frac{1}{3}$

文字と式 (20)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = R_1 I$$

(3) 電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{V_{out} - V_{in}}{R_2}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_{out} - V_{in} = R_2 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

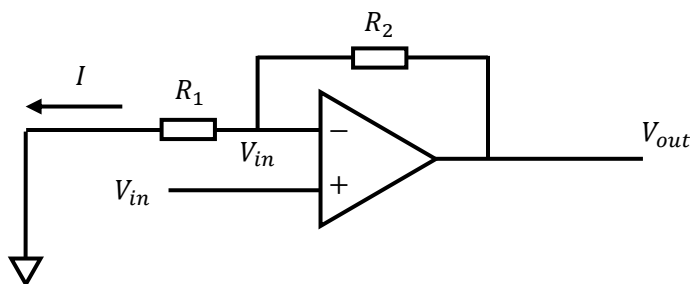
$$\left(\frac{R_2}{R_1} + 1\right) V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (20)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = R_1 I$$

$$\frac{V_{in}}{R_1} = I$$

Ans. $I = \frac{V_{in}}{R_1}$

(3) 電圧 V_{out} を求めよ

$$\begin{aligned} \frac{V_{in}}{R_1} &= \frac{V_{out} - V_{in}}{R_2} \\ \frac{R_2}{R_1} V_{in} &= V_{out} - V_{in} \\ \frac{R_2}{R_1} V_{in} + V_{in} &= V_{out} \end{aligned} \quad \left(\frac{R_2}{R_1} + 1 \right) V_{in} = V_{out}$$

Ans. $V_{out} = \left(\frac{R_2}{R_1} + 1 \right) V_{in}$

(2) 電流 I を求めよ

$$V_{out} - V_{in} = R_2 I$$

$$\frac{V_{out} - V_{in}}{R_2} = I$$

Ans. $I = \frac{V_{out} - V_{in}}{R_2}$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$\left(\frac{R_2}{R_1} + 1 \right) V_{in} = V_{out}$$

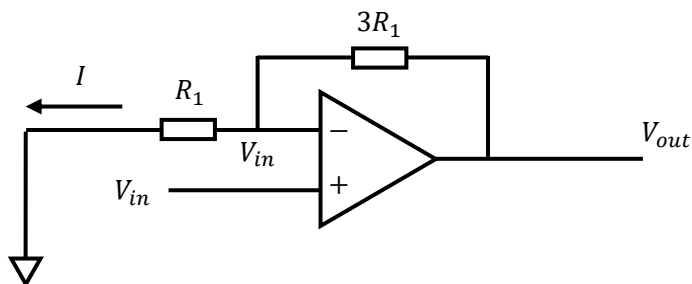
$$\frac{R_2}{R_1} + 1 = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = \frac{R_2}{R_1} + 1$$

Ans. $A_V = \frac{R_2}{R_1} + 1$

文字と式 (2 1)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = R_1 I$$

(3) 電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{V_{out} - V_{in}}{3R_1}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 3R_1 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

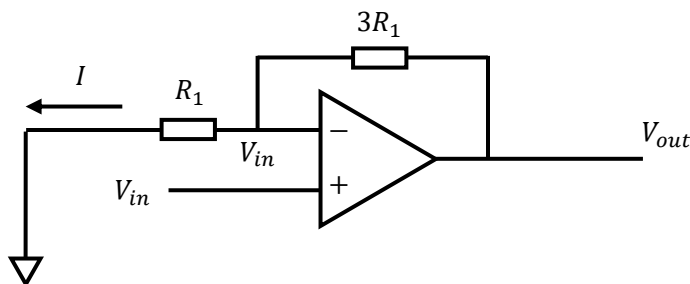
$$\left(\frac{3R_1}{R_1} + 1\right) V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (21)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = R_1 I$$

$$\frac{V_{in}}{R_1} = I$$

Ans. $I = \frac{V_{in}}{R_1}$

(3) 電圧 V_{out} を求めよ

$$\frac{V_{in}}{R_1} = \frac{V_{out} - V_{in}}{3R_1}$$

$$\frac{3R_1}{R_1} V_{in} = V_{out} - V_{in}$$

$$3V_{in} + V_{in} = V_{out}$$

$$4V_{in} = V_{out}$$

Ans. $V_{out} = 4V_{in}$

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 3R_1 I$$

$$\frac{V_{out} - V_{in}}{3R_1} = I$$

Ans. $I = \frac{V_{out} - V_{in}}{3R_1}$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$\left(\frac{3R_1}{R_1} + 1\right) V_{in} = V_{out}$$

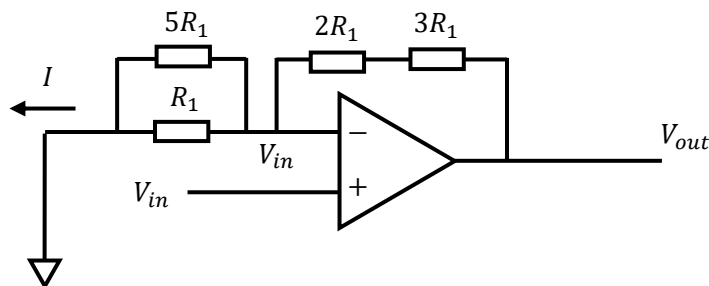
$$3 + 1 = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = 4$$

Ans. $A_V = 4$

文字と式 (22)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = \left(\frac{R_1 \cdot 5R_1}{R_1 + 5R_1} \right) I$$

(3) 電圧 V_{out} を求めよ

$$\frac{V_{in}}{\frac{R_1 \cdot 5R_1}{R_1 + 5R_1}} = \frac{V_{out} - V_{in}}{2R_1 + 3R_1}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 2R_1 I + 3R_1 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

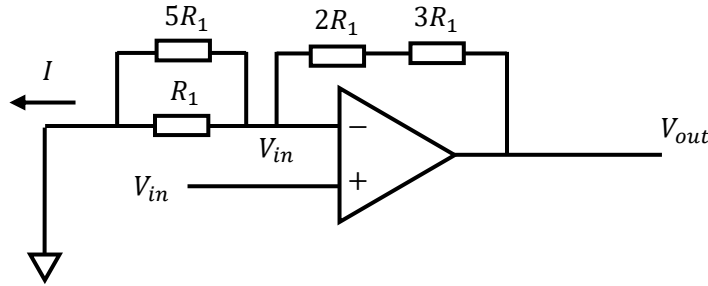
$$\left(\frac{2R_1 + 3R_1}{\frac{R_1 \cdot 5R_1}{R_1 + 5R_1}} + 1 \right) V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (22)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} = \left(\frac{R_1 \cdot 5R_1}{R_1 + 5R_1} \right) I$$

$$V_{in} = \frac{5R_1^2}{6R_1} I = \frac{5R_1}{6} I$$

$$\frac{6}{5R_1} V_{in} = I$$

Ans. $I = \frac{6}{5R_1} V_{in}$

(3) 電圧 V_{out} を求めよ

$$\frac{V_{in}}{\frac{R_1 \cdot 5R_1}{R_1 + 5R_1}} = \frac{V_{out} - V_{in}}{2R_1 + 3R_1} \quad \frac{6V_{in}}{5R_1} = \frac{V_{out} - V_{in}}{5R_1}$$

$$\frac{V_{in}}{\frac{5R_1^2}{6R_1}} = \frac{V_{out} - V_{in}}{5R_1}$$

$$\frac{6R_1 V_{in}}{5R_1^2} = \frac{V_{out} - V_{in}}{5R_1}$$

$$6V_{in} = V_{out} - V_{in}$$

$$6V_{in} + V_{in} = V_{out}$$

$$7V_{in} = V_{out}$$

Ans. $V_{out} = 7V_{in}$

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 2R_1 I + 3R_1 I$$

$$V_{out} - V_{in} = 5R_1 I$$

$$\frac{V_{out} - V_{in}}{5R_1} = I$$

Ans. $I = \frac{V_{out} - V_{in}}{5R_1}$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$\left(\frac{2R_1 + 3R_1}{\frac{R_1 \cdot 5R_1}{R_1 + 5R_1}} + 1 \right) V_{in} = V_{out}$$

$$\frac{2R_1 + 3R_1}{\frac{R_1 \cdot 5R_1}{R_1 + 5R_1}} + 1 = \frac{V_{out}}{V_{in}}$$

$$\frac{5R_1}{\frac{5R_1^2}{6R_1}} + 1 = \frac{V_{out}}{V_{in}}$$

$$\frac{6R_1 \cdot 5R_1}{5R_1^2} + 1 = \frac{V_{out}}{V_{in}}$$

$$6 + 1 = \frac{V_{out}}{V_{in}}$$

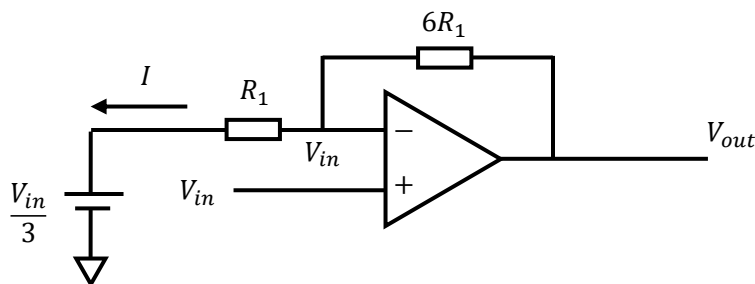
$$7 = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = 7$$

Ans. $A_V = 7$

文字と式 (23)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - \frac{V_{in}}{3} = R_1 I$$

(3) 電圧 V_{out} を求めよ

$$\frac{2}{3} \frac{V_{in}}{R_1} = \frac{V_{out} - V_{in}}{6R_1}$$

Ans. $I =$ _____

Ans. $V_{out} =$ _____

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 6R_1 I$$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

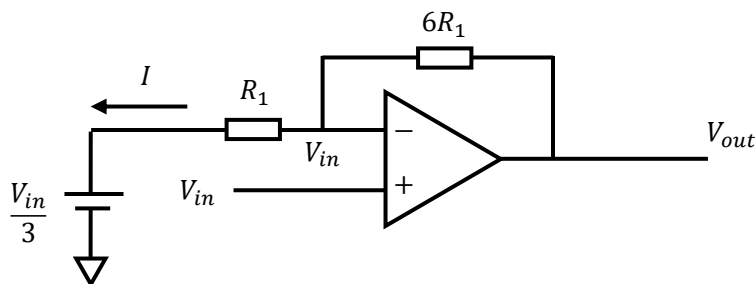
$$\left(\frac{6R_1}{\frac{3}{2}R_1} + 1 \right) V_{in} = V_{out}$$

Ans. $I =$ _____

Ans. $A_V =$ _____

文字と式 (23)

各問に答えなさい。



(1) 電流 I を求めよ

$$V_{in} - \frac{V_{in}}{3} = R_1 I$$

$$\frac{2}{3} V_{in} = R_1 I$$

$$\frac{2}{3} \frac{V_{in}}{R_1} = I$$

Ans. $I = \frac{2}{3} \frac{V_{in}}{R_1}$

(3) 電圧 V_{out} を求めよ

$$\frac{2}{3} \frac{V_{in}}{R_1} = \frac{V_{out} - V_{in}}{6R_1}$$

$$\frac{2}{3} \frac{6R_1}{R_1} V_{in} = V_{out} - V_{in}$$

$$4V_{in} = V_{out} - V_{in}$$

$$5V_{in} = V_{out}$$

Ans. $V_{out} = 5V_{in}$

(2) 電流 I を求めよ

$$V_{out} - V_{in} = 6R_1 I$$

$$\frac{V_{out} - V_{in}}{6R_1} = I$$

Ans. $I = \frac{V_{out} - V_{in}}{6R_1}$

(4) 増幅率 $A_V = V_{out}/V_{in}$ を求めよ

$$\left(\frac{6R_1}{\frac{2}{3}R_1} + 1 \right) V_{in} = V_{out}$$

$$\frac{2 \cdot 6R_1}{3R_1} + 1 = \frac{V_{out}}{V_{in}}$$

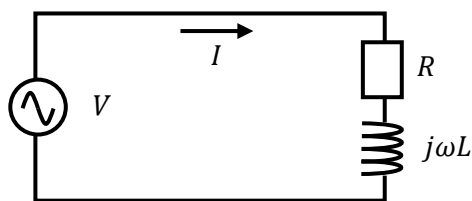
$$4 + 1 = \frac{V_{out}}{V_{in}}$$

$$A_V = \frac{V_{out}}{V_{in}} = 5$$

Ans. $A_V = 5$

文字と式 (24)

各問に答えなさい。



Hint

$$V = ZI$$

$$Z = R + j\omega L$$

$$(R + j\omega L)(R - j\omega L) = R^2 + \omega^2 L^2$$

$$|Z| = \sqrt{R^2 + \omega^2 L^2}$$

(1) 電流 I を求めよ

$$V = RI + j\omega LI$$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \frac{|V|}{|Z|}$$

$$|I| = \frac{|V|}{|R + j\omega L|}$$

Ans. $I =$ _____

Ans. $|I| =$ _____

(2) 以下の複素数の分母を実数化せよ (4) 有効電力 P を求めよ

$$I = \frac{V}{R + j\omega L}$$

$$P = R|I|^2$$

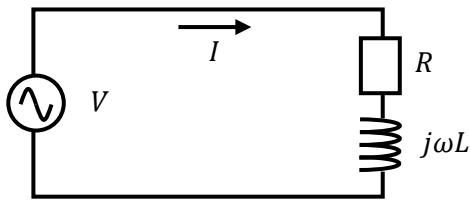
$$P = R \left| \frac{V}{R + j\omega L} \right|^2$$

Ans. $I =$ _____

Ans. $P =$ _____

文字と式 (24)

各問に答えなさい。



Hint

$$V = ZI$$

$$Z = R + j\omega L$$

$$(R + j\omega L)(R - j\omega L) = R^2 + \omega^2 L^2$$

$$|Z| = \sqrt{R^2 + \omega^2 L^2}$$

(1) 電流 I を求めよ

$$V = RI + j\omega LI$$

$$V = (R + j\omega L)I$$

$$\frac{V}{R + j\omega L} = I$$

Ans. $I = \frac{V}{R + j\omega L}$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \frac{|V|}{|Z|}$$

$$|I| = \frac{|V|}{|R + j\omega L|}$$

$$|I| = \frac{|V|}{\sqrt{R^2 + \omega^2 L^2}}$$

Ans. $|I| = \frac{|V|}{\sqrt{R^2 + \omega^2 L^2}}$

(2) 以下の複素数の分母を実数化せよ (4) 有効電力 P を求めよ

$$I = \frac{V}{R + j\omega L}$$

$$I = \frac{V(R - j\omega L)}{(R + j\omega L)(R - j\omega L)}$$

$$I = \frac{V(R - j\omega L)}{R^2 + \omega^2 L^2}$$

Ans. $I = \frac{V(R - j\omega L)}{R^2 + \omega^2 L^2}$

$$P = R|I|^2$$

$$P = R \left| \frac{V}{R + j\omega L} \right|^2$$

$$P = R \frac{|V|^2}{|R + j\omega L|^2}$$

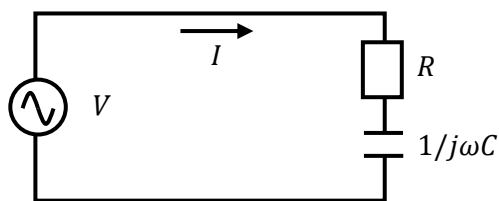
$$P = R \frac{|V|^2}{\sqrt{R^2 + \omega^2 L^2}^2}$$

$$P = \frac{R|V|^2}{R^2 + \omega^2 L^2}$$

Ans. $P = \frac{R|V|^2}{R^2 + \omega^2 L^2}$

文字と式 (25)

各問に答えなさい。



Hint

$$V = ZI$$

$$Z = R + \frac{1}{j\omega C}$$

$$|Z| = \sqrt{R^2 + 1/\omega^2 C^2}$$

(1) 電流 I を求めよ

$$V = RI + \frac{I}{j\omega C}$$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \frac{|V|}{|Z|}$$

$$|I| = \frac{|V|}{\left| R + \frac{1}{j\omega C} \right|}$$

Ans. $I =$ _____

Ans. $|I| =$ _____

(2) 以下の複素数の分母を実数化せよ (4) 有効電力 P を求めよ

$$I = \frac{j\omega CV}{1 + j\omega CR}$$

$$P = R|I|^2$$

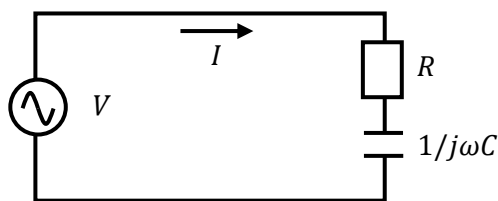
$$P = R \left| \frac{j\omega CV}{1 + j\omega CR} \right|^2$$

Ans. $I =$ _____

Ans. $P =$ _____

文字と式 (25)

各問に答えなさい。



Hint

$$V = ZI$$

$$Z = R + \frac{1}{j\omega C}$$

$$|Z| = \sqrt{R^2 + 1/\omega^2 C^2}$$

(1) 電流 I を求めよ

$$V = RI + \frac{I}{j\omega C}$$

$$V = \left(R + \frac{1}{j\omega C} \right) I$$

$$V = \left(\frac{j\omega CR + 1}{j\omega C} \right) I$$

$$\frac{j\omega CV}{1 + j\omega CR} = I$$

Ans. $I = \frac{j\omega CV}{1 + j\omega CR}$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \frac{|V|}{|Z|}$$

$$|I| = \frac{|V|}{\left| R + \frac{1}{j\omega C} \right|}$$

$$|I| = \frac{|V|}{\sqrt{R^2 + \frac{1}{\omega^2 C^2}}}$$

$$|I| = \frac{|V|}{\sqrt{\frac{\omega^2 C^2 R^2 + 1}{\omega^2 C^2}}}$$

$$|I| = \frac{|V|}{\frac{1}{\omega C} \sqrt{\omega^2 C^2 R^2 + 1}}$$

$$|I| = \frac{\omega C |V|}{\sqrt{\omega^2 C^2 R^2 + 1}}$$

Ans. $|I| = \frac{\omega C |V|}{\sqrt{\omega^2 C^2 R^2 + 1}}$

(2) 以下の複素数の分母を実数化せよ

$$I = \frac{j\omega CV}{1 + j\omega CR}$$

$$I = \frac{j\omega CV(1 - j\omega CR)}{(1 + j\omega CR)(1 - j\omega CR)}$$

$$I = \frac{j\omega CV(1 - j\omega CR)}{1 + \omega^2 C^2 R^2}$$

Ans. $I = \frac{j\omega CV(1 - j\omega CR)}{1 + \omega^2 C^2 R^2}$

(4) 有効電力 P を求めよ

$$P = R|I|^2$$

$$P = R \left| \frac{j\omega CV}{1 + j\omega CR} \right|^2$$

$$P = R \left(\frac{\omega CV}{\sqrt{\omega^2 C^2 R^2 + 1}} \right)^2$$

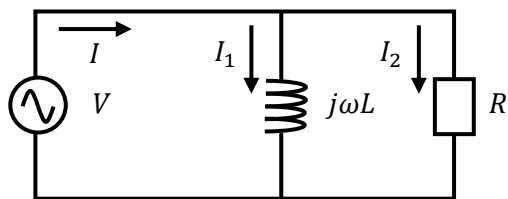
$$P = R \frac{\omega^2 C^2 |V|^2}{\omega^2 C^2 R^2 + 1}$$

$$P = R \frac{\omega^2 C^2 |V|^2}{\omega^2 C^2 R^2 + 1}$$

Ans. $P = \frac{\omega^2 C^2 R |V|^2}{\omega^2 C^2 R^2 + 1}$

文字と式 (26)

各問に答えなさい。



(1) 電流 I_1 を求めよ

$$V = j\omega L I_1$$

(3) 電流 I を求めよ

$$I = \frac{V}{j\omega L} + \frac{V}{R}$$

Ans. $I_1 =$ _____

Ans. $I = (\quad)V$ _____

(2) 電流 I_2 を求めよ

$$V = R I_2$$

(4) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(\frac{R + j\omega L}{j\omega L R} \right) V \right|$$

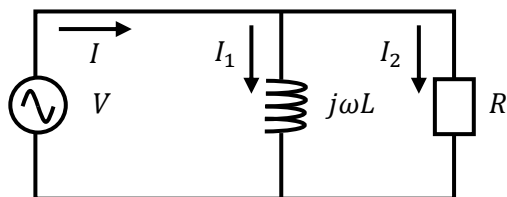
$$|I| = \left| \frac{R + j\omega L}{j\omega L R} \right| |V|$$

Ans. $I_2 =$ _____

Ans. $|I| =$ _____

文字と式 (26)

各問に答えなさい。



(1) 電流 I_1 を求めよ

$$V = j\omega L I_1$$

$$\frac{V}{j\omega L} = I_1$$

$$-j \frac{V}{\omega L} = I_1$$

Ans. $I_1 = -j \frac{V}{\omega L}$

(3) 電流 I を求めよ

$$I = \frac{V}{j\omega L} + \frac{V}{R}$$

$$I = \left(\frac{1}{j\omega L} + \frac{1}{R} \right) V$$

$$I = \left(\frac{R + j\omega L}{j\omega L R} \right) V$$

$$I = \left(\frac{-jR + \omega L}{\omega L R} \right) V$$

Ans. $I = \left(\frac{\omega L - jR}{\omega L R} \right) V$

(2) 電流 I_2 を求めよ

$$V = R I_2$$

$$\frac{V}{R} = I_2$$

Ans. $I_2 = \frac{V}{R}$

(4) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(\frac{R + j\omega L}{j\omega L R} \right) V \right|$$

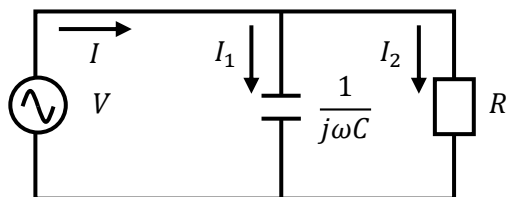
$$|I| = \left| \frac{R + j\omega L}{j\omega L R} \right| |V|$$

$$|I| = \frac{\sqrt{R^2 + \omega^2 L^2}}{\omega L R} |V|$$

Ans. $|I| = \frac{\sqrt{R^2 + \omega^2 L^2}}{\omega L R} |V|$

文字と式 (27)

各問に答えなさい。



(1) 電流 I_1 を求めよ

$$V = \frac{I_1}{j\omega C}$$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(\frac{j\omega CR + 1}{R} \right) V \right|$$

$$|I| = \left| \frac{j\omega CR + 1}{R} \right| |V|$$

Ans. $I_1 =$ _____

Ans. $|I| =$ _____

(2) 電流 I を求めよ

$$I = j\omega CV + \frac{V}{R}$$

(4) 合成インピーダンス Z を求めよ

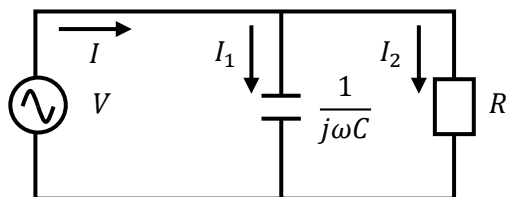
$$I = j\omega CV + \frac{V}{R}$$

Ans. $I = (\quad) V$ _____

Ans. $Z =$ _____

文字と式 (27)

各問に答えなさい。



(1) 電流 I_1 を求めよ

$$V = \frac{I_1}{j\omega C}$$

$$j\omega CV = I_1$$

Ans. $I_1 = j\omega CV$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(\frac{j\omega CR + 1}{R} \right) V \right|$$

$$|I| = \left| \frac{j\omega CR + 1}{R} \right| |V|$$

$$|I| = \frac{\sqrt{\omega^2 C^2 R^2 + 1}}{R} |V|$$

Ans. $|I| = \frac{\sqrt{\omega^2 C^2 R^2 + 1}}{R} |V|$

(2) 電流 I を求めよ

$$I = j\omega CV + \frac{V}{R}$$

$$I = \left(j\omega C + \frac{1}{R} \right) V$$

$$I = \left(\frac{j\omega CR + 1}{R} \right) V$$

Ans. $I = \left(\frac{j\omega CR + 1}{R} \right) V$

(4) 合成インピーダンス Z を求めよ

$$I = j\omega CV + \frac{V}{R}$$

$$I = \left(j\omega C + \frac{1}{R} \right) V$$

$$I = \left(\frac{j\omega CR + 1}{R} \right) V$$

$$\frac{1}{\frac{j\omega CR + 1}{R}} = \frac{V}{I} = Z$$

$$\frac{R}{j\omega CR + 1} = Z$$

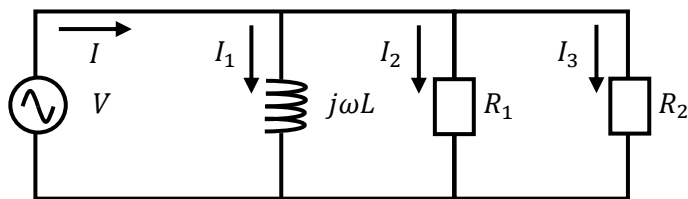
$$= \frac{R(1 - j\omega CR)}{(1 + j\omega CR)(1 - j\omega CR)}$$

$$= \frac{R - j\omega CR^2}{1 + \omega^2 C^2 R^2}$$

Ans. $Z = \frac{R - j\omega CR^2}{1 + \omega^2 C^2 R^2}$

文字と式 (28)

各問に答えなさい。



(1) 電流 I を求めよ

$$I = I_1 + I_2 + I_3$$

$$I = \frac{V}{j\omega L} + \frac{V}{R_1} + \frac{V}{R_2}$$

(3) 合成インピーダンス Z を求めよ

$$Z = \frac{1}{Y} = \frac{\omega L R_1 R_2}{\omega L (R_1 + R_2) - j R_1 R_2}$$

Ans. $I_1 = ($ _____ $)V$

Ans. $Z =$ _____

(2) 合成アドミタンス Y を求めよ

$$Y = \frac{I}{V} = \frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2}$$

(4) 電流の絶対値 $|I|$ を求めよ

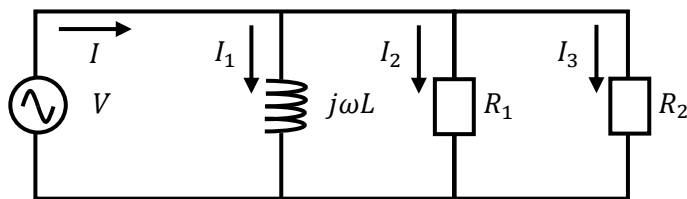
$$|I| = \left| \left(\frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2} \right) V \right|$$

Ans. $Y =$ _____

Ans. $|I| =$ _____

文字と式 (28)

各問に答えなさい。



(1) 電流 I を求めよ

$$I = I_1 + I_2 + I_3$$

$$I = \frac{V}{j\omega L} + \frac{V}{R_1} + \frac{V}{R_2}$$

$$I = \left(\frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2} \right) V$$

Ans. $I_1 = \left(\frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2} \right) V$

(3) 合成インピーダンス Z を求めよ

$$\begin{aligned} Z &= \frac{1}{Y} = \frac{\omega L R_1 R_2}{\omega L (R_1 + R_2) - j R_1 R_2} \\ &= \frac{\omega L R_1 R_2}{\omega L (R_1 + R_2) - j R_1 R_2} \cdot \frac{\omega L (R_1 + R_2) + j R_1 R_2}{\omega L (R_1 + R_2) + j R_1 R_2} \\ &= \frac{\omega^2 L^2 R_1 R_2 (R_1 + R_2) + j \omega L R_1^2 R_2^2}{\omega^2 L^2 (R_1 + R_2)^2 + R_1^2 R_2^2} \end{aligned}$$

Ans. $Z = \frac{\omega^2 L^2 R_1 R_2 (R_1 + R_2) + j \omega L R_1^2 R_2^2}{\omega^2 L^2 (R_1 + R_2)^2 + R_1^2 R_2^2}$

(2) 合成アドミタンス Y を求めよ

$$Y = \frac{I}{V} = \frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2}$$

$$Y = \frac{R_1 R_2}{j\omega L R_1 R_2} + \frac{j\omega L R_2}{R_1 j\omega L R_2} + \frac{j\omega L R_1}{R_2 j\omega L R_1}$$

$$Y = \frac{R_1 R_2 + j\omega L R_1 + j\omega L R_2}{j\omega L R_1 R_2}$$

$$Y = \frac{R_1 R_2 + j\omega L (R_1 + R_2)}{j\omega L R_1 R_2} \cdot \frac{-j}{-j}$$

$$Y = \frac{\omega L (R_1 + R_2) - j R_1 R_2}{\omega L R_1 R_2}$$

Ans. $Y = \frac{\omega L (R_1 + R_2) - j R_1 R_2}{\omega L R_1 R_2}$

(4) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(\frac{1}{j\omega L} + \frac{1}{R_1} + \frac{1}{R_2} \right) V \right|$$

$$|I| = \left| \frac{R_1 R_2 + j\omega L R_1 + j\omega L R_2}{j\omega L R_1 R_2} \right| |V|$$

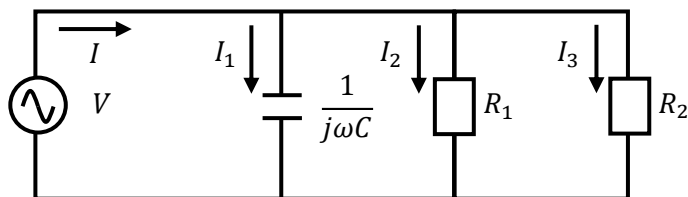
$$|I| = \frac{|R_1 R_2 + j\omega L (R_1 + R_2)|}{\omega L R_1 R_2} |V|$$

$$|I| = \frac{\sqrt{R_1^2 R_2^2 + \omega^2 L^2 (R_1 + R_2)^2}}{\omega L R_1 R_2} |V|$$

Ans. $|I| = \frac{\sqrt{R_1^2 R_2^2 + \omega^2 L^2 (R_1 + R_2)^2}}{\omega L R_1 R_2} |V|$

文字と式 (29)

各問に答えなさい。



(1) 電流 I を求めよ

$$I = I_1 + I_2 + I_3$$

$$I = j\omega CV + \frac{V}{R_1} + \frac{V}{R_2}$$

(3) 合成インピーダンス Z を求めよ

$$Z = \frac{1}{Y} = \frac{1}{j\omega C + \frac{R_1 + R_2}{R_1 R_2}}$$

Ans. $I_1 = (\quad)V$

Ans. $Z =$

(2) 合成アドミタンス Y を求めよ

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

(4) 電流の絶対値 $|I|$ を求めよ

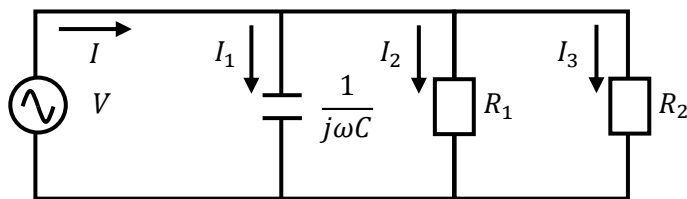
$$|I| = \left| \left(j\omega C + \frac{1}{R_1} + \frac{1}{R_2} \right) V \right|$$

Ans. $Y =$

Ans. $|I| =$

文字と式 (29)

各問に答えなさい。



(1) 電流 I を求めよ

$$I = I_1 + I_2 + I_3$$

$$I = j\omega CV + \frac{V}{R_1} + \frac{V}{R_2}$$

$$I = \left(j\omega C + \frac{1}{R_1} + \frac{1}{R_2} \right) V$$

Ans. $I = \left(j\omega C + \frac{1}{R_1} + \frac{1}{R_2} \right) V$

(2) 合成アドミタンス Y を求めよ

$$Y = \frac{I}{V} = j\omega C + \frac{1}{R_1} + \frac{1}{R_2}$$

$$Y = j\omega C + \frac{R_1 + R_2}{R_1 R_2}$$

Ans. $Y = j\omega C + \frac{R_1 + R_2}{R_1 R_2}$

(3) 合成インピーダンス Z を求めよ

$$Z = \frac{1}{Y} = \frac{1}{j\omega C + \frac{R_1 + R_2}{R_1 R_2}} = \frac{1}{\frac{j\omega C R_1 R_2 + R_1 + R_2}{R_1 R_2}}$$

$$= \frac{R_1 R_2}{R_1 + R_2 + j\omega C R_1 R_2} \cdot \frac{R_1 + R_2 - j\omega C R_1 R_2}{R_1 + R_2 - j\omega C R_1 R_2}$$

$$= \frac{R_1 R_2 (R_1 + R_2) - j\omega C R_1^2 R_2^2}{(R_1 + R_2)^2 + \omega^2 C^2 R_1^2 R_2^2}$$

Ans. $Z = \frac{R_1 R_2 (R_1 + R_2) - j\omega C R_1^2 R_2^2}{(R_1 + R_2)^2 + \omega^2 C^2 R_1^2 R_2^2}$

(4) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(j\omega C + \frac{1}{R_1} + \frac{1}{R_2} \right) V \right|$$

$$|I| = \left| \frac{j\omega C R_1 R_2 + R_1 + R_2}{R_1 R_2} \right| |V|$$

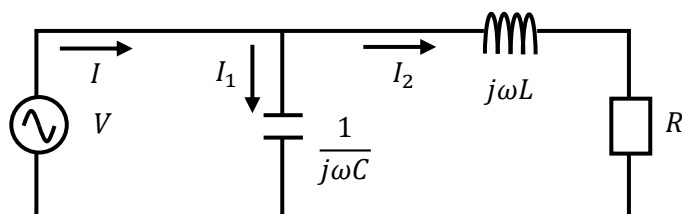
$$|I| = \frac{|R_1 + R_2 + j\omega C R_1 R_2|}{R_1 R_2} |V|$$

$$|I| = \frac{\sqrt{(R_1 + R_2)^2 + \omega^2 C^2 R_1^2 R_2^2}}{R_1 R_2} |V|$$

Ans. $|I| = \frac{\sqrt{(R_1 + R_2)^2 + \omega^2 C^2 R_1^2 R_2^2}}{R_1 R_2} |V|$

文字と式 (30)

各問に答えなさい。



(1) 電流 I を求めよ

$$I = I_1 + I_2$$

$$I = j\omega C V + \frac{V}{j\omega L + R}$$

(3) 電流の絶対値 $|I|$ を求めよ

$$|I| = \left| \left(j\omega C + \frac{1}{j\omega L + R} \right) V \right|$$

$$|I| = \left| \frac{j\omega C(j\omega L + R) + 1}{j\omega L + R} \right| |V|$$

Ans.

$$I = (\quad) V$$

Ans. $|I| =$

(2) 合成インピーダンス Z を求めよ

$$Z = \frac{V}{I} = \frac{1}{j\omega C + \frac{R - j\omega L}{R^2 + \omega^2 L^2}}$$

(4) 電流 I が実数となる角周波数 ω を求めよ

$$I = \left(\frac{j\omega C(R^2 + \omega^2 L^2) + R - j\omega L}{R^2 + \omega^2 L^2} \right) V$$

虚部が0となればよいので

$$\omega C(R^2 + \omega^2 L^2) - \omega L = 0$$

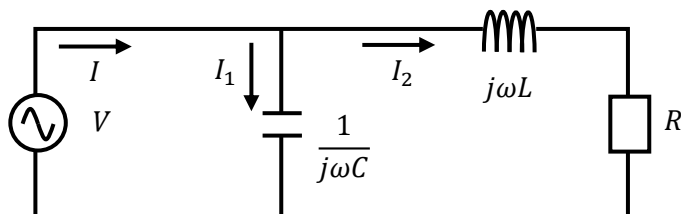
Ans.

$$Z =$$

Ans. $\omega =$

文字と式 (30)

各問に答えなさい。



(1) 電流 I を求めよ

$$\begin{aligned} I &= I_1 + I_2 \\ I &= j\omega C V + \frac{V}{j\omega L + R} \\ I &= \left(j\omega C + \frac{1}{j\omega L + R} \right) V \\ I &= \left(j\omega C + \frac{R - j\omega L}{(R + j\omega L)(R - j\omega L)} \right) V \\ I &= \left(j\omega C + \frac{R - j\omega L}{R^2 + \omega^2 L^2} \right) V \\ I &= \left(\frac{j\omega C(R^2 + \omega^2 L^2) + R - j\omega L}{R^2 + \omega^2 L^2} \right) V \end{aligned}$$

Ans.

$$I = \left(\frac{j\omega C(R^2 + \omega^2 L^2) + R - j\omega L}{R^2 + \omega^2 L^2} \right) V$$

(3) 電流の絶対値 $|I|$ を求めよ

$$\begin{aligned} |I| &= \left| \left(j\omega C + \frac{1}{j\omega L + R} \right) V \right| \\ |I| &= \left| \frac{j\omega C(j\omega L + R) + 1}{j\omega L + R} \right| |V| \\ |I| &= \frac{|-\omega^2 LC + j\omega CR + 1|}{\sqrt{\omega^2 L^2 + R^2}} |V| \\ |I| &= \sqrt{\frac{(1 - \omega^2 LC)^2 + \omega^2 C^2 R^2}{\omega^2 L^2 + R^2}} |V| \end{aligned}$$

Ans. $|I| = \sqrt{\frac{(1 - \omega^2 LC)^2 + \omega^2 C^2 R^2}{\omega^2 L^2 + R^2}} |V|$

(2) 合成インピーダンス Z を求めよ

$$\begin{aligned} Z &= \frac{V}{I} = \frac{1}{j\omega C + \frac{R - j\omega L}{R^2 + \omega^2 L^2}} \\ &= \frac{1}{\frac{j\omega C(R^2 + \omega^2 L^2) + R - j\omega L}{R^2 + \omega^2 L^2}} \\ &= \frac{R^2 + \omega^2 L^2}{R + j\omega \{C(R^2 + \omega^2 L^2) - L\}} \\ &= \frac{(R^2 + \omega^2 L^2)[R - j\omega \{C(R^2 + \omega^2 L^2) - L\}]}{R^2 + \omega^2 \{C(R^2 + \omega^2 L^2) - L\}^2} \end{aligned}$$

Ans.

$$Z = \frac{(R^2 + \omega^2 L^2)[R - j\omega \{C(R^2 + \omega^2 L^2) - L\}]}{R^2 + \omega^2 \{C(R^2 + \omega^2 L^2) - L\}^2}$$

(4) 電流 I が実数となる角周波数 ω を求めよ

$$I = \left(\frac{j\omega C(R^2 + \omega^2 L^2) + R - j\omega L}{R^2 + \omega^2 L^2} \right) V$$

虚部が0となればよいので

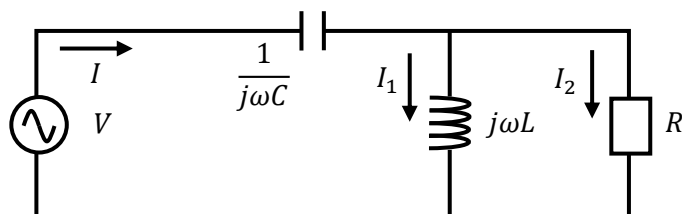
$$\begin{aligned} \omega C(R^2 + \omega^2 L^2) - \omega L &= 0 \\ R^2 + \omega^2 L^2 - \frac{L}{C} &= 0 \quad \leftarrow \times \frac{1}{\omega C} \\ \omega^2 L^2 &= \frac{L}{C} - R^2 \\ \omega^2 &= \frac{L}{CL^2} - \frac{R^2}{L^2} \quad \left| \begin{array}{l} \vdots \\ \omega = \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}} \end{array} \right. \end{aligned}$$

Ans.

$$\omega = \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

文字と式 (3 1)

各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$Z = \frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L}$$

(3) 電流 I を求めよ

$$I = \frac{V}{Z} = \frac{V}{\frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L}}$$

Ans.

$$Z =$$

Ans.

$$I =$$

(2) 電流の絶対値 $|I|$ を求めよ

$$|I| = \frac{|V|}{|Z|} = \frac{|V|}{\left| \frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L} \right|}$$

(4) 電流 I が実数となる角周波数 ω を求めよ

(3) の虚部が0となればいいので

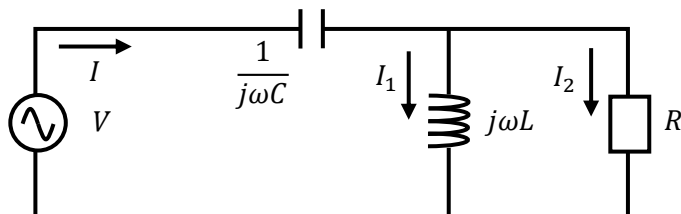
$$R^2(1 - \omega^2 LC) + \omega^2 L^2 = 0$$

Ans. $|I| =$

Ans. $\omega =$

文字と式 (3 1)

各問に答えなさい。



(1) 合成インピーダンスZを求めよ

$$\begin{aligned} Z &= \frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L} \\ &= \frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L} \cdot \frac{R - j\omega L}{R - j\omega L} \\ &= \frac{-j}{\omega C} + \frac{j\omega LR^2 + \omega^2 L^2 R}{R^2 + \omega^2 L^2} \\ &= \frac{-j(R^2 + \omega^2 L^2) + \omega C(j\omega LR^2 + \omega^2 L^2 R)}{\omega C(R^2 + \omega^2 L^2)} \end{aligned}$$

Ans.

$$Z = \frac{-j(R^2 + \omega^2 L^2) + j\omega^2 LCR^2 + \omega^3 L^2 CR}{\omega C(R^2 + \omega^2 L^2)}$$

(2) 電流の絶対値|I|を求めよ

$$\begin{aligned} |I| &= \frac{|V|}{|Z|} = \frac{|V|}{\left| \frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L} \right|} \\ &= \frac{|V|}{\left| \frac{1}{j\omega C} \cdot \frac{R + j\omega L}{R + j\omega L} + \frac{j\omega LR}{R + j\omega L} \cdot \frac{j\omega C}{j\omega C} \right|} \\ &= \frac{|V|}{\left| \frac{R + j\omega L - \omega^2 LCR}{j\omega C(R + j\omega L)} \right|} = \frac{|j\omega C(R + j\omega L)||V|}{|R(1 - \omega^2 LC) + j\omega L|} \\ &= \frac{\omega C \sqrt{R^2 + \omega^2 L^2}}{\sqrt{R^2(1 - \omega^2 LC)^2 + \omega^2 L^2}} |V| \end{aligned}$$

$$\text{Ans. } |I| = \frac{\omega C \sqrt{R^2 + \omega^2 L^2}}{\sqrt{R^2(1 - \omega^2 LC)^2 + \omega^2 L^2}} |V|$$

(3) 電流Iを求めよ

$$\begin{aligned} I &= \frac{V}{Z} = \frac{V}{\frac{1}{j\omega C} + \frac{j\omega LR}{R + j\omega L}} \\ &= \frac{j\omega C(R + j\omega L)V}{R(1 - \omega^2 LC) + j\omega L} \quad \text{(2)の変形を参照} \\ &= \frac{(jR - \omega L)(R(1 - \omega^2 LC) - j\omega L)\omega CV}{(R(1 - \omega^2 LC) + j\omega L)(R(1 - \omega^2 LC) - j\omega L)} \\ &= \frac{jR^2(1 - \omega^2 LC) + j\omega^2 L^2}{R^2(1 - \omega^2 LC)^2 + \omega^2 L^2} \omega CV \\ &\quad + \frac{-\omega LR(1 - \omega^2 LC) + \omega LR}{R^2(1 - \omega^2 LC)^2 + \omega^2 L^2} \omega CV \end{aligned}$$

Ans.

$$I = \frac{\omega^3 L^2 CR + j(R^2(1 - \omega^2 LC) + \omega^2 L^2)}{R^2(1 - \omega^2 LC)^2 + \omega^2 L^2} \omega CV$$

(4) 電流Iが実数となる角周波数ωを求めよ

(3) の虚部が0となればいので

$$R^2(1 - \omega^2 LC) + \omega^2 L^2 = 0$$

$$R^2 - \omega^2 LCR^2 + \omega^2 L^2 = 0$$

$$-\omega^2(LCR^2 - L^2) = -R^2$$

$$\omega^2 = \frac{R^2}{L(CR^2 - L)}$$

$$\omega = \frac{R}{\sqrt{L(CR^2 - L)}}$$

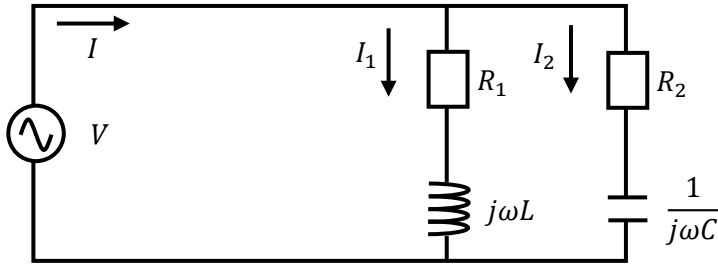
$$\omega = \frac{R}{\sqrt{L(CR^2 - L)}}$$

Ans.

文字と式 (3 2)



各問に答えなさい。



(1) 合成アドミタンス Y を求めよ

$$Y = \frac{1}{R_1 + j\omega L} + \frac{1}{R_2 + \frac{1}{j\omega C}}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればいいので

$$\omega \left(\frac{-L}{R_1^2 + \omega^2 L^2} + \frac{C}{1 + \omega^2 C^2 R_2^2} \right) = 0$$

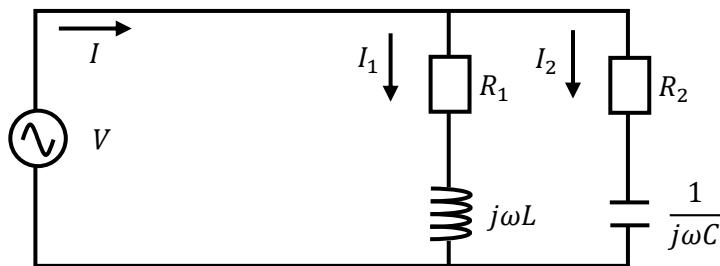
Ans.

$Y =$

Ans. $\omega =$

文字と式 (32)

各問に答えなさい。



(1) 合成アドミタンス Y を求めよ

$$\begin{aligned}
 Y &= \frac{1}{R_1 + j\omega L} + \frac{1}{R_2 + \frac{1}{j\omega C}} \\
 &= \frac{1}{R_1 + j\omega L} + \frac{j\omega C}{j\omega C R_2 + 1} \\
 &= \frac{1}{R_1 + j\omega L} \cdot \frac{R_1 - j\omega L}{R_1 - j\omega L} + \frac{j\omega C}{j\omega C R_2 + 1} \\
 &= \frac{R_1 - j\omega L}{R_1^2 + \omega^2 L^2} + \frac{j\omega C}{j\omega C R_2 + 1} \cdot \frac{1 - j\omega C R_2}{1 - j\omega C R_2} \\
 &= \frac{R_1 - j\omega L}{R_1^2 + \omega^2 L^2} + \frac{j\omega C + \omega^2 C^2 R_2}{1 + \omega^2 C^2 R_2^2} \\
 &= \frac{R_1}{R_1^2 + \omega^2 L^2} + \frac{\omega^2 C^2 R_2}{1 + \omega^2 C^2 R_2^2} \\
 &\quad + j\omega \left(\frac{-L}{R_1^2 + \omega^2 L^2} + \frac{C}{1 + \omega^2 C^2 R_2^2} \right)
 \end{aligned}$$

Ans.

$$\begin{aligned}
 Y &= \frac{R_1}{R_1^2 + \omega^2 L^2} + \frac{\omega^2 C^2 R_2}{1 + \omega^2 C^2 R_2^2} \\
 &\quad + j\omega \left(\frac{-L}{R_1^2 + \omega^2 L^2} + \frac{C}{1 + \omega^2 C^2 R_2^2} \right)
 \end{aligned}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればよいので

$$\omega \left(\frac{-L}{R_1^2 + \omega^2 L^2} + \frac{C}{1 + \omega^2 C^2 R_2^2} \right) = 0$$

$$\frac{-L}{R_1^2 + \omega^2 L^2} + \frac{C}{1 + \omega^2 C^2 R_2^2} = 0$$

$$\frac{C}{1 + \omega^2 C^2 R_2^2} = \frac{L}{R_1^2 + \omega^2 L^2}$$

$$C(R_1^2 + \omega^2 L^2) = L(1 + \omega^2 C^2 R_2^2)$$

$$C R_1^2 + \omega^2 L^2 C = L + \omega^2 L C^2 R_2^2$$

$$\omega^2 L^2 C - \omega^2 L C^2 R_2^2 = L - C R_1^2$$

$$\omega^2 L C (L - C R_2^2) = L - C R_1^2$$

$$\omega^2 = \frac{L - C R_1^2}{L C (L - C R_2^2)}$$

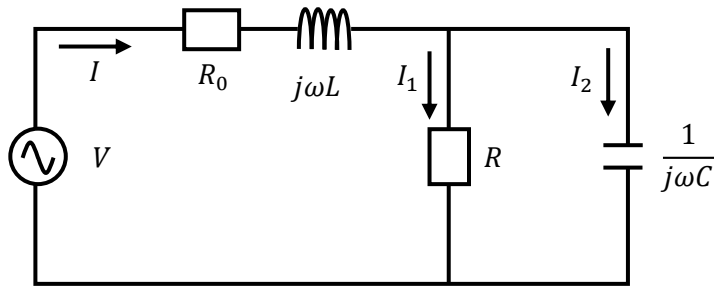
$$\omega = \sqrt{\frac{L - C R_1^2}{L C (L - C R_2^2)}}$$

$$\text{Ans. } \omega = \sqrt{\frac{L - C R_1^2}{L C (L - C R_2^2)}}$$

文字と式 (3 3)



各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$Z = R_0 + j\omega L + \frac{R \frac{1}{j\omega C}}{R + \frac{1}{j\omega C}}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればいいので

$$\omega \left(L - \frac{CR^2}{1 + \omega^2 C^2 R^2} \right) = 0$$

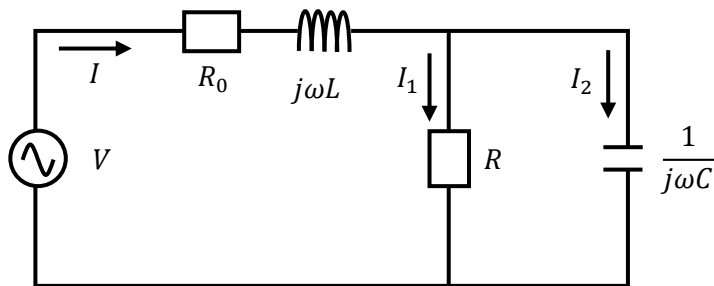
Ans.

$Z =$

Ans. $\omega =$

文字と式 (33)

各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$\begin{aligned}
 Z &= R_0 + j\omega L + \frac{R \frac{1}{j\omega C}}{R + \frac{1}{j\omega C}} \\
 &= R_0 + j\omega L + \frac{R \frac{1}{j\omega C}}{R + \frac{1}{j\omega C}} \cdot \frac{j\omega C}{j\omega C} \\
 &= R_0 + j\omega L + \frac{R}{j\omega CR + 1} \\
 &= R_0 + j\omega L + \frac{R}{j\omega CR + 1} \cdot \frac{1 - j\omega CR}{1 - j\omega CR} \\
 &= R_0 + j\omega L + \frac{R - j\omega CR^2}{1 + \omega^2 C^2 R^2} \\
 &= R_0 + \frac{R}{1 + \omega^2 C^2 R^2} \\
 &\quad + j\omega \left(L - \frac{CR^2}{1 + \omega^2 C^2 R^2} \right)
 \end{aligned}$$

Ans.
$$Z = R_0 + \frac{R}{1 + \omega^2 C^2 R^2} + j\omega \left(L - \frac{CR^2}{1 + \omega^2 C^2 R^2} \right)$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればよいので

$$\omega \left(L - \frac{CR^2}{1 + \omega^2 C^2 R^2} \right) = 0$$

$$L - \frac{CR^2}{1 + \omega^2 C^2 R^2} = 0$$

$$L = \frac{CR^2}{1 + \omega^2 C^2 R^2}$$

$$L(1 + \omega^2 C^2 R^2) = CR^2$$

$$L + \omega^2 LC^2 R^2 = CR^2$$

$$\omega^2 LC^2 R^2 = CR^2 - L$$

$$\omega^2 = \frac{CR^2 - L}{LC^2 R^2}$$

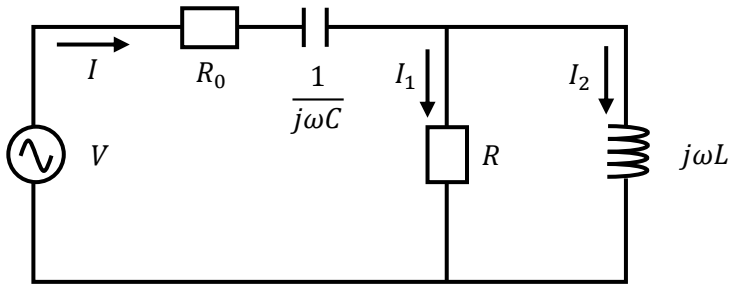
$$\omega = \sqrt{\frac{CR^2 - L}{LC^2 R^2}}$$

Ans.
$$\omega = \sqrt{\frac{CR^2 - L}{LC^2 R^2}}$$

文字と式 (3 4)



各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$Z = R_0 + \frac{1}{j\omega C} + \frac{Rj\omega L}{R + j\omega L}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればいいので

$$-\frac{1}{\omega C} + \frac{\omega LR^2}{R^2 + \omega^2 L^2} = 0$$

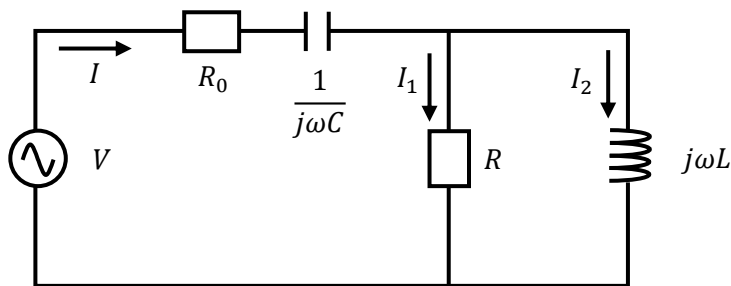
Ans.

$Z =$

Ans. $\omega =$

文字と式 (34)

各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$\begin{aligned} Z &= R_0 + \frac{1}{j\omega C} + \frac{Rj\omega L}{R + j\omega L} \\ &= R_0 + \frac{1}{j\omega C} \cdot \frac{j}{j} + \frac{Rj\omega L}{R + j\omega L} \cdot \frac{R - j\omega L}{R - j\omega L} \\ &= R_0 - \frac{j}{\omega C} + \frac{\omega^2 L^2 R + j\omega L R^2}{R^2 + \omega^2 L^2} \\ &= R_0 + \frac{\omega^2 L^2 R}{R^2 + \omega^2 L^2} + j \left(-\frac{1}{\omega C} + \frac{\omega L R^2}{R^2 + \omega^2 L^2} \right) \end{aligned}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればよいので

$$-\frac{1}{\omega C} + \frac{\omega L R^2}{R^2 + \omega^2 L^2} = 0$$

$$\frac{\omega L R^2}{R^2 + \omega^2 L^2} = \frac{1}{\omega C}$$

$$\omega L R^2 \cdot \omega C = R^2 + \omega^2 L^2$$

$$\omega^2 L C R^2 = R^2 + \omega^2 L^2$$

$$\omega^2 L C R^2 - \omega^2 L^2 = R^2$$

$$\omega^2 L (C R^2 - L) = R^2$$

$$\omega^2 = \frac{R^2}{L(C R^2 - L)}$$

$$\omega = \sqrt{\frac{R^2}{L(C R^2 - L)}} = \frac{R}{\sqrt{L(C R^2 - L)}}$$

Ans.

$$Z = R_0 + \frac{\omega^2 L^2 R}{R^2 + \omega^2 L^2} + j \left(-\frac{1}{\omega C} + \frac{\omega L R^2}{R^2 + \omega^2 L^2} \right)$$

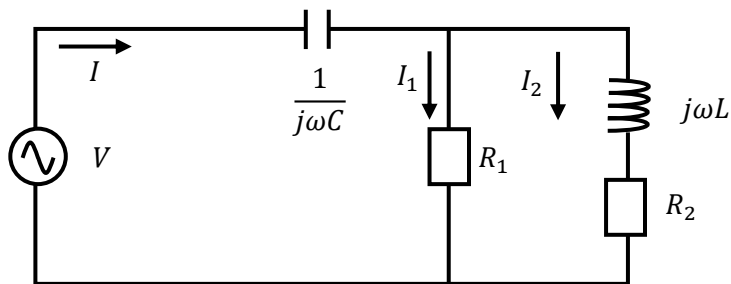
Ans.

$$\omega = \frac{R}{\sqrt{L(C R^2 - L)}}$$

文字と式 (35)



各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$Z = \frac{1}{j\omega C} + \frac{R_1(j\omega L + R_2)}{R_1 + R_2 + j\omega L}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればいいので

$$\frac{\omega L R_1^2}{(R_1 + R_2)^2 + \omega^2 L^2} - \frac{1}{\omega C} = 0$$

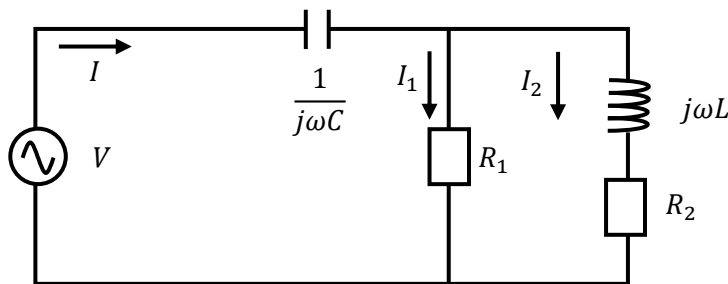
Ans.

$Z =$

Ans. $\omega =$

文字と式 (35)

各問に答えなさい。



(1) 合成インピーダンス Z を求めよ

$$\begin{aligned}
 Z &= \frac{1}{j\omega C} + \frac{R_1(j\omega L + R_2)}{R_1 + R_2 + j\omega L} \\
 &= \frac{1}{j\omega C} \cdot \frac{j}{j} + \frac{R_1(j\omega L + R_2)}{R_1 + R_2 + j\omega L} \cdot \frac{R_1 + R_2 - j\omega L}{R_1 + R_2 - j\omega L} \\
 &= -\frac{j}{\omega C} + \frac{j\omega LR_1 + R_1R_2}{R_1 + R_2 + j\omega L} \cdot \frac{R_1 + R_2 - j\omega L}{R_1 + R_2 - j\omega L} \\
 &= -\frac{j}{\omega C} + \frac{(j\omega LR_1 + R_1R_2)(R_1 + R_2 - j\omega L)}{(R_1 + R_2)^2 + \omega^2 L^2} \\
 &= -\frac{j}{\omega C} + \frac{R_1^2 R_2 + R_1 R_2^2 + \omega^2 L^2 R_1}{(R_1 + R_2)^2 + \omega^2 L^2} \\
 &\quad + \frac{j\omega LR_1^2 + j\omega LR_1 R_2 - j\omega LR_1 R_2}{(R_1 + R_2)^2 + \omega^2 L^2} \\
 &= \frac{R_1^2 R_2 + R_1 R_2^2 + \omega^2 L^2 R_1}{(R_1 + R_2)^2 + \omega^2 L^2} \\
 &\quad + \frac{j\omega LR_1^2}{(R_1 + R_2)^2 + \omega^2 L^2} - \frac{j}{\omega C}
 \end{aligned}$$

(2) 電流 I が実数となる角周波数 ω を求めよ

(1) の虚部が0となればよいので

$$\begin{aligned}
 \frac{\omega LR_1^2}{(R_1 + R_2)^2 + \omega^2 L^2} - \frac{1}{\omega C} &= 0 \\
 \frac{\omega LR_1^2}{(R_1 + R_2)^2 + \omega^2 L^2} &= \frac{1}{\omega C} \\
 \omega LR_1^2 \cdot \omega C &= (R_1 + R_2)^2 + \omega^2 L^2 \\
 \omega^2 LCR_1^2 &= (R_1 + R_2)^2 + \omega^2 L^2 \\
 \omega^2 LCR_1^2 - \omega^2 L^2 &= (R_1 + R_2)^2 \\
 \omega^2 L(CR_1^2 - L) &= (R_1 + R_2)^2 \\
 \omega^2 &= \frac{(R_1 + R_2)^2}{L(CR_1^2 - L)} \\
 \omega &= \sqrt{\frac{(R_1 + R_2)^2}{L(CR_1^2 - L)}} = \frac{R_1 + R_2}{\sqrt{L(CR_1^2 - L)}}
 \end{aligned}$$

Ans.

$$\begin{aligned}
 Z &= \frac{R_1^2 R_2 + R_1 R_2^2 + \omega^2 L^2 R_1}{(R_1 + R_2)^2 + \omega^2 L^2} \\
 &\quad + \frac{j\omega LR_1^2}{(R_1 + R_2)^2 + \omega^2 L^2} - \frac{j}{\omega C}
 \end{aligned}$$

Ans. $\omega = \frac{R_1 + R_2}{\sqrt{L(CR_1^2 - L)}}$

方程式 (1)

各問に答えなさい。



(1) $10 = 3I + 1$

(5) $\frac{V}{3} - 4 = 2$

Ans. $I =$ _____

Ans. $V =$ _____

(2) $10 - 5R = 20$

(6) $\frac{V}{3} + 6 = \frac{V}{6} + 5$

Ans. $R =$ _____

Ans. $V =$ _____

(3) $6I + 10 = 2I - 5$

(7) $-\frac{3}{11}V - 7 = 2$

Ans. $I =$ _____

Ans. $V =$ _____

(4) $17R + 38 = -7 + 8R$

(8) $\frac{3}{4}V - \frac{2}{7} = \frac{5}{6}V + \frac{1}{3}$

Ans. $R =$ _____

Ans. $V =$ _____

方程式 (1)

各問に答えなさい。



$$(1) 10 = 3I + 1$$

$$10 - 1 = 3I$$

$$9 = 3I$$

$$3 = I$$

$$\text{Ans. } I = 3$$

$$(5) \frac{V}{3} - 4 = 2$$

$$\frac{V}{3} = 2 + 4$$

$$\frac{V}{3} = 6$$

$$V = 18$$

$$\text{Ans. } V = 18$$

$$(2) 10 - 5R = 20$$

$$-5R = 20 - 10$$

$$-5R = 10$$

$$R = -2$$

$$\text{Ans. } R = -2$$

$$(6) \frac{V}{3} + 6 = \frac{V}{6} + 5$$

$$\begin{array}{l|l} \frac{V}{3} - \frac{V}{6} = 5 - 6 & \frac{V}{6} = -1 \\ \frac{2V}{6} - \frac{V}{6} = -1 & V = -6 \end{array}$$

$$\text{Ans. } V = -6$$

$$(3) 6I + 10 = 2I - 5$$

$$6I - 2I = -5 - 10$$

$$4I = -15$$

$$I = -\frac{15}{4}$$

$$\text{Ans. } I = -\frac{15}{4}$$

$$(7) -\frac{3}{11}V - 7 = 2$$

$$\begin{array}{l|l} -\frac{3}{11}V = 2 + 7 & V = 9 \times \left(-\frac{11}{3}\right) \\ -\frac{3}{11}V = 9 & V = -33 \end{array}$$

$$\text{Ans. } V = -33$$

$$(4) 17R + 38 = -7 + 8R$$

$$17R - 8R = -7 - 38$$

$$9R = -45$$

$$R = -5$$

$$\text{Ans. } R = -5$$

$$(8) \frac{3}{4}V - \frac{2}{7} = \frac{5}{6}V + \frac{1}{3}$$

$$\begin{array}{l|l} \frac{3}{4}V - \frac{5}{6}V = \frac{1}{3} + \frac{2}{7} & V = -12 \times \frac{13}{21} \\ \frac{9}{12}V - \frac{10}{12}V = \frac{7}{21} + \frac{6}{21} & V = -4 \times \frac{13}{7} \\ -\frac{1}{12}V = \frac{13}{21} & V = -\frac{52}{7} \end{array}$$

$$\text{Ans. } V = -\frac{52}{7}$$

方程式 (2)

各問に答えなさい。



$$(1) \frac{7-V}{4} = \frac{11-V}{8}$$

$$(4) \frac{3V-8}{5} = \frac{-V-8}{9}$$

Ans. $V =$ _____

$$(2) \frac{4-V}{3} = \frac{6V-4}{2}$$

Ans. $V =$ _____

$$(5) \frac{2-2V}{3} = \frac{V-18}{7}$$

Ans. $V =$ _____

$$(3) \frac{3V-5}{7} = \frac{2V-5}{3}$$

Ans. $V =$ _____

$$(6) \frac{24-V}{11} = \frac{-1+V}{12}$$

Ans. $V =$ _____

Ans. $V =$ _____

方程式 (2)

各問に答えなさい。



$$(1) \frac{7-V}{4} = \frac{11-V}{8}$$

$$\begin{aligned}\frac{7-V}{4} \times 8 &= \frac{11-V}{8} \times 8 \\ 2(7-V) &= 11-V \\ 14-2V &= 11-V \\ -2V+V &= 11-14 \\ -V &= -3 \\ V &= 3\end{aligned}$$

Ans. $V = 3$

$$(2) \frac{4-V}{3} = \frac{6V-4}{2}$$

$$\begin{aligned}\frac{4-V}{3} &= 3V-2 \\ \frac{4-V}{3} \times 3 &= (3V-2) \times 3 \\ 4-V &= 9V-6 \\ -9V-V &= -6-4 \\ -10V &= -10 \\ V &= 1\end{aligned}$$

Ans. $V = 1$

$$(3) \frac{3V-5}{7} = \frac{2V-5}{3}$$

$$\begin{aligned}\frac{3V-5}{7} \times 21 &= \frac{2V-5}{3} \times 21 \\ 3(3V-5) &= 7(2V-5) \\ 9V-15 &= 14V-35 \\ 9V-14V &= 15-35 \\ -5V &= -20 \\ V &= 4\end{aligned}$$

Ans. $V = 4$

$$(4) \frac{3V-8}{5} = \frac{-V-8}{9}$$

$$\begin{aligned}\frac{3V-8}{5} \times 45 &= \frac{-V-8}{9} \times 45 \\ 9(3V-8) &= 5(-V-8) \\ 27V-72 &= -5V-40 \\ 27V+5V &= 72-40 \\ 32V &= 32 \\ V &= 1\end{aligned}$$

Ans. $V = 1$

$$(5) \frac{2-2V}{3} = \frac{V-18}{7}$$

$$\begin{aligned}\frac{2-2V}{3} \times 21 &= \frac{V-18}{7} \times 21 \\ 7(2-2V) &= 3(V-18) \\ 14-14V &= 3V-54 \\ -14V-3V &= -14-54 \\ -17V &= -68 \\ V &= 4\end{aligned}$$

Ans. $V = 4$

$$(6) \frac{24-V}{11} = \frac{-1+V}{12}$$

$$\begin{aligned}\frac{24-V}{11} \times 121 &= \frac{-1+V}{12} \times 121 \\ 12(24-V) &= 11(-1+V) \\ 288-12V &= -11+11V \\ -12V-11V &= -288-11 \\ -23V &= -299 \\ V &= 13\end{aligned}$$

Ans. $V = 13$

方程式 (3)

各問に答えなさい。



$$(1) \frac{5+V}{3} = \frac{2V+7}{5}$$

$$(4) \frac{V+3}{10} = \frac{-V-16}{3}$$

Ans. $V =$ _____

$$(2) \frac{V-8}{3} = \frac{2-8V}{7}$$

Ans. $V =$ _____

$$(5) \frac{11+V}{6} = \frac{1+2V}{5}$$

Ans. $V =$ _____

$$(3) \frac{-3+V}{2} = \frac{14-V}{9}$$

Ans. $V =$ _____

$$(6) \frac{49+28V}{9} = \frac{35+7V}{12}$$

Ans. $V =$ _____

Ans. $V =$ _____

方程式 (3)

各問に答えなさい。



$$(1) \frac{5+V}{3} = \frac{2V+7}{5}$$

$$\begin{aligned} \frac{5+V}{3} \times 15 &= \frac{2V+7}{5} \times 15 \\ 5(5+V) &= 3(2V+7) \\ 25+5V &= 6V+21 \\ 5V-6V &= 21-25 \\ -V &= -4 \\ V &= 4 \end{aligned}$$

Ans. $V = 4$

$$(4) \frac{V+3}{10} = \frac{-V-16}{3}$$

$$\begin{aligned} \frac{V+3}{10} \times 30 &= \frac{-V-16}{3} \times 30 \\ 3(V+3) &= 10(-V-16) \\ 3V+9 &= -10V-160 \\ 3V+10V &= -9-160 \\ 13V &= -169 \\ V &= -13 \end{aligned}$$

Ans. $V = -13$

$$(2) \frac{V-8}{3} = \frac{2-8V}{7}$$

$$\begin{aligned} \frac{V-8}{3} \times 21 &= \frac{2-8V}{7} \times 21 \\ 7(V-8) &= 3(2-8V) \\ 7V-56 &= 6-24V \\ 7V+24V &= 6+56 \\ 31V &= 62 \\ V &= 2 \end{aligned}$$

Ans. $V = 2$

$$(5) \frac{11+V}{6} = \frac{1+2V}{5}$$

$$\begin{aligned} \frac{11+V}{6} \times 30 &= \frac{1+2V}{5} \times 30 \\ 5(11+V) &= 6(1+2V) \\ 55+5V &= 6+12V \\ 5V-12V &= 6-55 \\ -7V &= -49 \\ V &= 7 \end{aligned}$$

Ans. $V = 7$

$$(3) \frac{-3+V}{2} = \frac{14-V}{9}$$

$$\begin{aligned} \frac{-3+V}{2} \times 18 &= \frac{14-V}{9} \times 18 \\ 9(-3+V) &= 2(14-V) \\ -27+9V &= 28-2V \\ 9V+2V &= 28+27 \\ 11V &= 55 \\ V &= 5 \end{aligned}$$

Ans. $V = 5$

$$(6) \frac{49+28V}{9} = \frac{35+7V}{12}$$

$$\begin{aligned} \frac{7(7+4V)}{3 \times 3} &= \frac{7(5+V)}{3 \times 4} \\ \frac{7(7+4V)}{3 \times 3} \times \frac{36}{7} &= \frac{7(5+V)}{3 \times 4} \times \frac{36}{7} \\ 4(7+4V) &= 3(5+V) \\ 28+16V &= 15+3V \\ 16V-3V &= 15-28 \\ 13V &= -13 \\ V &= -1 \end{aligned}$$

Ans. $V = -1$

方程式 (4)

各問に答えなさい。



$$(1) \frac{(V-1)-1}{3} = \frac{V-3}{2}$$

$$(4) \frac{V-(5+2V)}{6} = \frac{V-(10+V)}{5}$$

Ans. $V =$ _____

$$(2) \frac{-V-11}{4} = \frac{5-(V+12)}{3}$$

Ans. $V =$ _____

$$(5) \frac{4-2(V+10)}{9} = \frac{-6-4(V+1)}{7}$$

Ans. $V =$ _____

$$(3) \frac{(3V+1)-V}{7} = \frac{11-V}{8}$$

Ans. $V =$ _____

$$(6) \frac{(8V-3)-V}{11} = \frac{(10V-3)-2V}{13}$$

Ans. $V =$ _____

Ans. $V =$ _____

方程式 (4)

各問に答えなさい。



$$(1) \frac{(V-1)-1}{3} = \frac{V-3}{2}$$

$$\frac{(V-1)-1}{3} \times 6 = \frac{V-3}{2} \times 6$$

$$2(V-1)-2 = 3(V-3)$$

$$2V-2-2 = 3V-9$$

$$2V-3V = -9+2+2$$

$$-V = -5$$

$$V = 5$$

Ans. $V = 5$

$$(2) \frac{-V-11}{4} = \frac{5-(V+12)}{3}$$

$$\frac{-V-11}{4} \times 12 = \frac{5-(V+12)}{3} \times 12$$

$$3(-V-11) = 20-4(V+12)$$

$$-3V-33 = 20-4V-48$$

$$-3V+4V = 20-48+33$$

$$V = 5$$

Ans. $V = 5$

$$(3) \frac{(3V+1)-V}{7} = \frac{11-V}{8}$$

$$\frac{(3V+1)-V}{7} \times 56 = \frac{11-V}{8} \times 56$$

$$8(3V+1)-8V = 7(11-V)$$

$$24V+8-8V = 77-7V$$

$$24V-8V+7V = 77-8$$

$$13V = 69$$

$$V = 3$$

Ans. $V = 3$

$$(4) \frac{V-(5+2V)}{6} = \frac{V-(10+V)}{5}$$

$$\frac{V-(5+2V)}{6} \times 30 = \frac{V-(10+V)}{5} \times 30$$

$$5V-5(5+2V) = 6V-6(10+V)$$

$$5V-25-10V = 6V-60-6V$$

$$5V-10V-6V+6V = -60+25$$

$$-5V = -35$$

$$V = 7$$

Ans. $V = 7$

$$(5) \frac{4-2(V+10)}{9} = \frac{-6-4(V+1)}{7}$$

$$\frac{4-2(V+10)}{9} \times 63 = \frac{-6-4(V+1)}{7} \times 63$$

$$28-14(V+10) = -54-36(V+1)$$

$$28-14V-140 = -54-36V-36$$

$$-14V+36V = -54-36-28+140$$

$$22V = 22$$

$$V = 1$$

Ans. $V = 1$

$$(6) \frac{(8V-3)-V}{11} = \frac{(10V-3)-2V}{13}$$

$$\frac{(8V-3)-V}{11} \times 143 = \frac{(10V-3)-2V}{13} \times 143$$

$$\frac{7V-3}{11} \times 143 = \frac{8V-3}{13} \times 143$$

$$13(7V-3) = 11(8V-3)$$

$$91V-39 = 88V-33$$

$$91V-88V = -33+39$$

$$3V = 6$$

$$V = 2$$

Ans. $V = 2$

方程式 (5)

各問に答えなさい。



(1)

$$\frac{3(V-2)-1}{8} = \frac{3(V-1)-5}{7}$$

(3)

$$\frac{2(2V+3)-5}{9} = \frac{4(2V-1)-7}{5}$$

Ans. $V =$ _____

Ans. $V =$ _____

(2)

$$\frac{2(3V+2)+3}{13} = \frac{10(3-V)-13}{7}$$

(4)

$$\frac{8(2V-7)+16}{5} = \frac{8(V-1)-8}{3}$$

Ans. $V =$ _____

Ans. $V =$ _____

方程式 (5)



各問に答えなさい。

(1)

$$\frac{3(V-2)-1}{8} = \frac{3(V-1)-5}{7}$$

$$\frac{3V-6-1}{8} = \frac{3V-3-5}{7}$$

$$\frac{3V-7}{8} \times 56 = \frac{3V-8}{7} \times 56$$

$$7(3V-7) = 8(3V-8)$$

$$21V-49 = 24V-64$$

$$21V-24V = -64+49$$

$$-3V = -15$$

$$V = 5$$

Ans. $V = 5$

(3)

$$\frac{2(2V+3)-5}{9} = \frac{4(2V-1)-7}{5}$$

$$\frac{4V+6-5}{9} = \frac{8V-4-7}{5}$$

$$\frac{4V+1}{9} \times 45 = \frac{8V-11}{5} \times 45$$

$$5(4V+1) = 9(8V-11)$$

$$20V+5 = 72V-99$$

$$20V-72V = -99-5$$

$$-52V = -104$$

$$V = 2$$

Ans. $V = 2$

(2)

$$\frac{2(3V+2)+3}{13} = \frac{10(3-V)-13}{7}$$

$$\frac{6V+4+3}{13} = \frac{30-10V-13}{7}$$

$$\frac{6V+7}{13} \times 91 = \frac{17-10V}{7} \times 91$$

$$7(6V+7) = 13(17-10V)$$

$$42V+49 = 221-130V$$

$$42V+130V = 221-49$$

$$172V = 172$$

$$V = 1$$

Ans. $V = 1$

(4)

$$\frac{8(2V-7)+16}{5} = \frac{8(V-1)-8}{3}$$

$$\frac{8\{(2V-7)+2\}}{5} = \frac{8\{(V-1)-1\}}{3}$$

$$\frac{8(2V-5)}{5} \times \frac{15}{8} = \frac{8(V-2)}{3} \times \frac{15}{8}$$

$$3(2V-5) = 5(V-2)$$

$$6V-15 = 5V-10$$

$$6V-5V = -10+15$$

$$V = 5$$

Ans. $V = 5$

方程式 (6)

各問に答えなさい。



$$(1) \quad \frac{2}{\frac{1}{R} + \frac{1}{R}} = 8$$

$$(3) \quad \frac{14}{\frac{1}{3R} + \frac{1}{4R}} = 48$$

$$(2) \quad \frac{6}{\frac{1}{R} + \frac{1}{2R}} = 8$$

Ans. $R =$ _____

$$(4) \quad \frac{1}{\frac{1}{3R} + \frac{1}{5R}} \cdot \frac{4}{5} = 9$$

Ans. $R =$ _____

Ans. $R =$ _____

Ans. $R =$ _____

方程式 (6)



各問に答えなさい。

$$(1) \quad \frac{2}{\frac{1}{R} + \frac{1}{R}} = 8$$

$$\frac{2}{\frac{2}{R}} = 8$$

$$\frac{2}{1} \times \frac{R}{2} = 8$$
$$R = 8$$

$$(3) \quad \frac{14}{\frac{1}{3R} + \frac{1}{4R}} = 48$$

$$\frac{14}{\frac{4}{12R} + \frac{3}{12R}} = 48$$

$$\frac{14}{\frac{7}{12R}} = 48$$

$$\frac{14}{1} \times \frac{12R}{7} = 48$$
$$24R = 48$$
$$R = 2$$

Ans. $R = 8$

Ans. $R = 2$

$$(2) \quad \frac{6}{\frac{1}{R} + \frac{1}{2R}} = 8$$

$$\frac{6}{\frac{2}{2R} + \frac{1}{2R}} = 8$$

$$\frac{6}{\frac{3}{2R}} = 8$$

$$\frac{6}{1} \times \frac{2R}{3} = 8$$
$$4R = 8$$
$$R = 2$$

$$(4) \quad \frac{1}{\frac{1}{3R} + \frac{1}{5R}} \cdot \frac{4}{5} = 9$$

$$\frac{1}{\frac{5}{15R} + \frac{3}{15R}} \cdot \frac{4}{5} = 9$$

$$\frac{1}{\frac{8}{15R}} \cdot \frac{4}{5} = 9$$

$$\frac{4}{5} \times \frac{15R}{8} = 9$$
$$\frac{3}{2}R = 9$$
$$R = 9 \times \frac{2}{3} = 6$$

Ans. $R = 2$

Ans. $R = 6$

方程式 (7)

各問に答えなさい。



$$(1) \quad \frac{2}{\frac{1}{R} + \frac{1}{5}} = 8$$

$$(3) \quad \frac{4}{\frac{1}{3R} + \frac{1}{18}} = 48$$

$$(2) \quad \frac{6}{\frac{1}{3} + \frac{1}{2R}} = 9$$

Ans. $R =$ _____

$$(4) \quad \frac{1}{\frac{1}{3R} + \frac{1}{5}} \cdot \frac{4}{5} = 6$$

Ans. $R =$ _____

Ans. $R =$ _____

Ans. $R =$ _____

方程式 (7)

各問に答えなさい。



$$(1) \quad \frac{2}{\frac{1}{R} + \frac{1}{5}} = 8$$

$$\frac{2}{\frac{5}{5R} + \frac{R}{5R}} = 8$$

$$\frac{2}{\frac{5+R}{5R}} = 8$$

$$\begin{aligned} \frac{2}{1} \times \frac{5R}{5+R} &= 8 \\ 10R &= 8(5+R) \\ 10R &= 40 + 8R \\ 10R - 8R &= 40 \\ 2R &= 40 \\ R &= 20 \end{aligned}$$

Ans. $R = 20$

$$(3) \quad \frac{4}{\frac{1}{3R} + \frac{1}{18}} = 48$$

$$\frac{4}{\frac{6}{18R} + \frac{R}{18R}} = 48$$

$$\frac{4}{\frac{6+R}{18R}} = 48$$

$$\begin{aligned} \frac{4}{1} \times \frac{18R}{6+R} &= 48 \\ 72R &= 48(6+R) \\ 3R &= 2(6+R) \\ 3R &= 12 + 2R \\ 3R - 2R &= 12 \\ R &= 12 \end{aligned}$$

Ans. $R = 12$

$$(2) \quad \frac{6}{\frac{1}{3} + \frac{1}{2R}} = 9$$

$$\frac{6}{\frac{2R}{6R} + \frac{3}{6R}} = 9$$

$$\frac{6}{\frac{2R+3}{6R}} = 9$$

$$\begin{aligned} \frac{6}{1} \times \frac{6R}{2R+3} &= 9 \\ 36R &= 9(2R+3) \\ 4R &= 2R+3 \\ 4R - 2R &= 3 \\ 2R &= 3 \end{aligned}$$

Ans. $R = \frac{3}{2}$

$$(4) \quad \frac{1}{\frac{1}{3R} + \frac{1}{5}} \cdot \frac{4}{5} = 6$$

$$\frac{1}{\frac{5}{15R} + \frac{3R}{15R}} \cdot \frac{4}{5} = 6$$

$$\frac{1}{\frac{5+3R}{15R}} \cdot \frac{4}{5} = 6$$

$$\begin{aligned} \frac{4}{5} \times \frac{15R}{5+3R} &= 6 \\ 12R &= 6(5+3R) \\ 2R &= 5+3R \\ 2R - 3R &= 5 \\ -R &= 5 \\ R &= -5 \end{aligned}$$

Ans. $R = -5$

方程式 (8)



各問に答えなさい。

$$(1) \quad \frac{7}{\frac{1}{4R} + \frac{1}{3R}} = 5R + 14$$

$$(3) \quad \frac{1}{\frac{1}{7R} + \frac{1}{3R}} \cdot \frac{2}{7} = 3R - 2$$

$$(2) \quad \frac{16}{\frac{1}{3R} + \frac{1}{5R}} = 42R - 36$$

Ans. $R =$ _____

$$(4) \quad \frac{1}{\frac{1}{3R} + \frac{1}{12R}} \cdot \frac{10}{3} = 9R - 8$$

Ans. $R =$ _____

Ans. $R =$ _____

Ans. $R =$ _____

方程式 (8)



各問に答えなさい。

$$\begin{aligned}
 (1) \quad & \frac{7}{\frac{1}{4R} + \frac{1}{3R}} = 5R + 14 \\
 & \frac{7}{\frac{3}{12R} + \frac{4}{12R}} = 5R + 14 \\
 & \frac{7}{\frac{7}{12R}} = 5R + 14 \\
 & \frac{7}{1} \times \frac{12R}{7} = 5R + 14 \\
 & 12R = 5R + 14 \\
 & 12R - 5R = 14 \\
 & 7R = 14 \\
 & R = 2
 \end{aligned}$$

Ans. $R = 2$

$$\begin{aligned}
 (2) \quad & \frac{16}{\frac{1}{3R} + \frac{1}{5R}} = 42R - 36 \\
 & \frac{16}{\frac{3}{15R} + \frac{5}{15R}} = 42R - 36 \\
 & \frac{16}{\frac{8}{15R}} = 42R - 36 \\
 & \frac{16}{1} \times \frac{15R}{8} = 42R - 36 \\
 & 30R = 42R - 36 \\
 & 30R - 42R = -36 \\
 & -12R = -36 \\
 & R = 3
 \end{aligned}$$

Ans. $R = 3$

$$\begin{aligned}
 (3) \quad & \frac{1}{\frac{1}{7R} + \frac{1}{3R}} \cdot \frac{2}{7} = 3R - 2 \\
 & \frac{1}{\frac{3}{21R} + \frac{7}{21R}} \cdot \frac{2}{7} = 3R - 2 \\
 & \frac{1}{\frac{10}{21R}} \cdot \frac{2}{7} = 3R - 2 \\
 & \frac{2}{7} \times \frac{21R}{10} = 3R - 2 \\
 & \frac{3R}{5} = 3R - 2 \\
 & 3R = 5(3R - 2) \\
 & 3R = 15R - 10 \\
 & -12R = -10
 \end{aligned}$$

Ans. $R = \frac{5}{6}$

$$\begin{aligned}
 (4) \quad & \frac{1}{\frac{1}{3R} + \frac{1}{12R}} \cdot \frac{10}{3} = 9R - 8 \\
 & \frac{1}{\frac{4}{12R} + \frac{1}{12R}} \cdot \frac{10}{3} = 9R - 8 \\
 & \frac{1}{\frac{5}{12R}} \cdot \frac{10}{3} = 9R - 8 \\
 & \frac{10}{3} \times \frac{12R}{5} = 9R - 8 \\
 & 8R = 9R - 8 \\
 & 8R - 9R = -8 \\
 & -R = -8 \\
 & R = 8
 \end{aligned}$$

Ans. $R = 8$

方程式 (9)



各問に答えなさい。

$$(1) \quad \frac{1}{\frac{1}{2R} + \frac{1}{3R}} \cdot \frac{5}{3} = R + 10$$

$$(3) \quad \frac{1}{\frac{1}{14R} + \frac{1}{21R}} \cdot \frac{5}{28} = 2R - 5$$

$$(2) \quad \frac{\text{Ans. } R =}{\frac{1}{9R} + \frac{1}{18R}} \cdot \frac{1}{15} = R - 9$$

$$(4) \quad \frac{\text{Ans. } R =}{\frac{1}{8R} + \frac{1}{20R}} \cdot \frac{7}{12} = 3R + 4$$

Ans. $R =$ _____

Ans. $R =$ _____

方程式 (9)



各問に答えなさい。

$$\begin{aligned}(1) \quad & \frac{1}{\frac{1}{2R} + \frac{1}{3R}} \cdot \frac{5}{3} = R + 10 \\ & \frac{1}{\frac{3}{6R} + \frac{2}{6R}} \cdot \frac{5}{3} = R + 10 \\ & \frac{1}{\frac{5}{6R}} \cdot \frac{5}{3} = R + 10 \\ & \frac{5}{3} \times \frac{6R}{5} = R + 10 \\ & 2R = R + 10 \\ & 2R - R = 10 \\ & R = 10\end{aligned}$$

Ans. $R = 10$

$$\begin{aligned}(2) \quad & \frac{1}{\frac{1}{9R} + \frac{1}{18R}} \cdot \frac{1}{15} = R - 9 \\ & \frac{1}{\frac{2}{18R} + \frac{1}{18R}} \cdot \frac{1}{15} = R - 9 \\ & \frac{1}{\frac{3}{18R}} \cdot \frac{1}{15} = R - 9 \\ & \frac{1}{15} \times \frac{18R}{3} = R - 9 \\ & 2R = 5(R - 9) \\ & 2R = 5R - 45 \\ & 2R - 5R = -45 \\ & -3R = -45 \\ & R = 15\end{aligned}$$

Ans. $R = 15$

$$\begin{aligned}(3) \quad & \frac{1}{\frac{1}{14R} + \frac{1}{21R}} \cdot \frac{5}{28} = 2R - 5 \\ & \frac{1}{\frac{3}{42R} + \frac{2}{42R}} \cdot \frac{5}{28} = 2R - 5 \\ & \frac{1}{\frac{5}{42R}} \cdot \frac{5}{28} = 2R - 5 \\ & \frac{5}{28} \times \frac{42R}{5} = 2R - 5 \\ & \frac{3R}{2} = 2R - 5 \\ & 3R = 4R - 10 \\ & 3R - 4R = -10 \\ & -R = -10\end{aligned}$$

Ans. $R = 10$

$$\begin{aligned}(4) \quad & \frac{1}{\frac{1}{8R} + \frac{1}{20R}} \cdot \frac{7}{12} = 3R + 4 \\ & \frac{1}{\frac{5}{40R} + \frac{2}{40R}} \cdot \frac{7}{12} = 3R + 4 \\ & \frac{1}{\frac{7}{40R}} \cdot \frac{7}{12} = 3R + 4 \\ & \frac{7}{12} \times \frac{40R}{7} = 3R + 4 \\ & \frac{10R}{3} = 3R + 4 \\ & 10R = 9R + 12 \\ & 10R - 9R = 12 \\ & R = 12\end{aligned}$$

Ans. $R = 12$

方程式 (10)

各問に答えなさい。



$$(1) \quad 1:2 = x:10$$

$$2x = 10$$

$$(5) \quad 1:2 = 8:x$$

$$\text{Ans. } x =$$

$$(2) \quad 3:5 = x:25$$

$$\text{Ans. } x =$$

$$(6) \quad 3:7 = 21:x$$

$$\text{Ans. } x =$$

$$(3) \quad 11:12 = x:144$$

$$\text{Ans. } x =$$

$$(7) \quad 13:15 = 169:x$$

$$\text{Ans. } x =$$

$$(4) \quad 1:4 = x:2$$

$$\text{Ans. } x =$$

$$(8) \quad 4:7 = 6:x$$

$$\text{Ans. } x =$$

$$\text{Ans. } x =$$

方程式 (10)

各問に答えなさい。



$$(1) \quad 1:2 = x:10$$

$$\begin{aligned} 2x &= 10 \\ x &= 5 \end{aligned}$$

$$\text{Ans. } x = 5$$

$$(2) \quad 3:5 = x:25$$

$$\begin{aligned} 5x &= 3 \times 25 \\ x &= 15 \end{aligned}$$

$$\text{Ans. } x = 15$$

$$(3) \quad 11:12 = x:144$$

$$\begin{aligned} 12x &= 11 \times 144 \\ 12x &= 11 \times 12 \times 12 \\ x &= 132 \end{aligned}$$

$$\text{Ans. } x = 132$$

$$(4) \quad 1:4 = x:2$$

$$\begin{aligned} 4x &= 2 \\ x &= \frac{2}{4} = \frac{1}{2} \end{aligned}$$

$$\text{Ans. } x = \frac{1}{2}$$

$$(5) \quad 1:2 = 8:x$$

$$\begin{aligned} x &= 2 \times 8 \\ x &= 16 \end{aligned}$$

$$\text{Ans. } x = 16$$

$$(6) \quad 3:7 = 21:x$$

$$\begin{aligned} 3x &= 7 \times 21 \\ x &= 49 \end{aligned}$$

$$\text{Ans. } x = 49$$

$$(7) \quad 13:15 = 169:x$$

$$\begin{aligned} 13x &= 15 \times 169 \\ 13x &= 15 \times 13 \times 13 \\ x &= 195 \end{aligned}$$

$$\text{Ans. } x = 195$$

$$(8) \quad 4:7 = 6:x$$

$$\begin{aligned} 4x &= 7 \times 6 \\ x &= \frac{42}{4} = \frac{21}{2} \end{aligned}$$

$$\text{Ans. } x = \frac{21}{2}$$

方程式 (1 1)

各問に答えなさい。



$$(1) \quad 1:2 = \frac{1}{x} : \frac{1}{10}$$

$\times 10x$
 $1:2 = 10:x$
 $x = 20$

Ans. $x = 20$

$$(5) \quad 3:8 = \frac{1}{32} : \frac{1}{x}$$

Ans. $x =$

$$(2) \quad 3:7 = \frac{1}{x} : \frac{1}{2}$$

$$(6) \quad 5:11 = \frac{1}{9} : \frac{1}{x}$$

Ans. $x =$

$$(3) \quad 12:15 = \frac{1}{x} : \frac{1}{144}$$

Ans. $x =$

$$(7) \quad 8:15 = \frac{1}{30} : \frac{1}{x}$$

Ans. $x =$

$$(4) \quad 14:5 = \frac{1}{x} : \frac{1}{2}$$

Ans. $x =$

$$(8) \quad \frac{4}{5} : \frac{13}{2} = \frac{1}{5} : \frac{1}{x}$$

Ans. $x =$

Ans. $x =$

方程式 (11)

各問に答えなさい。



$$(1) \quad 1:2 = \frac{1}{x} : \frac{1}{10} \quad \times 10x$$

$$1:2 = 10:x$$

$$x = 20$$

Ans. $x = 20$

$$(2) \quad 3:7 = \frac{1}{x} : \frac{1}{2} \quad \times 2x$$

$$3:7 = 2:x$$

$$3x = 14$$

$$x = \frac{14}{3}$$

Ans. $x = \frac{14}{3}$

$$(3) \quad 12:15 = \frac{1}{x} : \frac{1}{144} \quad \times 144x$$

$$12:15 = 144:x$$

$$12x = 15 \times 144$$

$$12x = 15 \times 12 \times 12$$

$$x = 180$$

Ans. $x = 180$

$$(4) \quad 14:5 = \frac{1}{x} : \frac{1}{2} \quad \times 2x$$

$$14:5 = 2:x$$

$$14x = 10$$

$$x = \frac{10}{14} = \frac{5}{7}$$

Ans. $x = \frac{5}{7}$

$$(5) \quad 3:8 = \frac{1}{32} : \frac{1}{x}$$

$$3:8 = x:32$$

$$8x = 3 \times 32$$

$$x = 12$$

Ans. $x = 12$

$$(6) \quad 5:11 = \frac{1}{9} : \frac{1}{x}$$

$$5:11 = x:9$$

$$11x = 5 \times 9$$

$$x = \frac{45}{11}$$

Ans. $x = \frac{45}{11}$

$$(7) \quad 8:15 = \frac{1}{30} : \frac{1}{x}$$

$$8:15 = x:30$$

$$15x = 8 \times 30$$

$$x = 16$$

Ans. $x = 16$

$$(8) \quad \frac{4}{5} : \frac{13}{2} = \frac{1}{5} : \frac{1}{x}$$

$$\frac{4}{5} : \frac{13}{2} = x:5$$

$$\frac{13}{2}x = \frac{4}{5} \times 5$$

$$x = 4 \times \frac{2}{13} = \frac{8}{13}$$

Ans. $x = \frac{8}{13}$

方程式（１２）



各問に答えなさい。

$$\begin{aligned} (1) \quad \frac{1}{2} : 2 &= \frac{1}{x} : \frac{1}{10} \\ &\quad \times 10x \\ \frac{1}{2} : 2 &= 10 : x \\ \frac{x}{2} &= 20 \end{aligned}$$

$$(4) \quad \frac{3}{4} : 16 = \frac{1}{48} : \frac{1}{x}$$

Ans. $x =$ _____

$$(2) \quad \frac{3}{4} : 5 = \frac{1}{x} : \frac{1}{3}$$

Ans. $x =$ _____

$$(5) \quad \frac{5}{8} : 4 = \frac{1}{7} : \frac{1}{x}$$

Ans. $x =$ _____

$$(3) \quad \frac{2}{3} : 15 = \frac{1}{x} : \frac{1}{10}$$

Ans. $x =$ _____

$$(6) \quad \frac{5}{16} : 9 = \frac{1}{18} : \frac{1}{x}$$

Ans. $x =$ _____

Ans. $x =$ _____

方程式 (12)



各問に答えなさい。

$$\begin{aligned}(1) \quad \frac{1}{2}:2 &= \frac{1}{x}:\frac{1}{10} \\ &\quad \times 10x \\ \frac{1}{2}:2 &= 10:x \\ \frac{x}{2} &= 20 \\ x &= 40\end{aligned}$$

Ans. $x = 40$

$$\begin{aligned}(2) \quad \frac{3}{4}:5 &= \frac{1}{x}:\frac{1}{3} \\ \frac{3}{4}:5 &= 3:x \\ \frac{3}{4}x &= 15 \\ x &= 15 \times \frac{4}{3} \\ x &= 20\end{aligned}$$

Ans. $x = 20$

$$\begin{aligned}(3) \quad \frac{2}{3}:15 &= \frac{1}{x}:\frac{1}{10} \\ \frac{2}{3}:15 &= 10:x \\ \frac{2}{3}x &= 10 \times 15 \\ x &= 150 \times \frac{3}{2} \\ x &= 225\end{aligned}$$

Ans. $x = 225$

$$\begin{aligned}(4) \quad \frac{3}{4}:16 &= \frac{1}{48}:\frac{1}{x} \\ \frac{3}{4}:16 &= x:48 \\ 16x &= 48 \times \frac{3}{4} \\ x &= 48 \times \frac{3}{4} \times \frac{1}{16} \\ x &= \frac{9}{4}\end{aligned}$$

Ans. $x = \frac{9}{4}$

$$\begin{aligned}(5) \quad \frac{5}{8}:4 &= \frac{1}{7}:\frac{1}{x} \\ \frac{5}{8}:4 &= x:7 \\ 4x &= 7 \times \frac{5}{8} \\ x &= \frac{35}{8} \times \frac{1}{4} \\ x &= \frac{35}{32}\end{aligned}$$

Ans. $x = \frac{35}{32}$

$$\begin{aligned}(6) \quad \frac{5}{16}:9 &= \frac{1}{18}:\frac{1}{x} \\ \frac{5}{16}:9 &= x:18 \\ 9x &= 18 \times \frac{5}{16} \\ x &= 9 \times \frac{5}{8} \times \frac{1}{9} \\ x &= \frac{5}{8}\end{aligned}$$

Ans. $x = \frac{5}{8}$

方程式 (13)

各問に答えなさい。



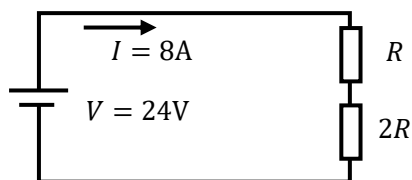
(1)



$$6 = 2I + I$$

Ans. $I =$ _____

(4)



$$24 = 8R + 8 \cdot 2R$$

Ans. $R =$ _____

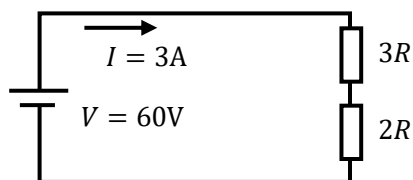
(2)



$$5 = 5I + 10I$$

Ans. $I =$ _____

(5)



$$60 = 3 \cdot 3R + 3 \cdot 2R$$

Ans. $R =$ _____

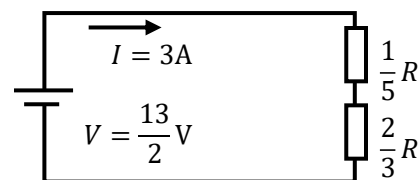
(3)



$$\frac{4}{3} = \frac{1}{2}I + \frac{1}{6}I$$

Ans. $I =$ _____

(6)



$$\frac{13}{2} = 3 \cdot \frac{1}{5}R + 3 \cdot \frac{2}{3}R$$

Ans. $R =$ _____

方程式 (13)

各問に答えなさい。



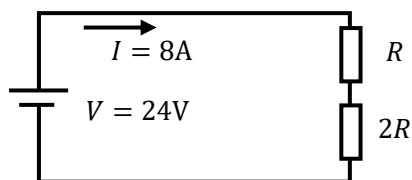
(1)



$$\begin{aligned} 6 &= 2I + I \\ 6 &= 3I \\ 2 &= I \end{aligned}$$

Ans. $I = 2 \text{ A}$

(4)



$$\begin{aligned} 24 &= 8R + 8 \cdot 2R \\ 24 &= 24R \\ 1 &= R \end{aligned}$$

Ans. $R = 1 \Omega$

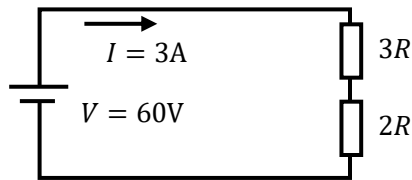
(2)



$$\begin{aligned} 5 &= 5I + 10I \\ 5 &= 15I \\ \frac{1}{3} &= I \end{aligned}$$

Ans. $I = \frac{1}{3} \text{ A}$

(5)



$$\begin{aligned} 60 &= 3 \cdot 3R + 3 \cdot 2R \\ 60 &= 15R \\ 4 &= R \end{aligned}$$

Ans. $R = 4 \Omega$

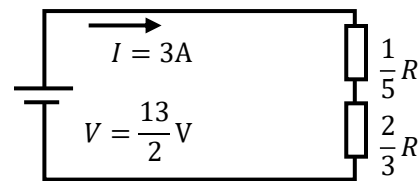
(3)



$$\begin{aligned} \frac{4}{3} &= \frac{1}{2}I + \frac{1}{6}I \\ 8 &= 3I + I \\ 8 &= 4I \\ 2 &= I \end{aligned}$$

Ans. $I = 2 \text{ A}$

(6)



$$\begin{aligned} \frac{13}{2} &= 3 \cdot \frac{1}{5}R + 3 \cdot \frac{2}{3}R \\ 13 \cdot 15 &= 3 \cdot 6R + 3 \cdot 20R \\ 13 \cdot 15 &= 3 \cdot 26R \\ \frac{13 \cdot 15}{3 \cdot 26} &= R \end{aligned}$$

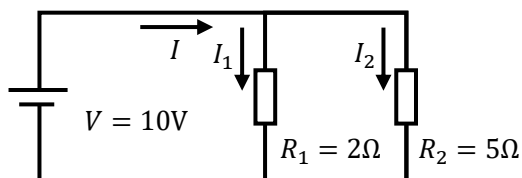
Ans. $R = \frac{5}{2} \Omega$

方程式 (14)

各問に答えなさい。



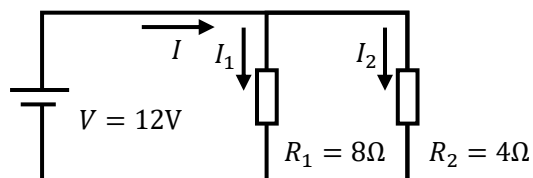
(1)



$$I = \frac{10}{2} + \frac{10}{5}$$

Ans. $I =$ _____

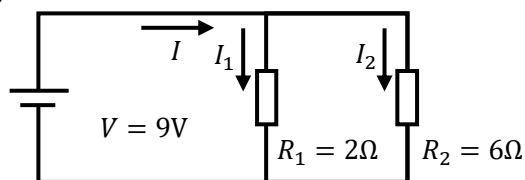
(4)



$$12 = \frac{8 \cdot 4}{8 + 4} I$$

Ans. $I =$ _____

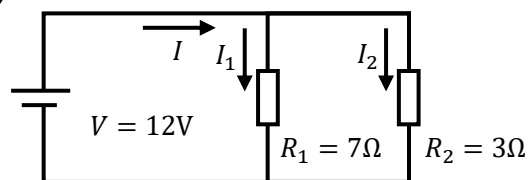
(2)



$$I = \frac{9}{2} + \frac{9}{6}$$

Ans. $I =$ _____

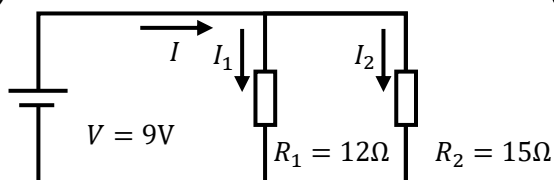
(5)



$$12 = \frac{7 \cdot 3}{7 + 3} I$$

Ans. $I =$ _____

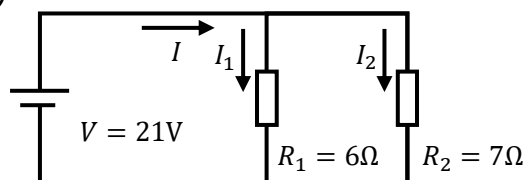
(3)



$$I = \frac{9}{12} + \frac{9}{15}$$

Ans. $I =$ _____

(6)



$$21 = \frac{7 \cdot 6}{7 + 6} I$$

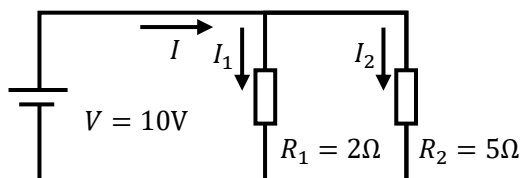
Ans. $I =$ _____

方程式 (14)

各問に答えなさい。



(1)



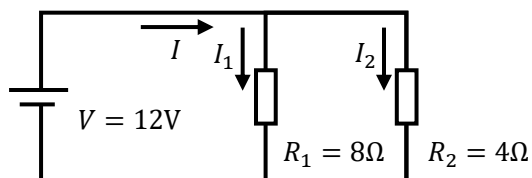
$$I = \frac{10}{2} + \frac{10}{5}$$

$$I = 5 + 2$$

$$I = 7$$

Ans. $I = 7 \text{ A}$

(4)



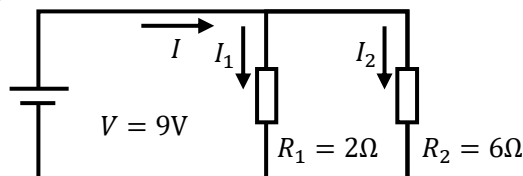
$$12 = \frac{8 \cdot 4}{8 + 4} I$$

$$12 = \frac{32}{12} I$$

$$I = \frac{12}{32} \cdot 12 = \frac{3}{2} \cdot 3 = \frac{9}{2}$$

Ans. $I = \frac{9}{2} \text{ A}$

(2)



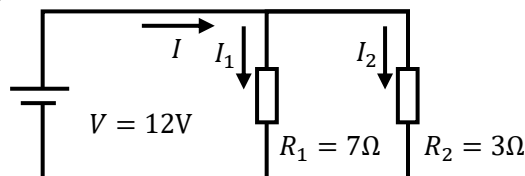
$$I = \frac{9}{2} + \frac{9}{6}$$

$$I = \frac{9}{2} + \frac{3}{2}$$

$$I = \frac{12}{2} = 6$$

Ans. $I = 6 \text{ A}$

(5)



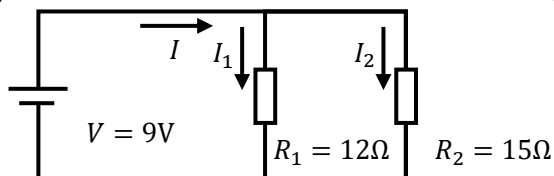
$$12 = \frac{7 \cdot 3}{7 + 3} I$$

$$12 = \frac{21}{10} I$$

$$I = \frac{10}{21} \cdot 12 = \frac{40}{7}$$

Ans. $I = \frac{40}{7} \text{ A}$

(3)



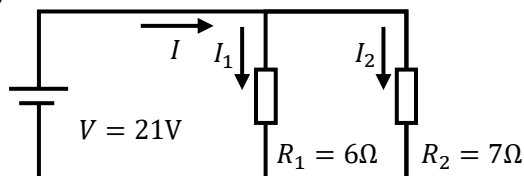
$$I = \frac{9}{12} + \frac{9}{15}$$

$$I = \frac{3}{4} + \frac{3}{5} = \frac{15}{20} + \frac{12}{20}$$

$$I = \frac{27}{20}$$

Ans. $I = \frac{27}{20}$

(6)



$$21 = \frac{7 \cdot 6}{7 + 6} I$$

$$21 = \frac{42}{13} I$$

$$I = \frac{13}{42} \cdot 21 = \frac{13}{2}$$

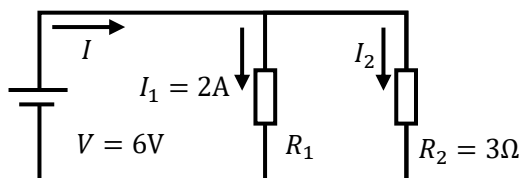
Ans. $I = \frac{13}{2} \text{ A}$

方程式 (15)

各問に答えなさい。



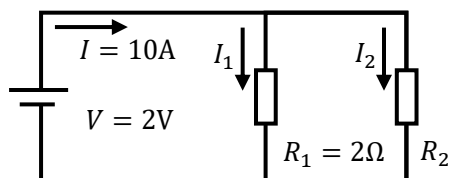
(1)



$$I = 2 + \frac{6}{3}$$

Ans. $I =$ _____

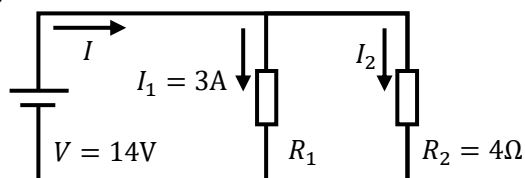
(4)



$$10 = \frac{2}{2} + I_2$$

Ans. $I_2 =$ _____

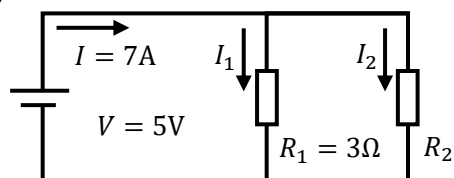
(2)



$$I = 3 + \frac{14}{4}$$

Ans. $I =$ _____

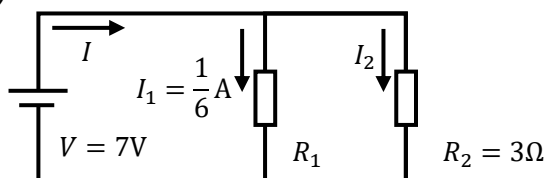
(5)



$$7 = \frac{5}{3} + I_2$$

Ans. $I_2 =$ _____

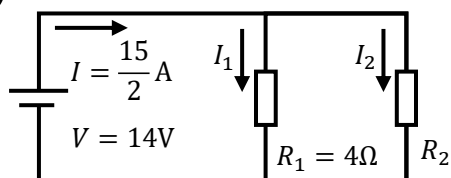
(3)



$$I = \frac{1}{6} + \frac{7}{3}$$

Ans. $I =$ _____

(6)



$$\frac{15}{2} = \frac{14}{4} + I_2$$

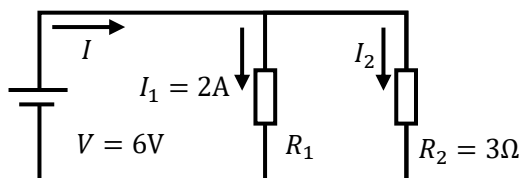
Ans. $I_2 =$ _____

方程式 (15)

各問に答えなさい。



(1)



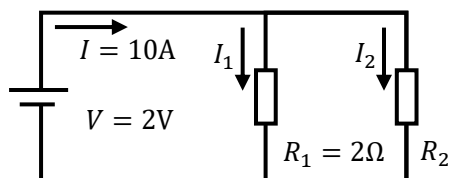
$$I = 2 + \frac{6}{3}$$

$$I = 2 + 2$$

$$I = 4$$

Ans. $I = 4 \text{ A}$

(4)



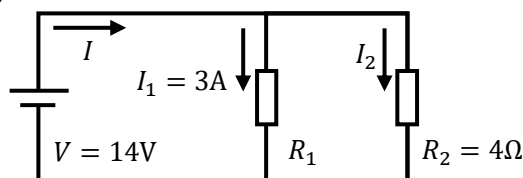
$$10 = \frac{2}{2} + I_2$$

$$10 - 1 = I_2$$

$$I_2 = 9$$

Ans. $I_2 = 9 \text{ A}$

(2)



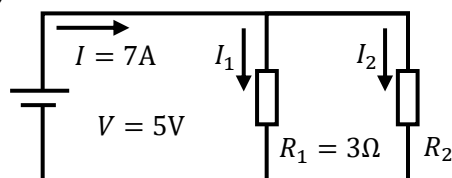
$$I = 3 + \frac{14}{4}$$

$$I = 3 + \frac{7}{2} = \frac{6}{2} + \frac{7}{2}$$

$$I = \frac{13}{2}$$

Ans. $I = \frac{13}{2} \text{ A}$

(5)



$$7 = \frac{5}{3} + I_2$$

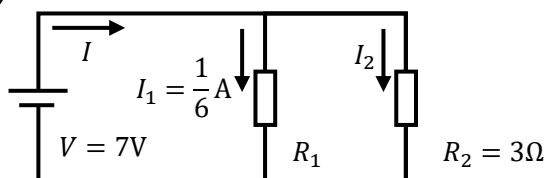
$$7 - \frac{5}{3} = I_2$$

$$I_2 = \frac{21}{3} - \frac{5}{3} = \frac{16}{3}$$

$$I_2 = \frac{16}{3} \text{ A}$$

Ans. $I_2 = \frac{16}{3} \text{ A}$

(3)



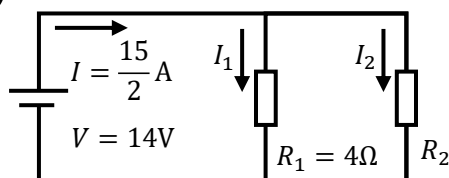
$$I = \frac{1}{6} + \frac{7}{3}$$

$$I = \frac{1}{6} + \frac{14}{6}$$

$$I = \frac{15}{6} = \frac{5}{2}$$

Ans. $I = \frac{5}{2}$

(6)



$$\frac{15}{2} = \frac{14}{4} + I_2$$

$$\frac{15}{2} - \frac{7}{2} = I_2$$

$$I_2 = \frac{8}{2} = 4$$

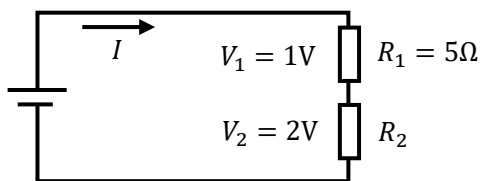
Ans. $I_2 = 4 \text{ A}$

方程式 (16)

各問に答えなさい。



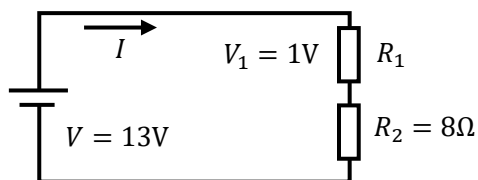
(1)



$$\begin{aligned} V_1:V_2 &= R_1:R_2 \\ 1:2 &= 5:R_2 \\ R_2 &= 10 \end{aligned}$$

Ans. $R_2 = 10\Omega$

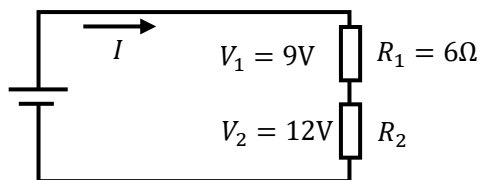
(4)



$$V_1:V - V_1 = R_1:R_2$$

Ans. $R_1 =$

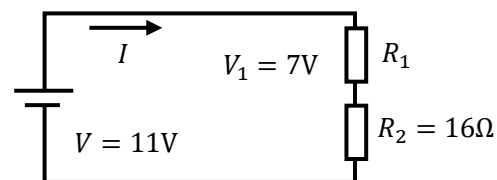
(2)



$$V_1:V_2 = R_1:R_2$$

Ans. $R_2 =$

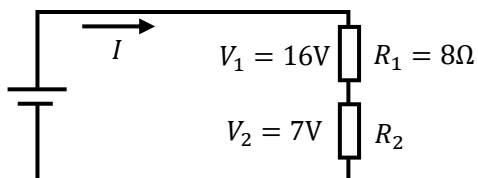
(5)



$$V_1:V - V_1 = R_1:R_2$$

Ans. $R_1 =$

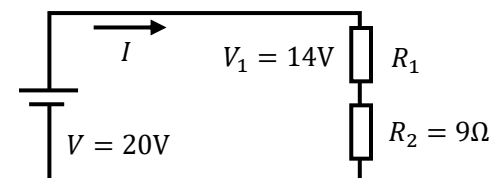
(3)



$$V_1:V_2 = R_1:R_2$$

Ans. $R_2 =$

(6)



$$V_1:V - V_2 = R_1:R_2$$

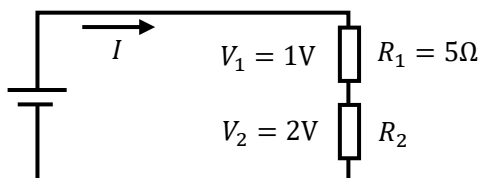
Ans. $R_1 =$

方程式 (16)

各問に答えなさい。



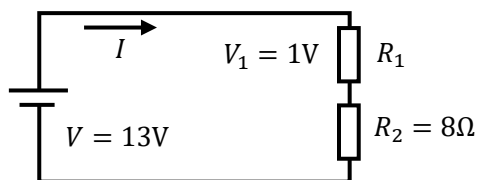
(1)



$$\begin{aligned} V_1:V_2 &= R_1:R_2 \\ 1:2 &= 5:R_2 \\ R_2 &= 10 \end{aligned}$$

Ans. $R_2 = 10\Omega$

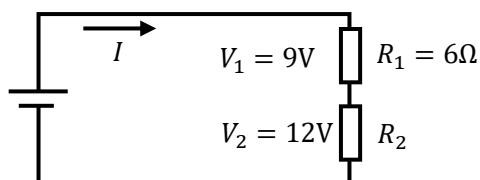
(4)



$$\begin{aligned} V_1:V - V_1 &= R_1:R_2 \\ 1:13 - 1 &= R_1:8 \\ 12R_1 &= 8 \\ R_1 &= \frac{8}{12} = \frac{2}{3} \end{aligned}$$

Ans. $R_1 = \frac{2}{3}\Omega$

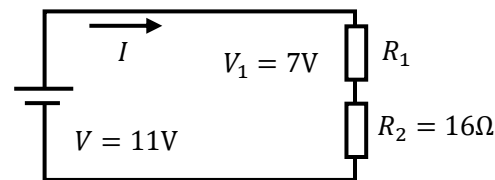
(2)



$$\begin{aligned} V_1:V_2 &= R_1:R_2 \\ 9:12 &= 6:R_2 \\ 9R_2 &= 12 \cdot 6 \\ R_2 &= \frac{12 \cdot 6}{9} = 8 \end{aligned}$$

Ans. $R_2 = 8\Omega$

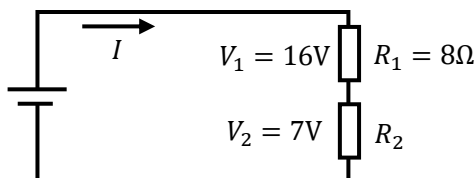
(5)



$$\begin{aligned} V_1:V - V_1 &= R_1:R_2 \\ 7:11 - 7 &= R_1:16 \\ 4R_1 &= 7 \cdot 16 \\ R_1 &= \frac{7 \cdot 16}{4} = 28 \end{aligned}$$

Ans. $R_1 = 28\Omega$

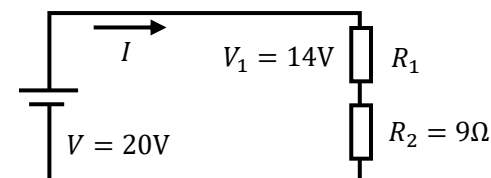
(3)



$$\begin{aligned} V_1:V_2 &= R_1:R_2 \\ 16:7 &= 8:R_2 \\ 16R_2 &= 7 \cdot 8 \\ R_2 &= \frac{7 \cdot 8}{16} = \frac{7}{2} \end{aligned}$$

Ans. $R_2 = \frac{7}{2}\Omega$

(6)



$$\begin{aligned} V_1:V - V_2 &= R_1:R_2 \\ 14:20 - 14 &= R_1:9 \\ 6R_1 &= 14 \cdot 9 \\ R_1 &= \frac{14 \cdot 9}{6} = 21 \end{aligned}$$

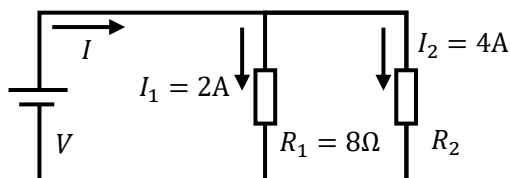
Ans. $R_1 = 21\Omega$

方程式 (17)

各問に答えなさい。



(1)



$$I_1:I_2 = \frac{1}{R_1}:\frac{1}{R_2}$$

$$I_1:I_2 = R_2:R_1$$

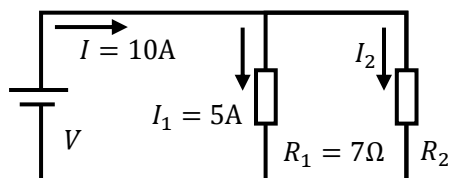
$$2:4 = R_2:8$$

$$4R_2 = 16$$

$$R_2 = 4$$

Ans. $R_2 = 4\Omega$

(4)

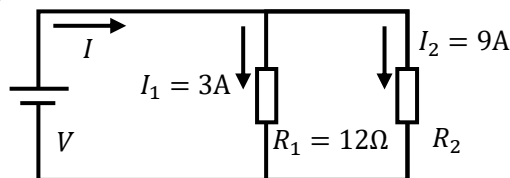


$$I_1:I_2 = \frac{1}{R_1}:\frac{1}{R_2}$$

$$I_1:I - I_1 = R_2:R_1$$

Ans. $R_2 =$

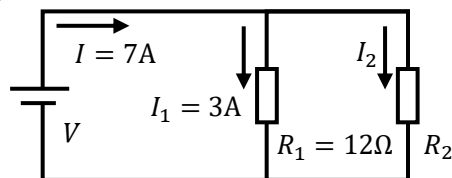
(2)



$$I_1:I_2 = R_2:R_1$$

Ans. $R_2 =$

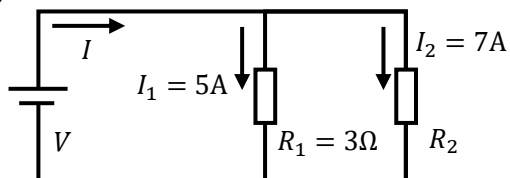
(5)



$$I_1:I - I_1 = R_2:R_1$$

Ans. $R_2 =$

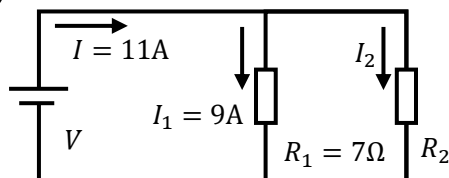
(3)



$$I_1:I_2 = R_2:R_1$$

Ans. $R_2 =$

(6)



$$I_1:I - I_1 = R_2:R_1$$

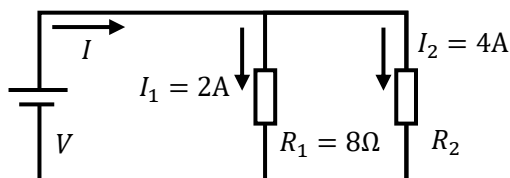
Ans. $R_2 =$

方程式 (17)

各問に答えなさい。



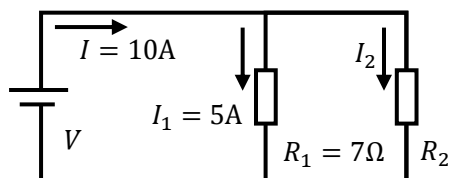
(1)



$$\begin{aligned} I_1 : I_2 &= \frac{1}{R_1} : \frac{1}{R_2} \\ I_1 : I_2 &= R_2 : R_1 \\ 2 : 4 &= R_2 : 8 \\ 4R_2 &= 16 \\ R_2 &= 4 \end{aligned}$$

Ans. $R_2 = 4\Omega$

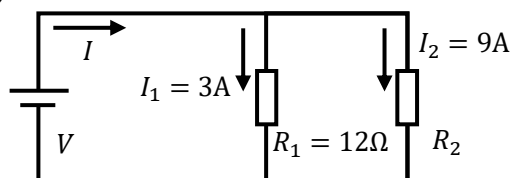
(4)



$$\begin{aligned} I_1 : I_2 &= \frac{1}{R_1} : \frac{1}{R_2} \\ I_1 : I - I_1 &= R_2 : R_1 \\ 5 : 10 - 5 &= R_2 : 7 \\ 5R_2 &= 5 \cdot 7 \\ R_2 &= 7 \end{aligned}$$

Ans. $R_2 = 7\Omega$

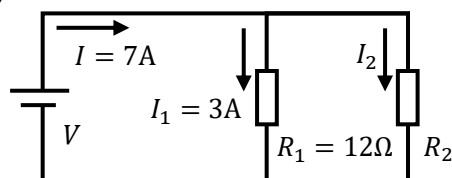
(2)



$$\begin{aligned} I_1 : I_2 &= R_2 : R_1 \\ 3 : 9 &= R_2 : 12 \\ 9R_2 &= 3 \cdot 12 \\ R_2 &= \frac{3 \cdot 12}{9} = 4 \end{aligned}$$

Ans. $R_2 = 4\Omega$

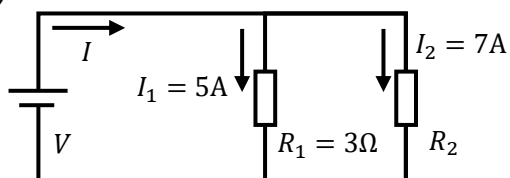
(5)



$$\begin{aligned} I_1 : I - I_1 &= R_2 : R_1 \\ 3 : 7 - 3 &= R_2 : 12 \\ 4R_2 &= 3 \cdot 12 \\ R_2 &= \frac{3 \cdot 12}{4} = 9 \end{aligned}$$

Ans. $R_2 = 9\Omega$

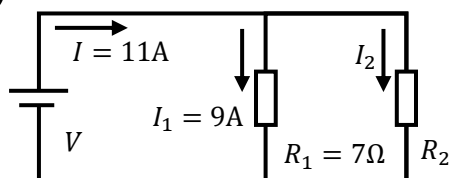
(3)



$$\begin{aligned} I_1 : I_2 &= R_2 : R_1 \\ 5 : 7 &= R_2 : 3 \\ 7R_2 &= 3 \cdot 5 \\ R_2 &= \frac{3 \cdot 5}{7} = \frac{15}{7} \end{aligned}$$

Ans. $R_2 = \frac{15}{7}\Omega$

(6)



$$\begin{aligned} I_1 : I - I_1 &= R_2 : R_1 \\ 9 : 11 - 9 &= R_2 : 7 \\ 2R_2 &= 9 \cdot 7 \\ R_2 &= \frac{9 \cdot 7}{2} = \frac{63}{2} \end{aligned}$$

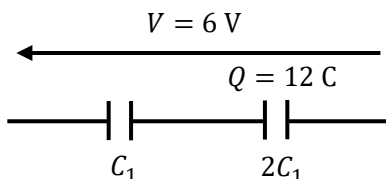
Ans. $R_2 = \frac{63}{2}\Omega$

方程式 (18)

各問に答えなさい。



(1)



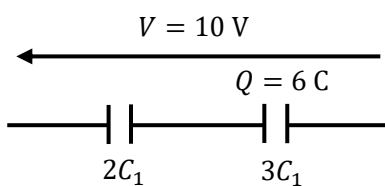
$$V = \frac{Q}{C_1} + \frac{Q}{2C_1}$$

$$V = \frac{2Q}{2C_1} + \frac{Q}{2C_1} = \frac{3Q}{2C_1}$$

$$C_1 = \frac{3Q}{2V} = \frac{3 \cdot 12}{2 \cdot 6} = 3$$

Ans. $C_1 = 3\text{F}$

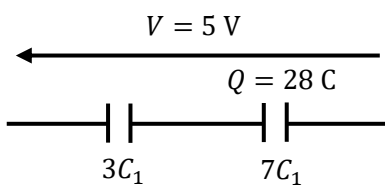
(2)



$$V = \frac{Q}{2C_1} + \frac{Q}{3C_1}$$

Ans. $C_1 =$

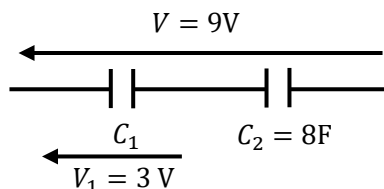
(3)



$$V = \frac{Q}{3C_1} + \frac{Q}{7C_1}$$

Ans. $C_1 =$

(4)



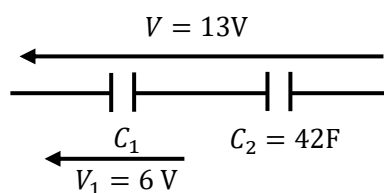
$$V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2}$$

$$V_1:V_2 = C_2:C_1$$

$$V_1:V - V_1 = C_2:C_1$$

Ans. $C_1 =$

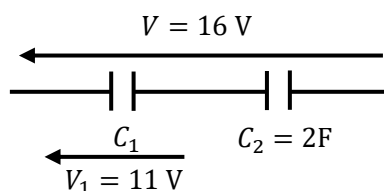
(5)



$$V_1:V_2 = C_2:C_1$$

Ans. $C_1 =$

(6)

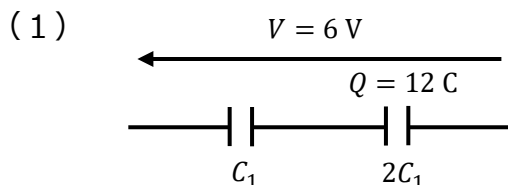


$$V_1:V_2 = C_2:C_1$$

Ans. $C_1 =$

方程式 (18)

各問に答えなさい。

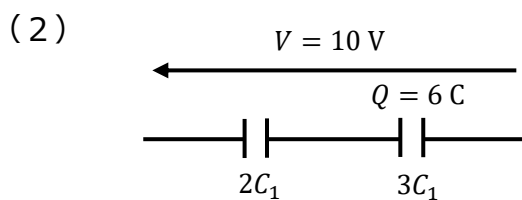


$$V = \frac{Q}{C_1} + \frac{Q}{2C_1}$$

$$V = \frac{2Q}{2C_1} + \frac{Q}{2C_1} = \frac{3Q}{2C_1}$$

$$C_1 = \frac{3Q}{2V} = \frac{3 \cdot 12}{2 \cdot 6} = 3$$

Ans. $C_1 = 3\text{F}$

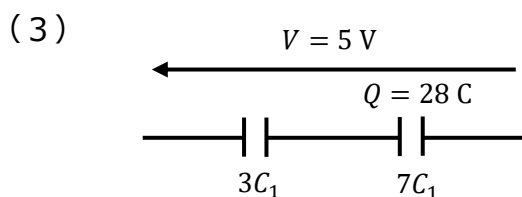


$$V = \frac{Q}{2C_1} + \frac{Q}{3C_1}$$

$$V = \frac{3Q}{6C_1} + \frac{2Q}{6C_1} = \frac{5Q}{6C_1}$$

$$C_1 = \frac{5Q}{6V} = \frac{5 \cdot 6}{6 \cdot 10} = \frac{1}{2}$$

Ans. $C_1 = \frac{1}{2}\text{F}$

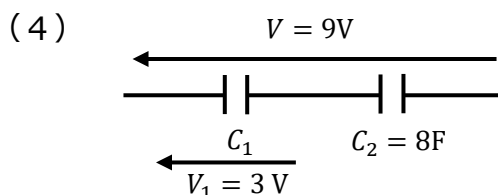


$$V = \frac{Q}{3C_1} + \frac{Q}{7C_1}$$

$$V = \frac{7Q}{21C_1} + \frac{3Q}{21C_1} = \frac{10Q}{21C_1}$$

$$C_1 = \frac{10Q}{21V} = \frac{10 \cdot 28}{21 \cdot 5} = \frac{8}{3}$$

Ans. $C_1 = \frac{8}{3}\text{F}$



$$V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2}$$

$$V_1:V_2 = C_2:C_1$$

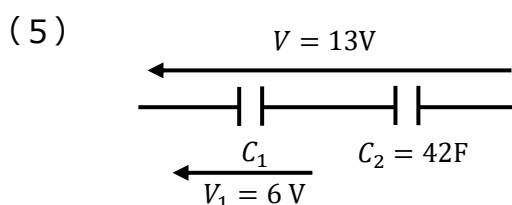
$$V_1:V - V_1 = C_2:C_1$$

$$3:9 - 3 = 8:C_1$$

$$3C_1 = 6 \cdot 8$$

$$C_1 = 16$$

Ans. $C_1 = 16\text{F}$



$$V_1:V_2 = C_2:C_1$$

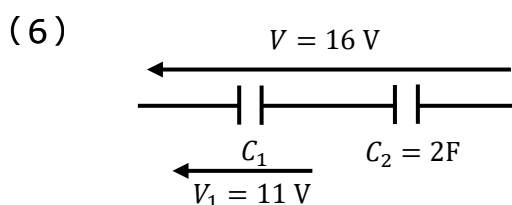
$$V_1:V - V_1 = C_2:C_1$$

$$6:13 - 6 = 42:C_1$$

$$6C_1 = 7 \cdot 42$$

$$C_1 = 49$$

Ans. $C_1 = 49\text{F}$



$$V_1:V_2 = C_2:C_1$$

$$V_1:V - V_1 = C_2:C_1$$

$$11:16 - 11 = 2:C_1$$

$$11C_1 = 5 \cdot 2$$

$$C_1 = \frac{10}{11}$$

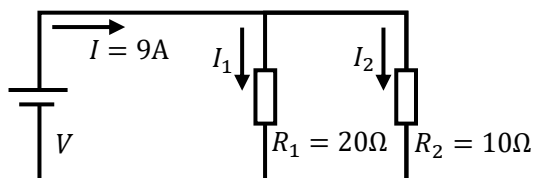
Ans. $C_1 = \frac{10}{11}\text{F}$

方程式 (19)

各問に答えなさい。



(1)

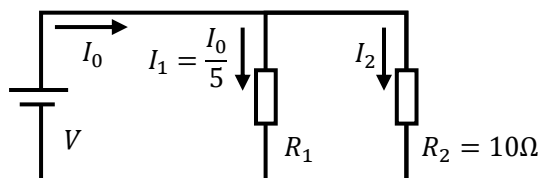


$$\begin{aligned} I_1: I_2 &= \frac{1}{R_1}: \frac{1}{R_2} \\ I_1: I_2 &= R_2: R_1 \\ I_1: I - I_1 &= R_2: R_1 \\ I_1: 9 - I_1 &= 10: 20 \\ 20I_1 &= 10(9 - I_1) \end{aligned}$$

$$\begin{aligned} 2I_1 &= 9 - I_1 \\ 2I_1 + I_1 &= 9 \\ 3I_1 &= 9 \\ I_1 &= 3 \end{aligned}$$

Ans. $I_1 = 3A$

(4)

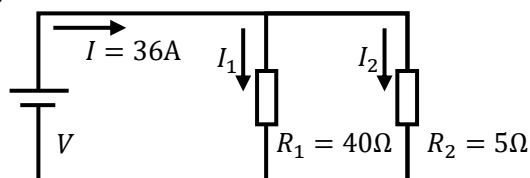


$$\begin{aligned} I_1: I_2 &= \frac{1}{R_1}: \frac{1}{R_2} \\ I_1: I_2 &= R_2: R_1 \\ \frac{I_0}{5}: I_0 - \frac{I_0}{5} &= 10: R_1 \\ \frac{I_0}{5}: \frac{4}{5}I_0 &= 10: R_1 \end{aligned}$$

$$\begin{aligned} 1: 4 &= 10: R_1 \\ R_1 &= 40 \end{aligned}$$

Ans. $R_1 = 40\Omega$

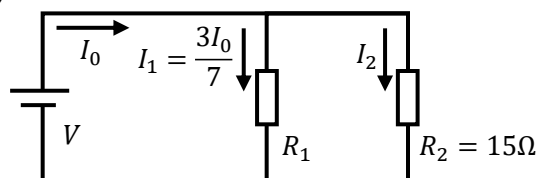
(2)



$$\begin{aligned} I_1: I - I_1 &= R_2: R_1 \\ I_1: 36 - I_1 &= 5: 40 \end{aligned}$$

Ans. $I_1 =$

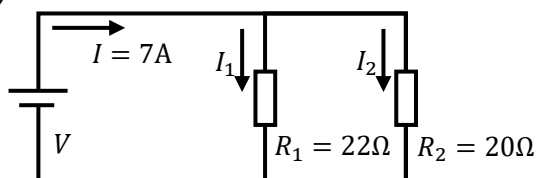
(5)



$$\begin{aligned} I_1: I_2 &= R_2: R_1 \\ \frac{3I_0}{7}: I_0 - \frac{3I_0}{7} &= 15: R_1 \end{aligned}$$

Ans. $R_1 =$

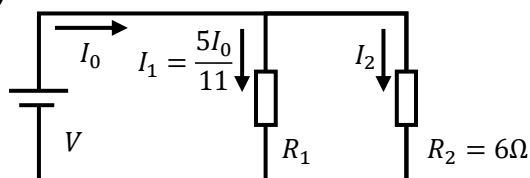
(3)



$$\begin{aligned} I_1: I - I_1 &= R_2: R_1 \\ I_1: 7 - I_1 &= 20: 22 \end{aligned}$$

Ans. $I_1 =$

(6)



$$\begin{aligned} I_1: I_2 &= R_2: R_1 \\ \frac{5I_0}{11}: I_0 - \frac{5I_0}{11} &= 6: R_1 \end{aligned}$$

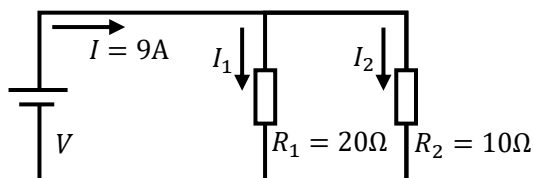
Ans. $R_1 =$

方程式 (19)

各問に答えなさい。



(1)

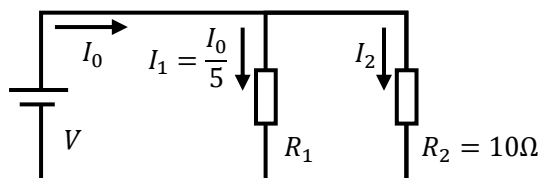


$$\begin{aligned} I_1: I_2 &= \frac{1}{R_1} : \frac{1}{R_2} \\ I_1: I_2 &= R_2: R_1 \\ I_1: I - I_1 &= R_2: R_1 \\ I_1: 9 - I_1 &= 10: 20 \\ 20I_1 &= 10(9 - I_1) \end{aligned}$$

$$\begin{aligned} 2I_1 &= 9 - I_1 \\ 2I_1 + I_1 &= 9 \\ 3I_1 &= 9 \\ I_1 &= 3 \end{aligned}$$

Ans. $I_1 = 3A$

(4)

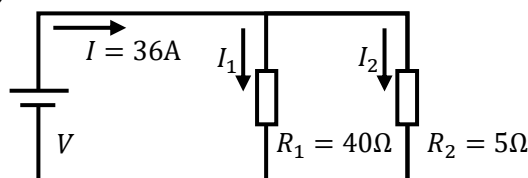


$$\begin{aligned} I_1: I_2 &= \frac{1}{R_1} : \frac{1}{R_2} \\ I_1: I_2 &= R_2: R_1 \\ \frac{I_0}{5} : I_0 - \frac{I_0}{5} &= 10: R_1 \\ \frac{I_0}{5} : \frac{4}{5} I_0 &= 10: R_1 \end{aligned}$$

$$\begin{aligned} 1: 4 &= 10: R_1 \\ R_1 &= 40 \end{aligned}$$

Ans. $R_1 = 40\Omega$

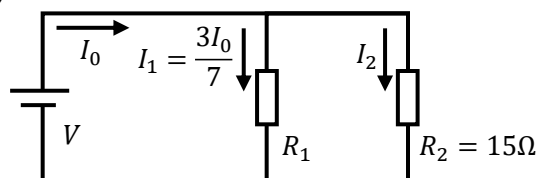
(2)



$$\begin{aligned} I_1: I - I_1 &= R_2: R_1 \\ I_1: 36 - I_1 &= 5: 40 \\ 40I_1 &= 5(36 - I_1) \\ 8I_1 &= 36 - I_1 \\ 8I_1 + I_1 &= 36 \\ I_1 &= \frac{36}{9} = 4 \end{aligned}$$

Ans. $I_1 = 4A$

(5)

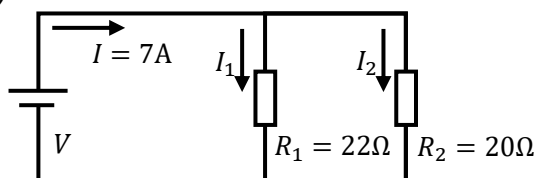


$$\begin{aligned} I_1: I_2 &= R_2: R_1 \\ \frac{3I_0}{7} : I_0 - \frac{3I_0}{7} &= 15: R_1 \\ \frac{3}{7} I_0 : \frac{4}{7} I_0 &= 15: R_1 \\ 3: 4 &= 15: R_1 \end{aligned}$$

$$\begin{aligned} 3R_1 &= 4 \cdot 15 \\ R_1 &= \frac{60}{3} = 20 \end{aligned}$$

Ans. $R_1 = 20\Omega$

(3)

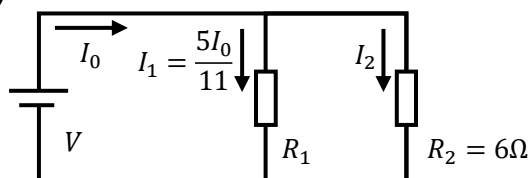


$$\begin{aligned} I_1: I - I_1 &= R_2: R_1 \\ I_1: 7 - I_1 &= 20: 22 \\ 22I_1 &= 20(7 - I_1) \\ 11I_1 &= 10(7 - I_1) \\ 11I_1 &= 70 - 10I_1 \\ 11I_1 + 10I_1 &= 70 \end{aligned}$$

$$\begin{aligned} 21I_1 &= 70 \\ I_1 &= \frac{70}{21} = \frac{10}{3} \end{aligned}$$

Ans. $I_1 = \frac{10}{3}A$

(6)



$$\begin{aligned} I_1: I_2 &= R_2: R_1 \\ \frac{5I_0}{11} : I_0 - \frac{5I_0}{11} &= 6: R_1 \\ \frac{5}{11} I_0 : \frac{6}{11} I_0 &= 6: R_1 \\ 5: 6 &= 6: R_1 \end{aligned}$$

$$\begin{aligned} 5R_1 &= 6 \cdot 6 \\ R_1 &= \frac{36}{5} \end{aligned}$$

Ans. $R_1 = \frac{36}{5}\Omega$

方程式 (20)

各問に答えなさい。



(1) $V = 14V$

$$C_1 = 16F, C_2 = 12F$$

$$V_1, V_2$$

$$V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2}$$

$$V_1:V_2 = C_2:C_1$$

$$V_1:V - V_1 = C_2:C_1$$

$$V_1:14 - V_1 = 12:16$$

$$16V_1 = 12(14 - V_1)$$

$$4V_1 = 3(14 - V_1)$$

$$4V_1 = 42 - 3V_1$$

$$4V_1 + 3V_1 = 42$$

$$7V_1 = 42$$

$$V_1 = 6$$

Ans. $V_1 = 6V$

(4) $V = V_0$

$$C_1, C_2 = 10F$$

$$V_1 = V_0/3, V_2$$

$$V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2}$$

$$V_1:V_2 = C_2:C_1$$

$$V_1:V_0 - \frac{V_0}{3} = 10:C_1$$

$$\frac{V_0}{3}:\frac{2V_0}{3} = 10:C_1$$

$$1:2 = 10:C_1$$

$$C_1 = 20$$

Ans. $C_1 = 20F$

(2) $V = 28V$

$$C_1 = 25F, C_2 = 10F$$

$$V_1, V_2$$

$$V_1:V - V_1 = C_2:C_1$$

$$V_1:28 - V_1 = 10:25$$

Ans. $V_1 =$

(5) $V = V_0$

$$C_1, C_2 = 10F$$

$$V_1 = 2V_0/9, V_2$$

$$V_1:V_2 = C_2:C_1$$

$$\frac{2V_0}{9}:V_0 - \frac{2V_0}{9} = 10:C_1$$

Ans. $C_1 =$

(3) $V = 9V$

$$C_1 = 48F, C_2 = 33F$$

$$V_1, V_2$$

$$V_1:V - V_1 = C_2:C_1$$

$$V_1:9 - V_1 = 33:48$$

Ans. $V_1 =$

(6) $V = V_0$

$$C_1, C_2 = 15F$$

$$V_1 = 5V_0/17, V_2$$

$$V_1:V_2 = C_2:C_1$$

$$\frac{5V_0}{17}:V_0 - \frac{5V_0}{17} = 15:C_1$$

Ans. $C_1 =$

方程式 (20)

各問に答えなさい。



(1)

$$\begin{array}{c}
 \overleftarrow{V = 14V} \\
 \overleftarrow{C_1 = 16F} \quad \overleftarrow{C_2 = 12F} \\
 \overleftarrow{V_1} \quad \overleftarrow{V_2} \\
 V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2} \quad \begin{array}{l} 4V_1 = 42 - 3V_1 \\ 4V_1 + 3V_1 = 42 \\ 7V_1 = 42 \\ V_1 = 6 \end{array} \\
 V_1:V_2 = C_2:C_1 \\
 V_1:V - V_1 = C_2:C_1 \\
 V_1:14 - V_1 = 12:16 \\
 16V_1 = 12(14 - V_1) \\
 4V_1 = 3(14 - V_1)
 \end{array}$$

Ans. $V_1 = 6V$

(4)

$$\begin{array}{c}
 \overleftarrow{V = V_0} \\
 \overleftarrow{C_1} \quad \overleftarrow{C_2 = 10F} \\
 \overleftarrow{V_1 = V_0/3} \quad \overleftarrow{V_2} \\
 V_1:V_2 = \frac{1}{C_1}:\frac{1}{C_2} \quad \begin{array}{l} 1:2 = 10:C_1 \\ C_1 = 20 \end{array} \\
 V_1:V_2 = C_2:C_1 \\
 \frac{V_0}{3}:V_0 - \frac{V_0}{3} = 10:C_1 \\
 \frac{V_0}{3}:\frac{2V_0}{3} = 10:C_1
 \end{array}$$

Ans. $C_1 = 20F$

(2)

$$\begin{array}{c}
 \overleftarrow{V = 28V} \\
 \overleftarrow{C_1 = 25F} \quad \overleftarrow{C_2 = 10F} \\
 \overleftarrow{V_1} \quad \overleftarrow{V_2} \\
 V_1:V - V_1 = C_2:C_1 \\
 V_1:28 - V_1 = 10:25 \\
 25V_1 = 10(28 - V_1) \\
 5V_1 = 2(28 - V_1) \\
 5V_1 = 56 - 2V_1 \\
 5V_1 + 2V_1 = 56 \\
 7V_1 = 56 \\
 V_1 = 8
 \end{array}$$

Ans. $V_1 = 8V$

(5)

$$\begin{array}{c}
 \overleftarrow{V = V_0} \\
 \overleftarrow{C_1} \quad \overleftarrow{C_2 = 10F} \\
 \overleftarrow{V_1 = 2V_0/9} \quad \overleftarrow{V_2} \\
 V_1:V_2 = C_2:C_1 \\
 \frac{2V_0}{9}:V_0 - \frac{2V_0}{9} = 10:C_1 \\
 \frac{2V_0}{9}:\frac{7V_0}{9} = 10:C_1 \\
 2:7 = 10:C_1 \\
 2C_1 = 70 \\
 C_1 = 35
 \end{array}$$

Ans. $C_1 = 35F$

(3)

$$\begin{array}{c}
 \overleftarrow{V = 9V} \\
 \overleftarrow{C_1 = 48F} \quad \overleftarrow{C_2 = 33F} \\
 \overleftarrow{V_1} \quad \overleftarrow{V_2} \\
 V_1:V - V_1 = C_2:C_1 \quad \begin{array}{l} V_1 = \frac{99}{27} = \frac{11}{3} \\ V_1:9 - V_1 = 33:48 \\ 48V_1 = 33(9 - V_1) \\ 16V_1 = 11(9 - V_1) \\ 16V_1 = 99 - 11V_1 \\ 16V_1 + 11V_1 = 99 \\ 27V_1 = 99 \end{array} \\
 V_1:9 - V_1 = 33:48 \\
 48V_1 = 33(9 - V_1) \\
 16V_1 = 11(9 - V_1) \\
 16V_1 = 99 - 11V_1 \\
 16V_1 + 11V_1 = 99 \\
 27V_1 = 99
 \end{array}$$

Ans. $V_1 = \frac{11}{3}V$

(6)

$$\begin{array}{c}
 \overleftarrow{V = V_0} \\
 \overleftarrow{C_1} \quad \overleftarrow{C_2 = 15F} \\
 \overleftarrow{V_1 = 5V_0/17} \quad \overleftarrow{V_2} \\
 V_1:V_2 = C_2:C_1 \\
 \frac{5V_0}{17}:V_0 - \frac{5V_0}{17} = 15:C_1 \\
 \frac{5V_0}{17}:\frac{12V_0}{17} = 15:C_1 \\
 5:12 = 15:C_1 \\
 5C_1 = 12 \cdot 15 \\
 C_1 = 36
 \end{array}$$

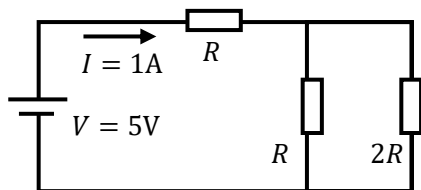
Ans. $C_1 = 36F$

方程式 (21)

各問に答えなさい。



(1)



$$V = \left(R + \frac{R \cdot 2R}{R + 2R} \right) I$$

$$\frac{V}{I} = R + \frac{2R^2}{3R}$$

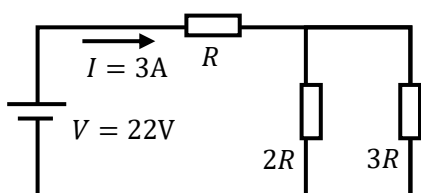
$$\frac{V}{I} = R + \frac{2}{3}R = \frac{5}{3}R$$

$$R = \frac{3}{5} \cdot \frac{V}{I} = \frac{3}{5} \times \frac{5}{1}$$

$$R = 3$$

Ans. $R = 3 \Omega$

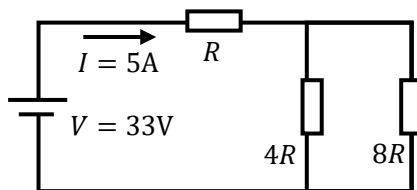
(2)



$$V = \left(R + \frac{2R \cdot 3R}{2R + 3R} \right) I$$

Ans. $R =$

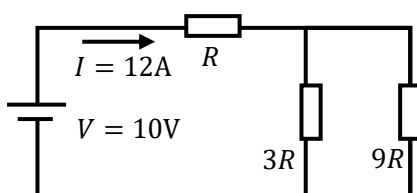
(3)



$$V = \left(R + \frac{4R \cdot 8R}{4R + 8R} \right) I$$

Ans. $R =$

(4)



$$V = \left(R + \frac{3R \cdot 9R}{3R + 9R} \right) I$$

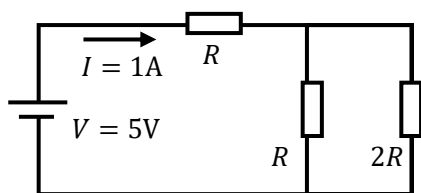
Ans. $R =$

方程式 (21)

各問に答えなさい。



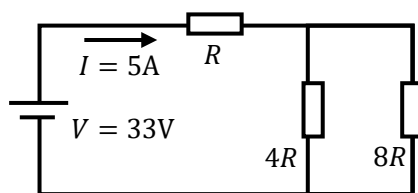
(1)



$$\begin{aligned}
 V &= \left(R + \frac{R \cdot 2R}{R + 2R} \right) I \\
 \frac{V}{I} &= R + \frac{2R^2}{3R} \\
 \frac{V}{I} &= R + \frac{2}{3}R = \frac{5}{3}R \\
 R &= \frac{3}{5} \cdot \frac{V}{I} = \frac{3}{5} \times \frac{5}{1} \\
 R &= 3
 \end{aligned}$$

Ans. $R = 3 \Omega$

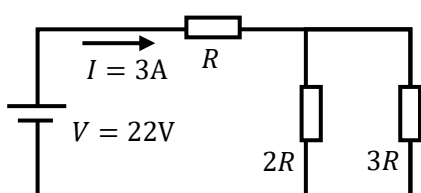
(3)



$$\begin{aligned}
 V &= \left(R + \frac{4R \cdot 8R}{4R + 8R} \right) I \\
 \frac{V}{I} &= R + \frac{32R^2}{12R} \\
 \frac{V}{I} &= R + \frac{8}{3}R = \frac{11}{3}R \\
 R &= \frac{3}{11} \cdot \frac{V}{I} = \frac{3}{11} \times \frac{33}{5} \\
 R &= \frac{9}{5}
 \end{aligned}$$

Ans. $R = \frac{9}{5} \Omega$

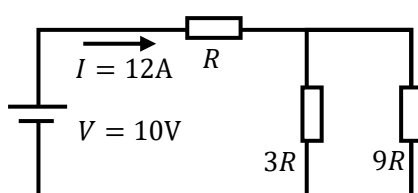
(2)



$$\begin{aligned}
 V &= \left(R + \frac{2R \cdot 3R}{2R + 3R} \right) I \\
 \frac{V}{I} &= R + \frac{6R^2}{5R} \\
 \frac{V}{I} &= R + \frac{6}{5}R = \frac{11}{5}R \\
 R &= \frac{5}{11} \cdot \frac{V}{I} = \frac{5}{11} \times \frac{22}{3} \\
 R &= \frac{10}{3}
 \end{aligned}$$

Ans. $R = \frac{10}{3} \Omega$

(4)



$$\begin{aligned}
 V &= \left(R + \frac{3R \cdot 9R}{3R + 9R} \right) I \\
 \frac{V}{I} &= R + \frac{27R^2}{12R} \\
 \frac{V}{I} &= R + \frac{9}{4}R = \frac{13}{4}R \\
 R &= \frac{4}{13} \cdot \frac{V}{I} = \frac{4}{13} \times \frac{10}{12} \\
 R &= \frac{10}{39}
 \end{aligned}$$

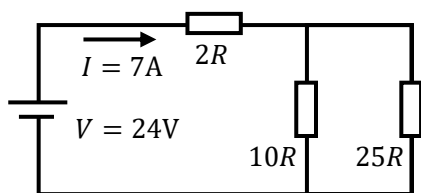
Ans. $R = \frac{10}{39} \Omega$

方程式 (22)

各問に答えなさい。



(1)



$$V = \left(2R + \frac{10R \cdot 25R}{10R + 25R} \right) I$$

$$\frac{V}{I} = 2R + \frac{250R^2}{35R}$$

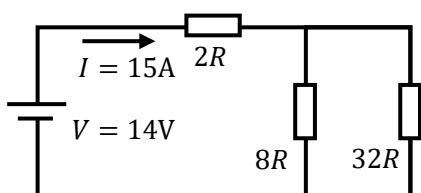
$$\frac{V}{I} = 2R + \frac{50}{7}R = \frac{64}{7}R$$

$$R = \frac{7}{64} \cdot \frac{V}{I} = \frac{7}{64} \times \frac{24}{7}$$

$$R = \frac{3}{8}$$

Ans. $R = \frac{3}{8} \Omega$

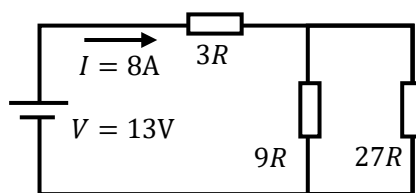
(2)



$$V = \left(2R + \frac{8R \cdot 32R}{8R + 32R} \right) I$$

Ans. $R =$

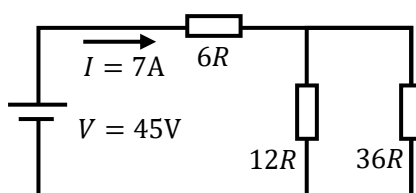
(3)



$$V = \left(3R + \frac{9R \cdot 27R}{9R + 27R} \right) I$$

Ans. $R =$

(4)



$$V = \left(6R + \frac{12R \cdot 36R}{12R + 36R} \right) I$$

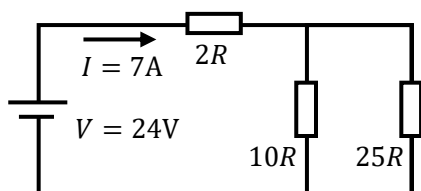
Ans. $R =$

方程式 (22)

各問に答えなさい。



(1)



$$V = \left(2R + \frac{10R \cdot 25R}{10R + 25R} \right) I$$

$$\frac{V}{I} = 2R + \frac{250R^2}{35R}$$

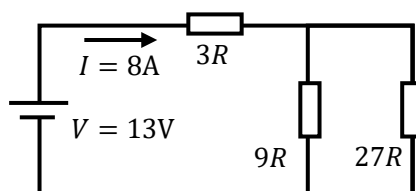
$$\frac{V}{I} = 2R + \frac{50}{7}R = \frac{64}{7}R$$

$$R = \frac{7}{64} \cdot \frac{V}{I} = \frac{7}{64} \times \frac{24}{7}$$

$$R = \frac{3}{8}$$

Ans. $R = \frac{3}{8} \Omega$

(3)



$$V = \left(3R + \frac{9R \cdot 27R}{9R + 27R} \right) I$$

$$\frac{V}{I} = 3R + \frac{9 \cdot 27R^2}{36R}$$

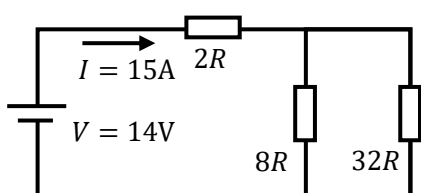
$$\frac{V}{I} = 3R + \frac{27}{4}R = \frac{39}{4}R$$

$$R = \frac{4}{39} \cdot \frac{V}{I} = \frac{4}{39} \times \frac{13}{8}$$

$$R = \frac{1}{6}$$

Ans. $R = \frac{1}{6} \Omega$

(2)



$$V = \left(2R + \frac{8R \cdot 32R}{8R + 32R} \right) I$$

$$\frac{V}{I} = 2R + \frac{8 \cdot 32R^2}{40R}$$

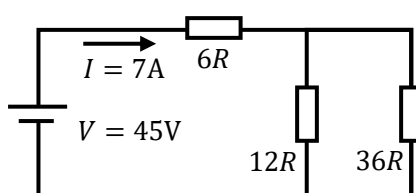
$$\frac{V}{I} = 2R + \frac{32}{5}R = \frac{42}{5}R$$

$$R = \frac{5}{42} \cdot \frac{V}{I} = \frac{5}{42} \times \frac{14}{15}$$

$$R = \frac{1}{9}$$

Ans. $R = \frac{1}{9} \Omega$

(4)



$$V = \left(6R + \frac{12R \cdot 36R}{12R + 36R} \right) I$$

$$\frac{V}{I} = 6R + \frac{12 \cdot 36R^2}{48R}$$

$$\frac{V}{I} = 6R + 9R = 15R$$

$$R = \frac{1}{15} \cdot \frac{V}{I} = \frac{1}{15} \times \frac{45}{7}$$

$$R = \frac{3}{7}$$

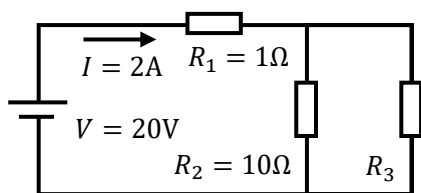
Ans. $R = \frac{3}{7} \Omega$

方程式 (23)

各問に答えなさい。



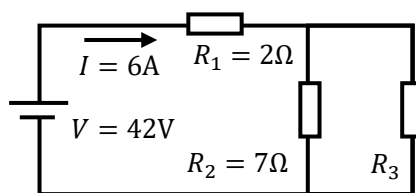
(1)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 20 &= \left(1 + \frac{10 R_3}{10 + R_3} \right) 2 \\
 \frac{20}{2} &= 1 + \frac{10 R_3}{10 + R_3} \\
 10 - 1 &= \frac{10 R_3}{10 + R_3} \\
 9(10 + R_3) &= 10 R_3 \\
 90 + 9 R_3 &= 10 R_3 \\
 R_3 &= 90
 \end{aligned}$$

Ans. $R_3 = 90 \Omega$

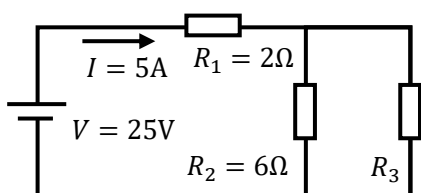
(3)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 42 &= \left(2 + \frac{7 R_3}{7 + R_3} \right) 6
 \end{aligned}$$

Ans. $R_3 =$

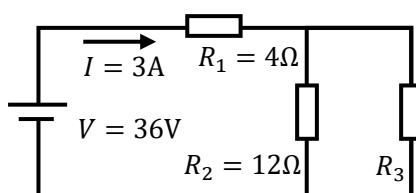
(2)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 25 &= \left(2 + \frac{6 R_3}{6 + R_3} \right) 5
 \end{aligned}$$

Ans. $R_3 =$

(4)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 36 &= \left(4 + \frac{12 R_3}{12 + R_3} \right) 3
 \end{aligned}$$

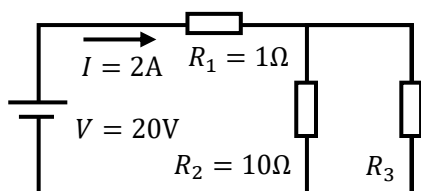
Ans. $R_3 =$

方程式 (23)

各問に答えなさい。



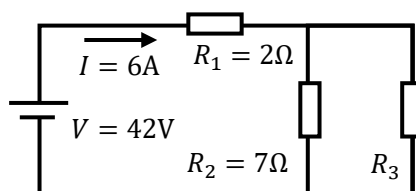
(1)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 20 &= \left(1 + \frac{10 R_3}{10 + R_3} \right) 2 \\
 \frac{20}{2} &= 1 + \frac{10 R_3}{10 + R_3} \\
 10 - 1 &= \frac{10 R_3}{10 + R_3} \\
 9(10 + R_3) &= 10 R_3 \\
 90 + 9 R_3 &= 10 R_3 \\
 R_3 &= 90
 \end{aligned}$$

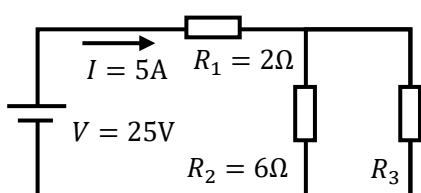
Ans. $R_3 = 90 \Omega$

(3)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 42 &= \left(2 + \frac{7 R_3}{7 + R_3} \right) 6 \\
 \frac{42}{6} &= 2 + \frac{7 R_3}{7 + R_3} \\
 7 - 2 &= \frac{7 R_3}{7 + R_3} \\
 5(7 + R_3) &= 7 R_3 \\
 35 + 5 R_3 &= 7 R_3 \\
 2 R_3 &= 35 \\
 R_3 &= \frac{35}{2} \\
 \text{Ans. } R_3 &= \frac{35}{2} \Omega
 \end{aligned}$$

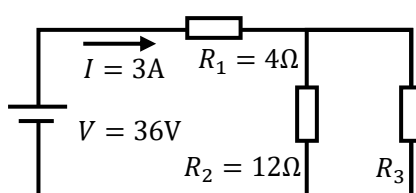
(2)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 25 &= \left(2 + \frac{6 R_3}{6 + R_3} \right) 5 \\
 \frac{25}{5} &= 2 + \frac{6 R_3}{6 + R_3} \\
 5 - 2 &= \frac{6 R_3}{6 + R_3} \\
 3(6 + R_3) &= 6 R_3 \\
 18 + 3 R_3 &= 6 R_3 \\
 3 R_3 &= 18 \\
 R_3 &= 6
 \end{aligned}$$

Ans. $R_3 = 6 \Omega$

(4)



$$\begin{aligned}
 V &= \left(R_1 + \frac{R_2 R_3}{R_2 + R_3} \right) I \\
 36 &= \left(4 + \frac{12 R_3}{12 + R_3} \right) 3 \\
 \frac{36}{3} &= 4 + \frac{12 R_3}{12 + R_3} \\
 12 - 4 &= \frac{12 R_3}{12 + R_3} \\
 8(12 + R_3) &= 12 R_3 \\
 96 + 8 R_3 &= 12 R_3 \\
 4 R_3 &= 96 \\
 R_3 &= 24
 \end{aligned}$$

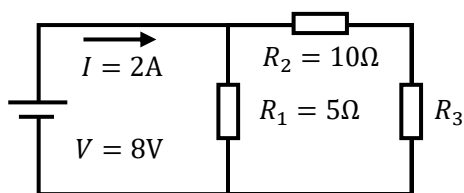
Ans. $R_3 = 24 \Omega$

方程式 (24)

各問に答えなさい。



(1)



$$V = \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I$$

$$8 = \left(\frac{5(10 + R_3)}{5 + 10 + R_3} \right) 2$$

$$\frac{8}{2} = \frac{50 + 5R_3}{15 + R_3}$$

$$4(15 + R_3) = 50 + 5R_3$$

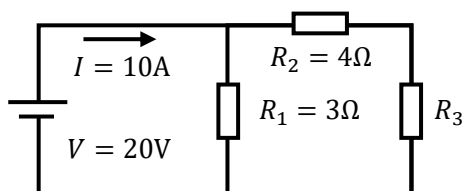
$$60 + 4R_3 = 50 + 5R_3$$

$$6R_3 = 60$$

$$R_3 = 10$$

Ans. $R_3 = 10 \Omega$

(2)

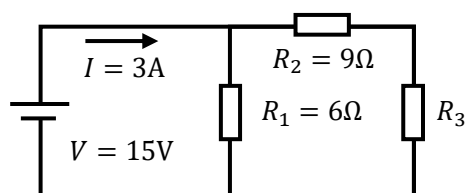


$$V = \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I$$

$$20 = \left(\frac{3(4 + R_3)}{3 + 4 + R_3} \right) 10$$

Ans. $R_3 =$

(3)

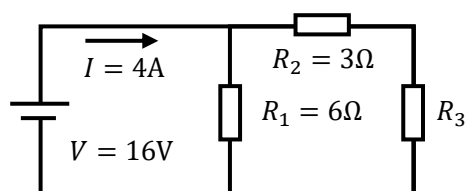


$$V = \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I$$

$$15 = \left(\frac{6(9 + R_3)}{6 + 9 + R_3} \right) 3$$

Ans. $R_3 =$

(4)



$$V = \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I$$

$$16 = \left(\frac{6(3 + R_3)}{6 + 3 + R_3} \right) 4$$

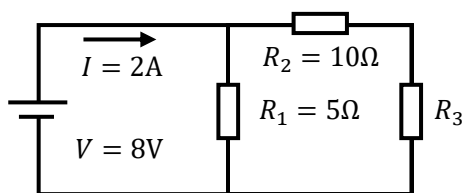
Ans. $R_3 =$

方程式 (24)

各問に答えなさい。



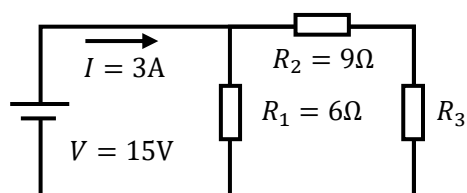
(1)



$$\begin{aligned}
 V &= \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I \\
 8 &= \left(\frac{5(10 + R_3)}{5 + 10 + R_3} \right) 2 \\
 \frac{8}{2} &= \frac{50 + 5R_3}{15 + R_3} \\
 4(15 + R_3) &= 50 + 5R_3 \\
 60 + 4R_3 &= 10R_3 \\
 6R_3 &= 60 \\
 R_3 &= 10
 \end{aligned}$$

Ans. $R_3 = 10 \Omega$

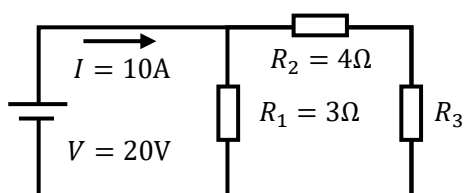
(3)



$$\begin{aligned}
 V &= \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I \\
 15 &= \left(\frac{6(9 + R_3)}{6 + 9 + R_3} \right) 3 \\
 \frac{15}{3} &= \frac{54 + 6R_3}{15 + R_3} \\
 5(15 + R_3) &= 54 + 6R_3 \\
 75 + 5R_3 &= 54 + 6R_3 \\
 6R_3 - 5R_3 &= 75 - 54 \\
 R_3 &= 21
 \end{aligned}$$

Ans. $R_3 = 21 \Omega$

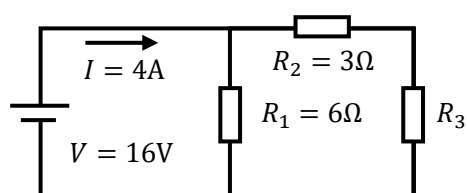
(2)



$$\begin{aligned}
 V &= \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I \\
 20 &= \left(\frac{3(4 + R_3)}{3 + 4 + R_3} \right) 10 \\
 \frac{20}{10} &= \frac{12 + 3R_3}{7 + R_3} \\
 2(7 + R_3) &= 12 + 3R_3 \\
 14 + 2R_3 &= 12 + 3R_3 \\
 R_3 &= 2
 \end{aligned}$$

Ans. $R_3 = 2 \Omega$

(4)

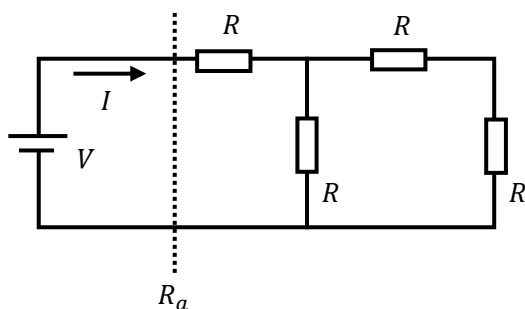


$$\begin{aligned}
 V &= \left(\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3} \right) I \\
 16 &= \left(\frac{6(3 + R_3)}{6 + 3 + R_3} \right) 4 \\
 \frac{16}{4} &= \frac{18 + 6R_3}{9 + R_3} \\
 4(9 + R_3) &= 18 + 6R_3 \\
 36 + 4R_3 &= 18 + 6R_3 \\
 6R_3 - 4R_3 &= 36 - 18 \\
 2R_3 &= 18 \\
 R_3 &= 9
 \end{aligned}$$

Ans. $R_3 = 9 \Omega$

方程式 (25)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = R + \frac{R(R+R)}{R+R+R}$$

$$R_a = R + \frac{R \cdot 2R}{3R} = R + \frac{2}{3}R$$

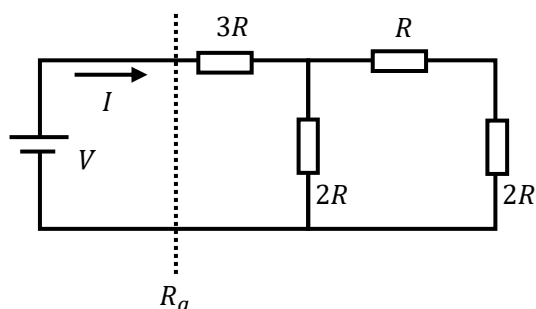
$$R_a = \frac{5}{3}R$$

Ans. $R_a = \frac{5}{3}R$

(2) $V = 15V, I = 2A$ のとき
抵抗 R を求めよ

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

Ans. $R =$



(3) 合成抵抗 R_a を求めよ

$$R_a = 3R + \frac{2R(R+2R)}{2R+R+2R}$$

Ans. $R_a =$

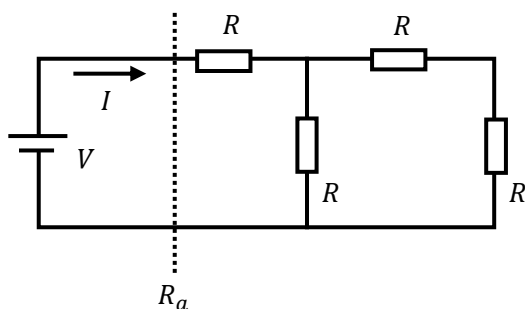
(4) $V = 14V, I = 10A$ のとき
抵抗 R を求めよ

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

Ans. $R =$

方程式 (25)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = R + \frac{R(R+R)}{R+R+R}$$

$$R_a = R + \frac{R \cdot 2R}{3R} = R + \frac{2}{3}R$$

$$R_a = \frac{5}{3}R$$

Ans. $R_a = \frac{5}{3}R$

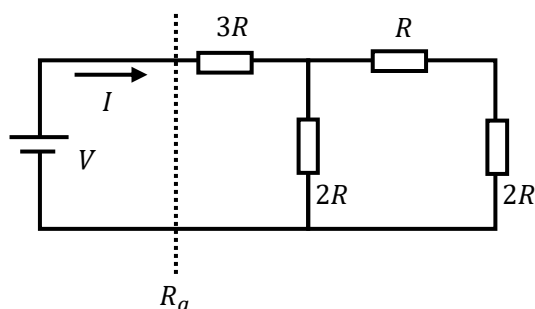
(2) $V = 15V, I = 2A$ のとき
抵抗 R を求めよ

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

$$\frac{5}{3}R = \frac{15}{2}$$

$$R_a = \frac{15}{2} \cdot \frac{3}{5} = \frac{9}{2}$$

Ans. $R = \frac{9}{2} \Omega$



(3) 合成抵抗 R_a を求めよ

$$R_a = 3R + \frac{2R(R+2R)}{2R+R+2R}$$

$$R_a = 3R + \frac{2R \cdot 3R}{5R} = 3R + \frac{6}{5}R$$

$$R_a = \frac{21}{5}R$$

Ans. $R_a = \frac{21}{5}R$

(4) $V = 14V, I = 10A$ のとき
抵抗 R を求めよ

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

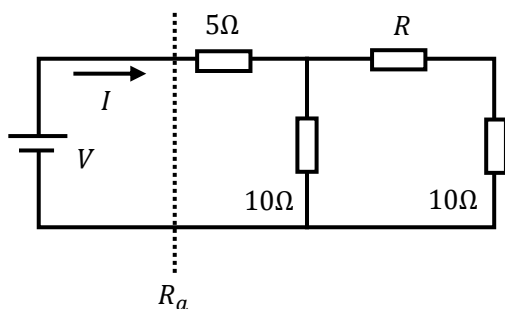
$$\frac{21}{5}R = \frac{14}{10}$$

$$R_a = \frac{14}{10} \cdot \frac{5}{21} = \frac{1}{3}$$

Ans. $R = \frac{1}{3} \Omega$

方程式 (26)

各問に答えなさい。



(1) 合成抵抗 R_a を求めよ

$$R_a = 5 + \frac{10(R + 10)}{10 + R + 10}$$

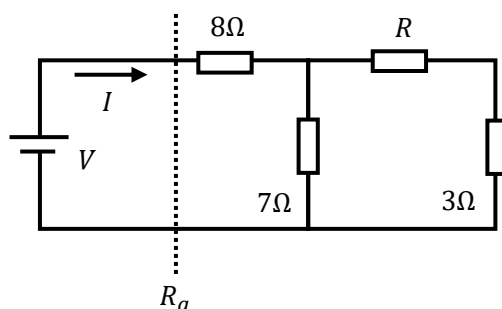
$$R_a = 5 + \frac{10(R + 10)}{R + 20}$$

Ans. $R_a = 5 + \frac{10(R + 10)}{R + 20}$

(2) $V = 72\text{V}$, $I = 6\text{A}$ のとき
抵抗 R を求めよ

$$5 + \frac{10(R + 10)}{R + 20} = \frac{V}{I}$$

Ans. $R =$



(3) 合成抵抗 R_a を求めよ

Ans. $R_a =$

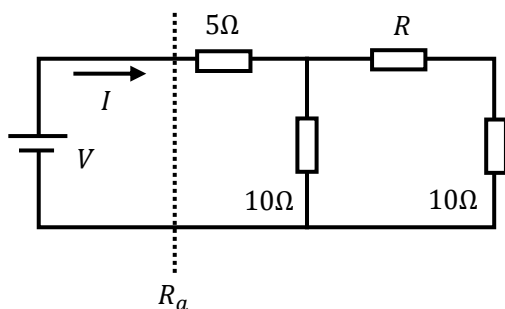
(4) $V = 42\text{V}$, $I = 3\text{A}$ のとき
抵抗 R を求めよ

$$8 + \frac{7(R + 3)}{R + 10} = \frac{V}{I}$$

Ans. $R =$

方程式 (26)

各問に答えなさい。

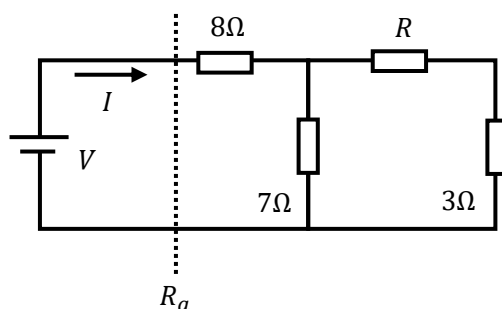


(1) 合成抵抗 R_a を求めよ

$$R_a = 5 + \frac{10(R + 10)}{10 + R + 10}$$

$$R_a = 5 + \frac{10(R + 10)}{R + 20}$$

$$\text{Ans. } R_a = 5 + \frac{10(R + 10)}{R + 20}$$



(3) 合成抵抗 R_a を求めよ

$$R_a = 8 + \frac{7(R + 3)}{7 + R + 3}$$

$$R_a = 8 + \frac{7(R + 3)}{R + 10}$$

$$\text{Ans. } R_a = 8 + \frac{7(R + 3)}{R + 10}$$

(2) $V = 72\text{V}, I = 6\text{A}$ のとき
抵抗 R を求めよ

$$\begin{aligned} 5 + \frac{10(R + 10)}{R + 20} &= \frac{V}{I} \\ \frac{10(R + 10)}{R + 20} &= \frac{72}{6} - 5 \\ \frac{10R + 100}{R + 20} &= 12 - 5 = 7 \\ 10R + 100 &= 7(R + 20) \\ 10R + 100 &= 7R + 140 \\ 10R - 7R &= 140 - 100 \\ R &= \frac{40}{3} \end{aligned}$$

$$\text{Ans. } R = \frac{40}{3} \Omega$$

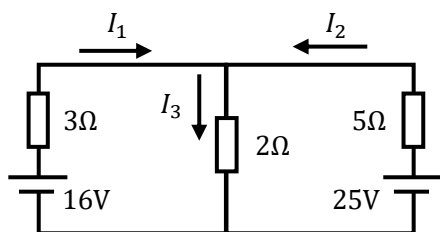
(4) $V = 42\text{V}, I = 3\text{A}$ のとき
抵抗 R を求めよ

$$\begin{aligned} 8 + \frac{7(R + 3)}{R + 10} &= \frac{V}{I} \\ \frac{7(R + 3)}{R + 10} &= \frac{42}{3} - 8 \\ \frac{7R + 21}{R + 10} &= 14 - 8 = 6 \\ 7R + 21 &= 6(R + 10) \\ 7R + 21 &= 6R + 60 \\ 7R - 6R &= 60 - 21 \\ R &= 39 \end{aligned}$$

$$\text{Ans. } R = 39 \Omega$$

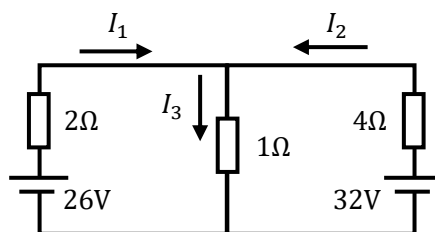
連立方程式 (1)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 3I_1 + 2I_3 &= 16 & (2) \\ 5I_2 + 2I_3 &= 25 & (3) \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

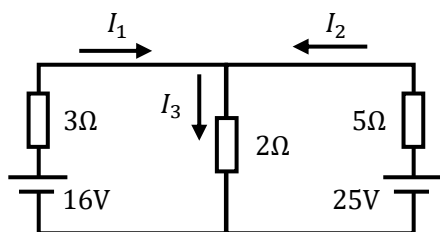
$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 2I_1 + I_3 &= 26 & (2) \\ 4I_2 + I_3 &= 32 & (3) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

連立方程式 (1)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 3I_1 + 2I_3 &= 16 & (2) \\ 5I_2 + 2I_3 &= 25 & (3) \end{aligned}$$

(1) $\rightarrow$ (2)

$$\begin{aligned} 3I_1 + 2(I_1 + I_2) &= 16 \\ 3I_1 + 2I_1 + 2I_2 &= 16 \\ 5I_1 + 2I_2 &= 16 & (2)' \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 5I_2 + 2(I_1 + I_2) &= 25 \\ 5I_2 + 2I_1 + 2I_2 &= 25 \\ 2I_1 + 7I_2 &= 25 & (3)' \end{aligned}$$

$$5 \times (3)' - 2 \times (2)'$$

$$\begin{array}{r} 10I_1 + 35I_2 = 125 \\ -) \quad 10I_1 + 4I_2 = 32 \\ \hline 31I_2 = 93 \\ I_2 = 3 \end{array}$$

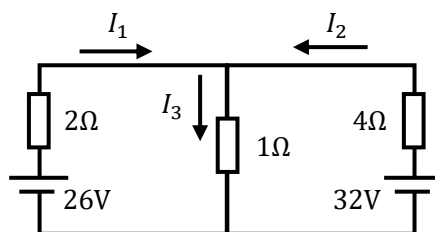
$$I_2 = 3 \rightarrow (3)$$

$$\begin{aligned} 5 \times 3 + 2I_3 &= 25 \\ 2I_3 &= 25 - 15 = 10 \\ I_3 &= 5 \end{aligned}$$

$$I_2 = 3, I_3 = 5 \rightarrow (1)$$

$$\begin{aligned} I_1 + 3 &= 5 \\ I_1 &= 2 \end{aligned}$$

Ans. $\begin{aligned} I_1 &= 2A \\ I_2 &= 3A \\ I_3 &= 5A \end{aligned}$



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 2I_1 + I_3 &= 26 & (2) \\ 4I_2 + I_3 &= 32 & (3) \end{aligned}$$

(1) $\rightarrow$ (2)

$$\begin{aligned} 2I_1 + (I_1 + I_2) &= 26 \\ 2I_1 + I_1 + I_2 &= 26 \\ 3I_1 + I_2 &= 26 & (2)' \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 4I_2 + (I_1 + I_2) &= 32 \\ 4I_2 + I_1 + I_2 &= 32 \\ I_1 + 5I_2 &= 32 & (3)' \end{aligned}$$

$$3 \times (3)' - (2)'$$

$$\begin{array}{r} 3I_1 + 15I_2 = 96 \\ -) \quad 3I_1 + I_2 = 26 \\ \hline 14I_2 = 70 \\ I_2 = 5 \end{array}$$

$$I_2 = 5 \rightarrow (3)$$

$$\begin{aligned} 5 \times 4 + I_3 &= 32 \\ I_3 &= 32 - 20 \\ I_3 &= 12 \end{aligned}$$

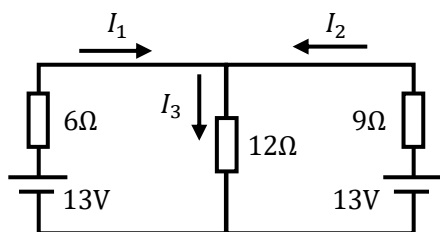
$$I_2 = 5, I_3 = 12 \rightarrow (1)$$

$$\begin{aligned} I_1 + 5 &= 12 \\ I_1 &= 7 \end{aligned}$$

Ans. $\begin{aligned} I_1 &= 7A \\ I_2 &= 5A \\ I_3 &= 12A \end{aligned}$

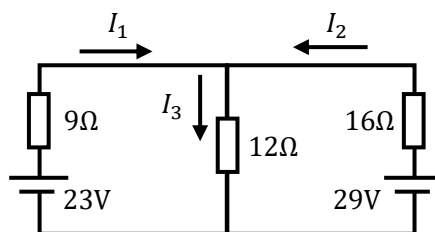
連立方程式（２）

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 6I_1 + 12I_3 &= 13 & (2) \\ 9I_2 + 12I_3 &= 13 & (3) \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

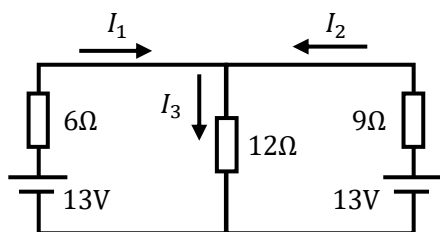
$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 9I_1 + 12I_3 &= 23 & (2) \\ 16I_2 + 12I_3 &= 29 & (3) \end{aligned}$$

Ans. $\begin{matrix} I_1 = \\ I_2 = \\ I_3 = \end{matrix}$ _____

Ans. $\begin{matrix} I_1 = \\ I_2 = \\ I_3 = \end{matrix}$ _____

連立方程式 (2)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 6I_1 + 12I_3 &= 13 & (2) \\ 9I_2 + 12I_3 &= 13 & (3) \end{aligned}$$

(1) → (2)

$$\begin{aligned} 6I_1 + 12(I_1 + I_2) &= 13 \\ 6I_1 + 12I_1 + 12I_2 &= 13 \\ 18I_1 + 12I_2 &= 13 & (2)' \end{aligned}$$

(1) → (3)

$$\begin{aligned} 9I_2 + 12(I_1 + I_2) &= 13 \\ 9I_2 + 12I_1 + 12I_2 &= 13 \\ 12I_1 + 21I_2 &= 13 & (3)' \end{aligned}$$

$$3 \times (3)' - 2 \times (2)'$$

$$\begin{array}{r} 36I_1 + 63I_2 = 39 \\ -) \quad 36I_1 + 24I_2 = 26 \\ \hline 39I_2 = 13 \\ I_2 = \frac{1}{3} \end{array}$$

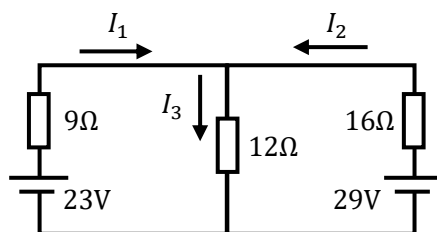
$$I_2 = \frac{1}{3} \rightarrow (3)$$

$$\begin{aligned} 9 \times \frac{1}{3} + 12I_3 &= 13 \\ 12I_3 &= 13 - 3 = 10 \\ I_3 &= \frac{10}{12} = \frac{5}{6} \end{aligned}$$

$$I_2 = \frac{1}{3}, I_3 = \frac{5}{6} \rightarrow (1)$$

$$\begin{aligned} I_1 + \frac{1}{3} &= \frac{5}{6} & I_1 &= \frac{1}{2} \text{ A} \\ I_1 &= \frac{5}{6} - \frac{1}{3} = \frac{3}{6} = \frac{1}{2} & I_2 &= \frac{1}{3} \text{ A} \\ & & I_3 &= \frac{5}{6} \text{ A} \end{aligned}$$

Ans.



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 9I_1 + 12I_3 &= 23 & (2) \\ 16I_2 + 12I_3 &= 29 & (3) \end{aligned}$$

(1) → (2)

$$\begin{aligned} 9I_1 + 12(I_1 + I_2) &= 23 \\ 9I_1 + 12I_1 + 12I_2 &= 23 \\ 21I_1 + 12I_2 &= 23 & (2)' \end{aligned}$$

(1) → (3)

$$\begin{aligned} 16I_2 + 12(I_1 + I_2) &= 29 \\ 16I_2 + 12I_1 + 12I_2 &= 29 \\ 12I_1 + 28I_2 &= 29 & (3)' \end{aligned}$$

$$7 \times (3)' - 4 \times (2)'$$

$$\begin{array}{r} 84I_1 + 196I_2 = 203 \\ -) \quad 84I_1 + 48I_2 = 92 \\ \hline 148I_2 = 111 \\ I_2 = \frac{111}{148} = \frac{3 \times 37}{4 \times 37} = \frac{3}{4} \end{array}$$

$$I_2 = \frac{3}{4} \rightarrow (3)$$

$$\begin{aligned} 16 \times \frac{3}{4} + 12I_3 &= 29 \\ 12I_3 &= 29 - 12 \\ I_3 &= \frac{17}{12} \end{aligned}$$

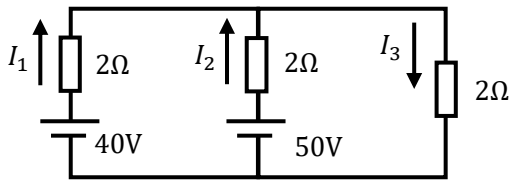
$$I_2 = \frac{3}{4}, I_3 = \frac{17}{12} \rightarrow (1)$$

$$\begin{aligned} I_1 + \frac{3}{4} &= \frac{17}{12} & I_1 &= \frac{2}{3} \text{ A} \\ I_1 &= \frac{17}{12} - \frac{9}{12} = \frac{8}{12} = \frac{2}{3} & I_2 &= \frac{3}{4} \text{ A} \\ & & I_3 &= \frac{17}{12} \text{ A} \end{aligned}$$

Ans.

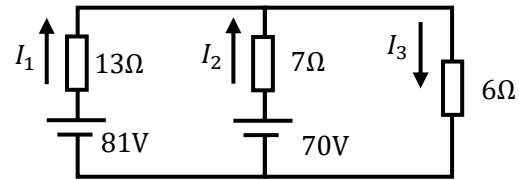
連立方程式 (3)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 40 - 50 &= 2I_1 - 2I_2 & (2) \\ 2I_2 + 2I_3 &= 50 & (3) \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

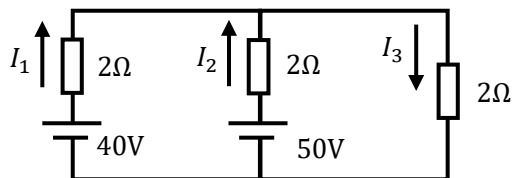
$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 81 - 70 &= 13I_1 - 7I_2 & (2) \\ 7I_2 + 6I_3 &= 70 & (3) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

連立方程式 (3)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 40 - 50 &= 2I_1 - 2I_2 & (2) \\ 2I_2 + 2I_3 &= 50 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 2I_2 + 2(I_1 + I_2) &= 50 \\ I_2 + I_1 + I_2 &= 25 \\ I_1 + 2I_2 &= 25 & (3)' \end{aligned}$$

(2)を変形

$$\begin{aligned} 40 - 50 &= 2I_1 - 2I_2 \\ 2I_1 - 2I_2 &= -10 \\ I_1 - I_2 &= -5 & (2)' \end{aligned}$$

(3)' - (2)'

$$\begin{array}{r} I_1 + 2I_2 = 25 \\ -) \quad I_1 - I_2 = -5 \\ \hline 3I_2 = 30 \\ I_2 = 10 \end{array}$$

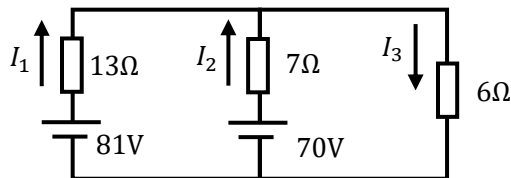
$I_2 = 10 \rightarrow (2)'$

$$\begin{aligned} I_1 - 10 &= -5 \\ I_1 &= -5 + 10 = 5 \end{aligned}$$

$I_1 = 5, I_2 = 10 \rightarrow (1)$

$$\begin{aligned} 5 + 10 &= I_3 \\ I_3 &= 15 \end{aligned}$$

Ans. $\begin{aligned} I_1 &= 5\text{A} \\ I_2 &= 10\text{A} \\ I_3 &= 15\text{A} \end{aligned}$



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 81 - 70 &= 13I_1 - 7I_2 & (2) \\ 7I_2 + 6I_3 &= 70 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 7I_2 + 6(I_1 + I_2) &= 70 \\ 7I_2 + 6I_1 + 6I_2 &= 70 \\ 6I_1 + 13I_2 &= 70 & (3)' \end{aligned}$$

(2)を変形

$$\begin{aligned} 81 - 70 &= 13I_1 - 7I_2 \\ 13I_1 - 7I_2 &= 11 & (2)' \end{aligned}$$

$7 \times (3)' + 13 \times (2)'$

$$\begin{aligned} 42I_1 + 91I_2 &= 490 \\ +) 169I_1 - 91I_2 &= 143 \\ \hline 211I_1 &= 633 \\ I_1 &= \frac{633}{211} = \frac{3 \times 211}{211} = 3 \end{aligned}$$

$I_1 = 3 \rightarrow (2)'$

$$\begin{aligned} 13 \times 3 - 7I_2 &= 11 \\ -7I_2 &= 11 - 39 \\ &= -28 \\ I_2 &= \frac{-28}{-7} = 4 \end{aligned}$$

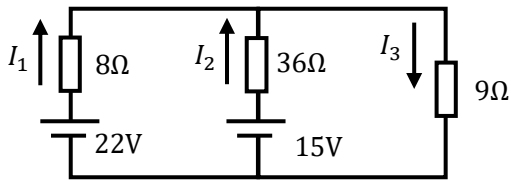
$I_1 = 3, I_2 = 4 \rightarrow (1)$

$$\begin{aligned} 3 + 4 &= I_3 \\ I_3 &= 7 \end{aligned}$$

Ans. $\begin{aligned} I_1 &= 3\text{A} \\ I_2 &= 4\text{A} \\ I_3 &= 7\text{A} \end{aligned}$

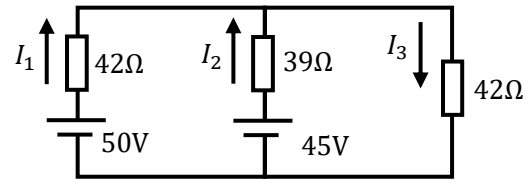
連立方程式（４）

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 22 - 15 &= 8I_1 - 36I_2 & (2) \\ 36I_2 + 9I_3 &= 15 & (3) \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

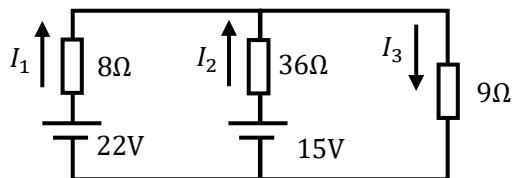
$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 50 - 45 &= 42I_1 - 39I_2 & (2) \\ 39I_2 + 42I_3 &= 45 & (3) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

連立方程式 (4)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 22 - 15 &= 8I_1 - 36I_2 & (2) \\ 36I_2 + 9I_3 &= 15 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 36I_2 + 9(I_1 + I_2) &= 15 \\ 36I_2 + 9I_1 + 9I_2 &= 15 \\ 9I_1 + 45I_2 &= 15 \\ 3I_1 + 15I_2 &= 5 & (3)' \end{aligned}$$

(2)を変形

$$\begin{aligned} 22 - 15 &= 8I_1 - 36I_2 \\ 8I_1 - 36I_2 &= 7 & (2)' \end{aligned}$$

$8 \times (3)' - 3 \times (2)'$

$$\begin{aligned} 24I_1 + 120I_2 &= 40 \\ -) \quad 24I_1 - 108I_2 &= 21 \\ \hline 228I_2 &= 19 \\ I_2 &= \frac{19}{228} = \frac{1}{12} \end{aligned}$$

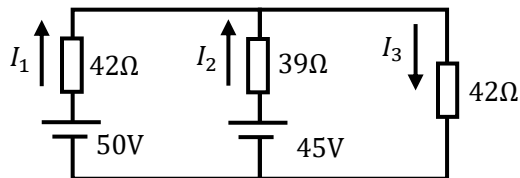
$$I_2 = \frac{1}{12} \rightarrow (2)'$$

$$\begin{aligned} 8I_1 - \frac{36}{12} &= 7 \\ 8I_1 - 3 &= 7 \\ 8I_1 &= 10 \\ I_1 &= \frac{10}{8} = \frac{5}{4} \end{aligned}$$

$$I_1 = \frac{5}{4}, I_2 = \frac{1}{12} \rightarrow (1)$$

$$\begin{aligned} \frac{5}{4} + \frac{1}{12} &= I_3 & I_1 &= \frac{5}{4} \text{ A} \\ I_3 &= \frac{16}{12} = \frac{4}{3} & I_2 &= \frac{1}{12} \text{ A} \\ & & I_3 &= \frac{4}{3} \text{ A} \end{aligned}$$

Ans.



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 50 - 45 &= 42I_1 - 39I_2 & (2) \\ 39I_2 + 42I_3 &= 45 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 39I_2 + 42(I_1 + I_2) &= 45 \\ 39I_2 + 42I_1 + 42I_2 &= 45 \\ 42I_1 + 81I_2 &= 45 & (3)' \end{aligned}$$

(2)を変形

$$\begin{aligned} 50 - 45 &= 42I_1 - 39I_2 \\ 42I_1 - 39I_2 &= 5 & (2)' \end{aligned}$$

$(3)' - (2)'$

$$\begin{aligned} 42I_1 + 81I_2 &= 45 \\ -) \quad 42I_1 - 39I_2 &= 5 \\ \hline 120I_2 &= 40 \\ I_2 &= \frac{40}{120} = \frac{1}{3} \end{aligned}$$

$$I_2 = \frac{1}{3} \rightarrow (2)'$$

$$\begin{aligned} 42I_1 - \frac{39}{3} &= 5 \\ 42I_1 - 13 &= 5 \\ 42I_1 &= 18 \\ I_1 &= \frac{18}{42} = \frac{3}{7} \end{aligned}$$

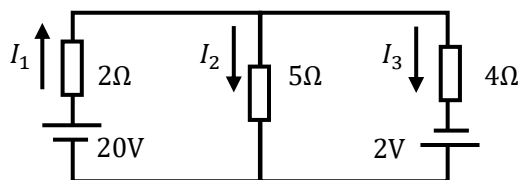
$$I_1 = \frac{3}{7}, I_2 = \frac{1}{3} \rightarrow (1)$$

$$\begin{aligned} \frac{3}{7} + \frac{1}{3} &= I_3 & I_1 &= \frac{3}{7} \text{ A} \\ I_3 &= \frac{9}{21} + \frac{7}{21} = \frac{16}{21} & I_2 &= \frac{1}{3} \text{ A} \\ & & I_3 &= \frac{16}{21} \text{ A} \end{aligned}$$

Ans.

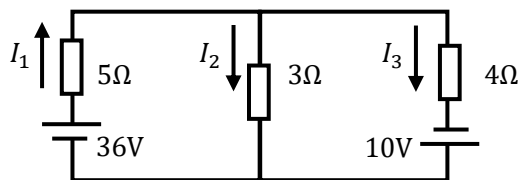
連立方程式（５）

各問に答えなさい。



(１) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 &= I_2 + I_3 & (1) \\ 2I_1 + 5I_2 &= 20 & (2) \\ -5I_2 + 4I_3 &= 2 & (3) \end{aligned}$$



(２) 電流 I_1, I_2, I_3 を求めよ

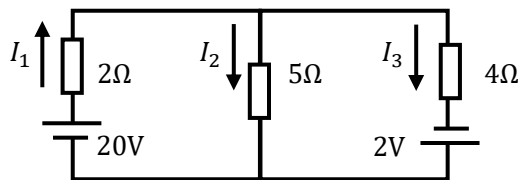
$$\begin{aligned} I_1 &= I_2 + I_3 & (1) \\ 5I_1 + 3I_2 &= 36 & (2) \\ -3I_2 + 4I_3 &= 10 & (3) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

連立方程式 (5)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 &= I_2 + I_3 & (1) \\ 2I_1 + 5I_2 &= 20 & (2) \\ -5I_2 + 4I_3 &= 2 & (3) \end{aligned}$$

(1) $\rightarrow$ (2)

$$\begin{aligned} 2(I_2 + I_3) + 5I_2 &= 20 \\ 2I_2 + 2I_3 + 5I_2 &= 20 \\ 7I_2 + 2I_3 &= 20 & (2)' \end{aligned}$$

$2 \times (2)' - (3)$

$$\begin{array}{r} 14I_2 + 4I_3 = 40 \\ -) \quad -5I_2 + 4I_3 = 2 \\ \hline 19I_2 = 38 \\ I_2 = \frac{38}{19} = 2 \end{array}$$

$I_2 = 2 \rightarrow (2)'$

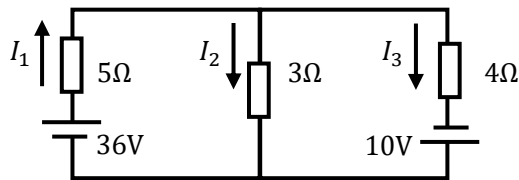
$$\begin{aligned} 7 \times 2 + 2I_3 &= 20 \\ 2I_3 &= 20 - 14 = 6 \\ I_3 &= \frac{6}{2} = 3 \end{aligned}$$

$I_2 = 2, I_3 = 3 \rightarrow (1)$

$$I_1 = 2 + 3 = 5$$

Ans.

$$\begin{aligned} I_1 &= 5\text{A} \\ I_2 &= 2\text{A} \\ I_3 &= 3\text{A} \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 &= I_2 + I_3 & (1) \\ 5I_1 + 3I_2 &= 36 & (2) \\ -3I_2 + 4I_3 &= 10 & (3) \end{aligned}$$

(1) $\rightarrow$ (2)

$$\begin{aligned} 5(I_2 + I_3) + 3I_2 &= 36 \\ 5I_2 + 5I_3 + 3I_2 &= 36 \\ 8I_2 + 5I_3 &= 36 & (2)' \end{aligned}$$

$3 \times (2)' + 8 \times (3)$

$$\begin{array}{r} 24I_2 + 15I_3 = 108 \\ +) \quad -24I_2 + 32I_3 = 80 \\ \hline 47I_3 = 188 \\ I_3 = \frac{188}{47} = \frac{47 \times 4}{47} = 4 \end{array}$$

$I_3 = 4 \rightarrow (3)$

$$\begin{aligned} -3I_2 + 4 \times 4 &= 10 \\ -3I_2 &= 10 - 16 \\ I_2 &= \frac{-6}{-3} = 2 \end{aligned}$$

$I_2 = 2, I_3 = 4 \rightarrow (1)$

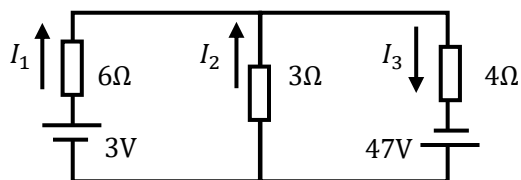
$$I_1 = 2 + 4 = 6$$

Ans.

$$\begin{aligned} I_1 &= 6\text{A} \\ I_2 &= 2\text{A} \\ I_3 &= 4\text{A} \end{aligned}$$

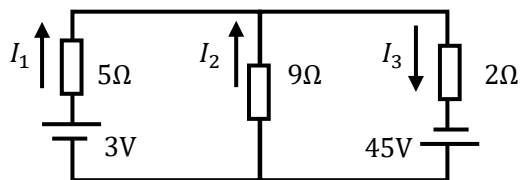
連立方程式 (6)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 6I_1 - 3I_2 &= 3 & (2) \\ 3I_2 + 4I_3 &= 47 & (3) \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

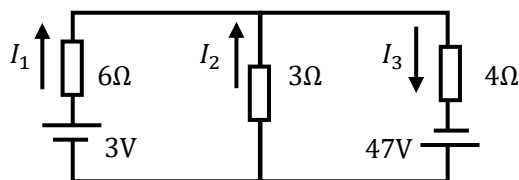
$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 5I_1 - 9I_2 &= 3 & (2) \\ 9I_2 + 2I_3 &= 45 & (3) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$

連立方程式 (6)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 6I_1 - 3I_2 &= 3 & (2) \\ 3I_2 + 4I_3 &= 47 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 3I_2 + 4(I_1 + I_2) &= 47 \\ 3I_2 + 4I_1 + 4I_2 &= 47 \\ 4I_1 + 7I_2 &= 47 & (3)' \end{aligned}$$

(2)を変形

$$\begin{aligned} 6I_1 - 3I_2 &= 3 \\ 2I_1 - I_2 &= 1 & (2)' \end{aligned}$$

(3)' - 2 $\times$ (2)'

$$\begin{aligned} 4I_1 + 7I_2 &= 47 \\ -) \quad 4I_1 - 2I_2 &= 2 \\ \hline 9I_2 &= 45 \\ I_2 &= \frac{45}{9} = 5 \end{aligned}$$

$I_2 = 5 \rightarrow$ (2)'

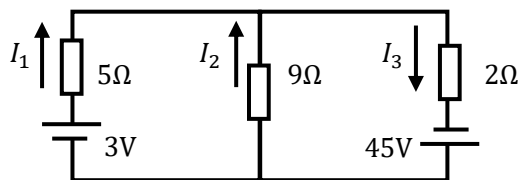
$$\begin{aligned} 2I_1 - 5 &= 1 \\ 2I_1 &= 1 + 5 = 6 \\ I_1 &= \frac{6}{2} = 3 \end{aligned}$$

$I_1 = 3, I_2 = 5 \rightarrow$ (1)

$$I_3 = 3 + 5 = 8$$

Ans.

$$\begin{aligned} I_1 &= 3\text{A} \\ I_2 &= 5\text{A} \\ I_3 &= 8\text{A} \end{aligned}$$



(2) 電流 I_1, I_2, I_3 を求めよ

$$\begin{aligned} I_1 + I_2 &= I_3 & (1) \\ 5I_1 - 9I_2 &= 3 & (2) \\ 9I_2 + 2I_3 &= 45 & (3) \end{aligned}$$

(1) $\rightarrow$ (3)

$$\begin{aligned} 9I_2 + 2(I_1 + I_2) &= 45 \\ 9I_2 + 2I_1 + 2I_2 &= 45 \\ 2I_1 + 11I_2 &= 45 & (3)' \end{aligned}$$

5 $\times$ (3)' - 2 $\times$ (2)

$$\begin{aligned} 10I_1 + 55I_2 &= 225 \\ -) \quad 10I_1 - 18I_2 &= 6 \\ \hline 73I_2 &= 219 \\ I_2 &= \frac{219}{73} = \frac{73 \times 3}{73} = 3 \end{aligned}$$

$I_2 = 3 \rightarrow$ (2)

$$\begin{aligned} 5I_1 - 9 \times 3 &= 3 \\ 5I_1 &= 3 + 27 = 30 \\ I_1 &= \frac{30}{5} = 6 \end{aligned}$$

$I_1 = 6, I_2 = 3 \rightarrow$ (1)

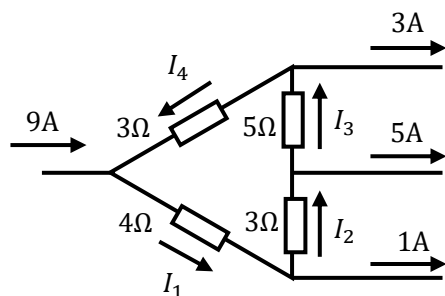
$$I_3 = 6 + 3 = 9$$

Ans.

$$\begin{aligned} I_1 &= 6\text{A} \\ I_2 &= 3\text{A} \\ I_3 &= 9\text{A} \end{aligned}$$

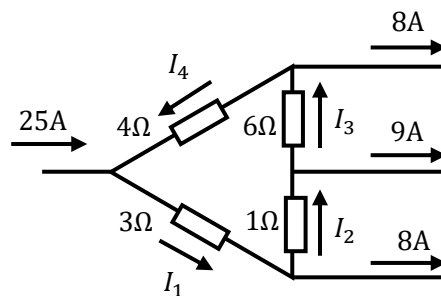
連立方程式 (7)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 1 & (1) \\ I_3 &= I_1 - 1 - 5 & (2) \\ I_4 &= I_1 - 1 - 5 - 3 & (3) \\ 4I_1 + 3I_2 + 5I_3 + 3I_4 &= 0 & (4) \end{aligned}$$



(2) 電流 I_1, I_2, I_3, I_4 を求めよ

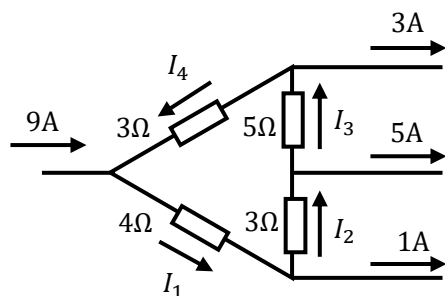
$$\begin{aligned} I_2 &= I_1 - 8 & (1) \\ I_3 &= I_1 - 8 - 9 & (2) \\ I_4 &= I_1 - 8 - 9 - 8 & (3) \\ 3I_1 + I_2 + 6I_3 + 4I_4 &= 0 & (4) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$
 $I_4 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$
 $I_4 =$

連立方程式 (7)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 1 & (1) \\ I_3 &= I_1 - 1 - 5 & (2) \\ I_4 &= I_1 - 1 - 5 - 3 & (3) \\ 4I_1 + 3I_2 + 5I_3 + 3I_4 &= 0 & (4) \end{aligned}$$

(2), (3)を変形

$$\begin{aligned} I_3 &= I_1 - 1 - 5 \\ I_3 &= I_1 - 6 & (2)' \\ I_4 &= I_1 - 1 - 5 - 3 \\ I_4 &= I_1 - 9 & (3)' \end{aligned}$$

(1)(2)'(3)' → (4)

$$4I_1 + 3(I_1 - 1) + 5(I_1 - 6) + 3(I_1 - 9) = 0$$

$$4I_1 + 3I_1 - 3 + 5I_1 - 30 + 3I_1 - 27 = 0$$

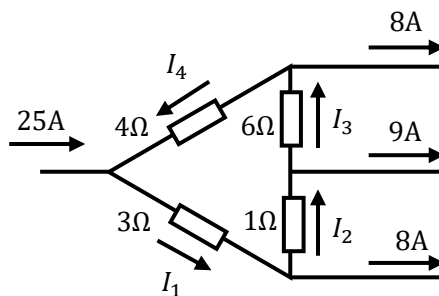
$$\begin{aligned} 15I_1 &= 60 \\ I_1 &= 4 \end{aligned}$$

$I_1 = 4 \rightarrow (1)(2)'(3)'$

$$\begin{aligned} I_2 &= 4 - 1 = 3 \\ I_3 &= 4 - 6 = -2 \\ I_4 &= 4 - 9 = -5 \end{aligned}$$

Ans.

$$\begin{aligned} I_1 &= 4A \\ I_2 &= 3A \\ I_3 &= -2A \\ I_4 &= -5A \end{aligned}$$



(2) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 8 & (1) \\ I_3 &= I_1 - 8 - 9 & (2) \\ I_4 &= I_1 - 8 - 9 - 8 & (3) \\ 3I_1 + I_2 + 6I_3 + 4I_4 &= 0 & (4) \end{aligned}$$

(2), (3)を変形

$$\begin{aligned} I_3 &= I_1 - 8 - 9 \\ I_3 &= I_1 - 17 & (2)' \\ I_4 &= I_1 - 1 - 8 - 9 - 8 \\ I_4 &= I_1 - 25 & (3)' \end{aligned}$$

(1)(2)'(3)' → (4)

$$3I_1 + (I_1 - 8) + 6(I_1 - 17) + 4(I_1 - 25) = 0$$

$$3I_1 + I_1 - 8 + 6I_1 - 102 + 4I_1 - 100 = 0$$

$$\begin{aligned} 14I_1 &= 210 \\ I_1 &= 15 \end{aligned}$$

$I_1 = 15 \rightarrow (1)(2)'(3)'$

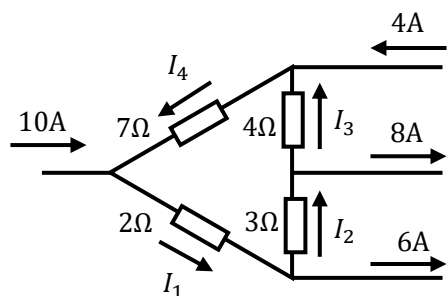
$$\begin{aligned} I_2 &= 15 - 8 = 7 \\ I_3 &= 15 - 17 = -2 \\ I_4 &= 15 - 25 = -10 \end{aligned}$$

Ans.

$$\begin{aligned} I_1 &= 15A \\ I_2 &= 7A \\ I_3 &= -2A \\ I_4 &= -10A \end{aligned}$$

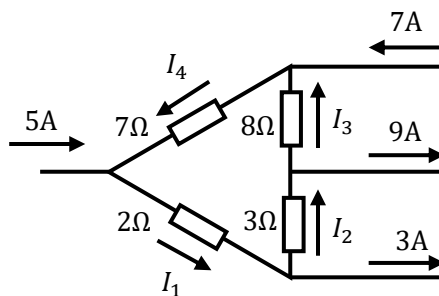
連立方程式 (8)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 6 & (1) \\ I_3 &= I_1 - 6 - 8 & (2) \\ I_4 &= I_1 - 6 - 8 + 4 & (3) \\ 2I_1 + 3I_2 + 4I_3 + 7I_4 &= 0 & (4) \end{aligned}$$



(2) 電流 I_1, I_2, I_3, I_4 を求めよ

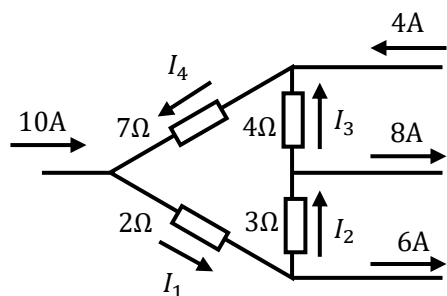
$$\begin{aligned} I_2 &= I_1 - 3 & (1) \\ I_3 &= I_1 - 3 - 9 & (2) \\ I_4 &= I_1 - 3 - 9 + 7 & (3) \\ 2I_1 + 3I_2 + 8I_3 + 7I_4 &= 0 & (4) \end{aligned}$$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$
 $I_4 =$

Ans. $I_1 =$
 $I_2 =$
 $I_3 =$
 $I_4 =$

連立方程式 (8)

各問に答えなさい。



(1) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 6 & (1) \\ I_3 &= I_1 - 6 - 8 & (2) \\ I_4 &= I_1 - 6 - 8 + 4 & (3) \\ 2I_1 + 3I_2 + 4I_3 + 7I_4 &= 0 & (4) \end{aligned}$$

(2), (3)を変形

$$\begin{aligned} I_3 &= I_1 - 6 - 8 \\ I_3 &= I_1 - 14 & (2)' \\ I_4 &= I_1 - 6 - 8 + 4 \\ I_4 &= I_1 - 10 & (3)' \end{aligned}$$

(1)(2)'(3)' → (4)

$$2I_1 + 3(I_1 - 6) + 4(I_1 - 14) + 7(I_1 - 10) = 0$$

$$2I_1 + 3I_1 - 18 + 4I_1 - 56 + 7I_1 - 70 = 0$$

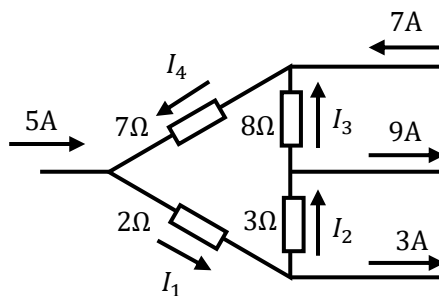
$$\begin{aligned} 16I_1 &= 144 \\ I_1 &= \frac{144}{16} = \frac{16 \times 9}{16} = 9 \end{aligned}$$

$I_1 = 9 \rightarrow (1)(2)'(3)'$

$$\begin{aligned} I_2 &= 9 - 6 = 3 \\ I_3 &= 9 - 14 = -5 \\ I_4 &= 9 - 10 = -1 \end{aligned}$$

Ans.

$$\begin{aligned} I_1 &= 9A \\ I_2 &= 3A \\ I_3 &= -5A \\ I_4 &= -1A \end{aligned}$$



(2) 電流 I_1, I_2, I_3, I_4 を求めよ

$$\begin{aligned} I_2 &= I_1 - 3 & (1) \\ I_3 &= I_1 - 3 - 9 & (2) \\ I_4 &= I_1 - 3 - 9 + 7 & (3) \\ 2I_1 + 3I_2 + 8I_3 + 7I_4 &= 0 & (4) \end{aligned}$$

(2), (3)を変形

$$\begin{aligned} I_3 &= I_1 - 3 - 9 \\ I_3 &= I_1 - 12 & (2)' \\ I_4 &= I_1 - 3 - 9 + 7 \\ I_4 &= I_1 - 5 & (3)' \end{aligned}$$

(1)(2)'(3)' → (4)

$$2I_1 + 3(I_1 - 3) + 8(I_1 - 12) + 7(I_1 - 5) = 0$$

$$2I_1 + 3I_1 - 9 + 8I_1 - 96 + 7I_1 - 35 = 0$$

$$\begin{aligned} 20I_1 &= 140 \\ I_1 &= 7 \end{aligned}$$

$I_1 = 7 \rightarrow (1)(2)'(3)'$

$$\begin{aligned} I_2 &= 7 - 3 = 4 \\ I_3 &= 7 - 12 = -5 \\ I_4 &= 7 - 5 = 2 \end{aligned}$$

Ans.

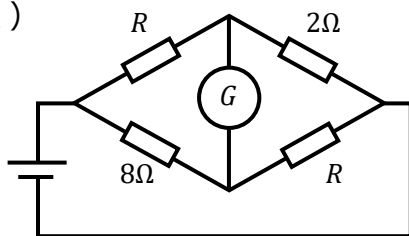
$$\begin{aligned} I_1 &= 7A \\ I_2 &= 4A \\ I_3 &= -5A \\ I_4 &= 2A \end{aligned}$$

二次方程式（１）



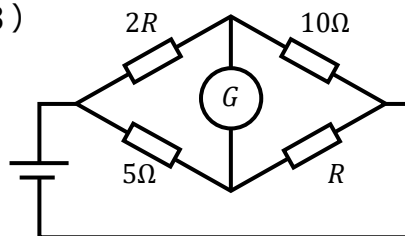
各問に答えなさい。
ただし、検流器Gの電流は0とする。

(1)



$$R \cdot R = 2 \cdot 8$$

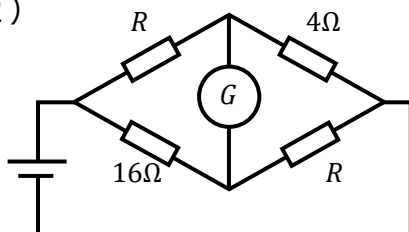
(3)



$$2R \cdot R = 5 \cdot 10$$

Ans. $R =$ _____

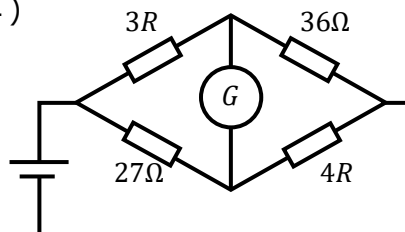
(2)



$$R \cdot R = 4 \cdot 16$$

Ans. $R =$ _____

(4)



$$3R \cdot 4R = 27 \cdot 36$$

Ans. $R =$ _____

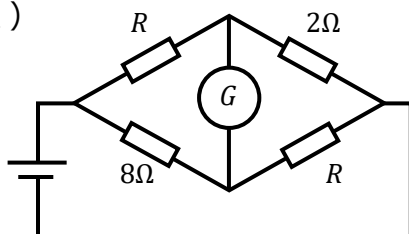
Ans. $R =$ _____

二次方程式（１）



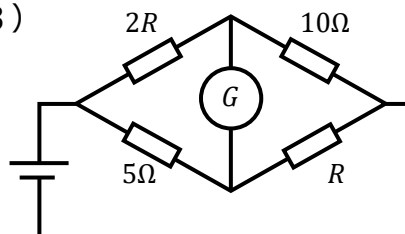
各問に答えなさい。
ただし、検流器Gの電流は0とする。

(1)



$$\begin{aligned} R \cdot R &= 2 \cdot 8 \\ R^2 &= 16 \\ R &= 4 \end{aligned}$$

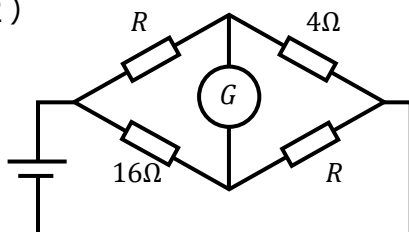
(3)



$$\begin{aligned} 2R \cdot R &= 5 \cdot 10 \\ 2R^2 &= 50 \\ R^2 &= 25 \\ R &= 5 \end{aligned}$$

Ans. $R = 4 \Omega$

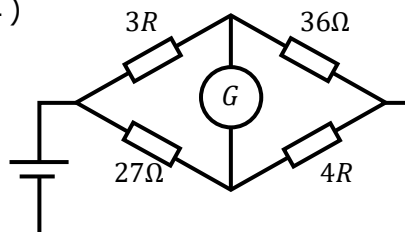
(2)



$$\begin{aligned} R \cdot R &= 4 \cdot 16 \\ R^2 &= 64 \\ R &= 8 \end{aligned}$$

Ans. $R = 5 \Omega$

(4)



$$\begin{aligned} 3R \cdot 4R &= 27 \cdot 36 \\ 12R^2 &= 27 \cdot 36 \\ R^2 &= 27 \cdot \frac{36}{12} = 27 \cdot 3 \\ R^2 &= 81 \\ R &= 9 \end{aligned}$$

Ans. $R = 4 \Omega$

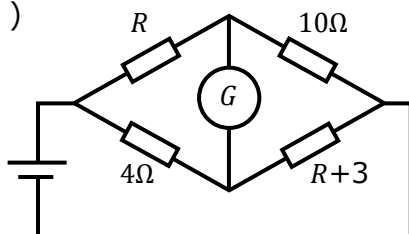
Ans. $R = 9 \Omega$

二次方程式（２）



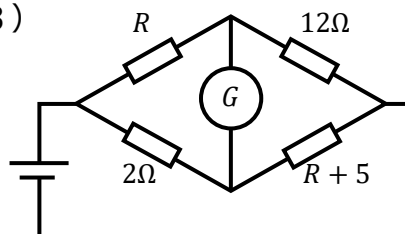
各問に答えなさい。
ただし、検流器Gの電流は0とする。

(1)



$$R \cdot (R + 3) = 4 \cdot 10$$

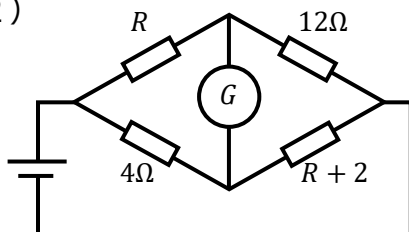
(3)



$$R \cdot (R + 5) = 2 \cdot 12$$

Ans. $R =$ _____

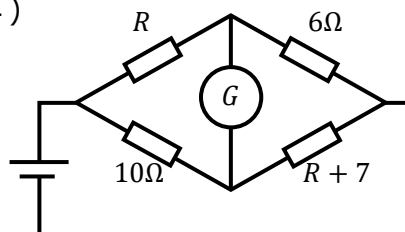
(2)



$$R \cdot (R + 2) = 4 \cdot 12$$

Ans. $R =$ _____

(4)



$$R \cdot (R + 7) = 6 \cdot 10$$

Ans. $R =$ _____

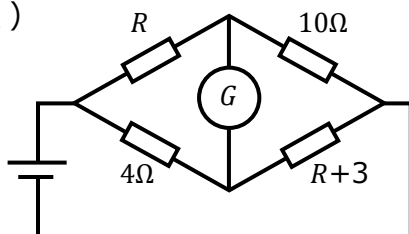
Ans. $R =$ _____

二次方程式（2）



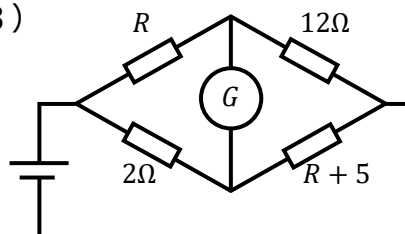
各問に答えなさい。
ただし、検流器Gの電流は0とする。

(1)



$$\begin{aligned} R \cdot (R + 3) &= 4 \cdot 10 \\ R^2 + 3R &= 40 \\ R^2 + 3R - 40 &= 0 \\ (R + 8)(R - 5) &= 0 \\ R &= -8, 5 \end{aligned}$$

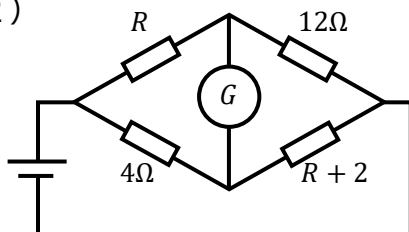
(3)



$$\begin{aligned} R \cdot (R + 5) &= 2 \cdot 12 \\ R^2 + 5R &= 24 \\ R^2 + 5R - 24 &= 0 \\ (R + 8)(R - 3) &= 0 \\ R &= -8, 3 \end{aligned}$$

Ans. $R = 5 \Omega$

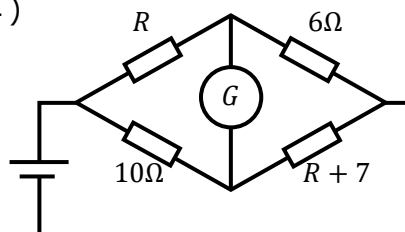
(2)



$$\begin{aligned} R \cdot (R + 2) &= 4 \cdot 12 \\ R^2 + 2R &= 48 \\ R^2 + 2R - 48 &= 0 \\ (R + 8)(R - 6) &= 0 \\ R &= -8, 6 \end{aligned}$$

Ans. $R = 3 \Omega$

(4)



$$\begin{aligned} R \cdot (R + 7) &= 6 \cdot 10 \\ R^2 + 7R &= 60 \\ R^2 + 7R - 60 &= 0 \\ (R + 12)(R - 5) &= 0 \\ R &= -12, 5 \end{aligned}$$

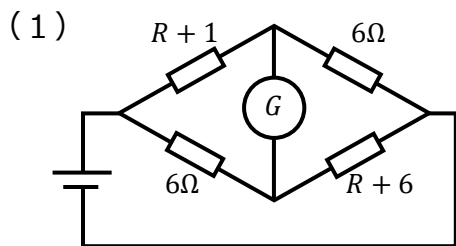
Ans. $R = 6 \Omega$

Ans. $R = 5 \Omega$

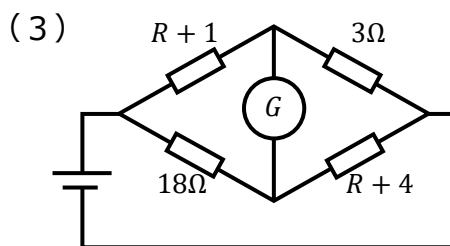
二次方程式（3）



各問に答えなさい。
ただし、検流器Gの電流は0とする。

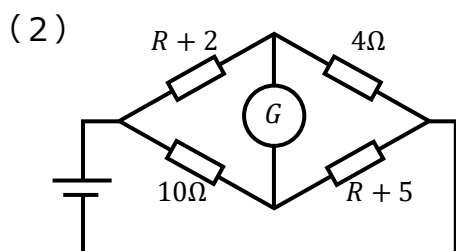


$$(R + 1) \cdot (R + 6) = 6 \cdot 6$$



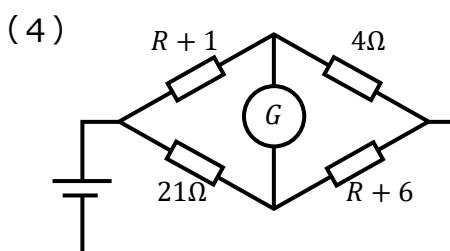
$$(R + 1) \cdot (R + 4) = 3 \cdot 18$$

Ans. $R =$ _____



$$(R + 2) \cdot (R + 5) = 4 \cdot 10$$

Ans. $R =$ _____



$$(R + 1) \cdot (R + 6) = 4 \cdot 21$$

Ans. $R =$ _____

Ans. $R =$ _____

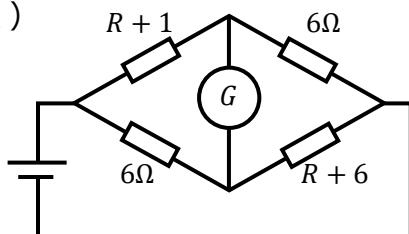
二次方程式 (3)



各問に答えなさい。

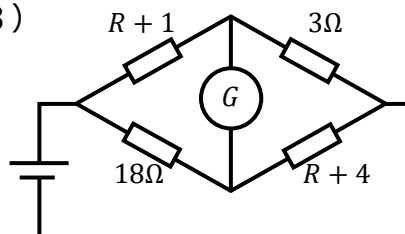
ただし、検流器Gの電流は0とする。

(1)



$$\begin{aligned}(R+1) \cdot (R+6) &= 6 \cdot 6 \\ R^2 + 7R + 6 &= 36 \\ R^2 + 7R + 6 - 36 &= 0 \\ R^2 + 7R - 30 &= 0 \\ (R+10)(R-3) &= 0 \\ R &= -10, 3\end{aligned}$$

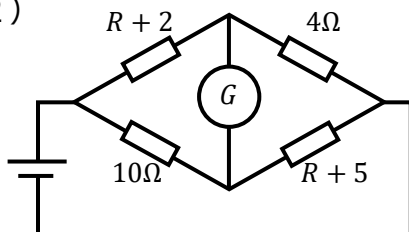
(3)



$$\begin{aligned}(R+1) \cdot (R+4) &= 3 \cdot 18 \\ R^2 + 5R + 4 &= 54 \\ R^2 + 5R + 4 - 54 &= 0 \\ R^2 + 5R - 50 &= 0 \\ (R+10)(R-5) &= 0 \\ R &= -10, 5\end{aligned}$$

Ans. $R = 3 \Omega$

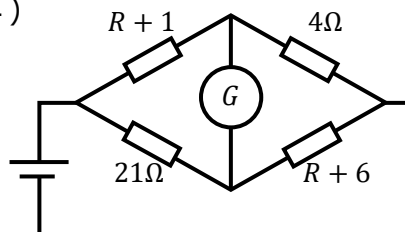
(2)



$$\begin{aligned}(R+2) \cdot (R+5) &= 4 \cdot 10 \\ R^2 + 7R + 10 &= 40 \\ R^2 + 7R + 10 - 40 &= 0 \\ R^2 + 7R - 30 &= 0 \\ (R+10)(R-3) &= 0 \\ R &= -10, 3\end{aligned}$$

Ans. $R = 5 \Omega$

(4)



$$\begin{aligned}(R+1) \cdot (R+6) &= 4 \cdot 21 \\ R^2 + 7R + 6 &= 84 \\ R^2 + 7R + 6 - 84 &= 0 \\ R^2 + 7R - 78 &= 0 \\ (R+13)(R-6) &= 0 \\ R &= -13, 6\end{aligned}$$

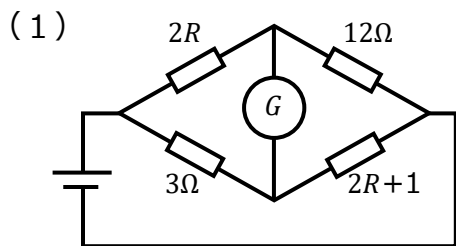
Ans. $R = 3 \Omega$

Ans. $R = 6 \Omega$

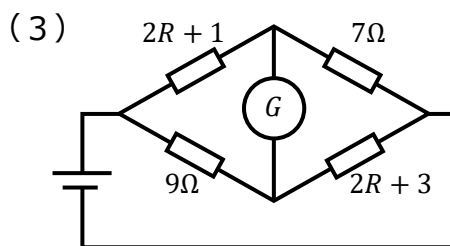
二次方程式（４）



各問に答えなさい。
ただし、検流器Gの電流は0とする。

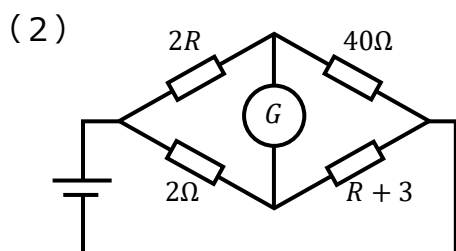


$$2R \cdot (2R + 5) = 3 \cdot 12$$



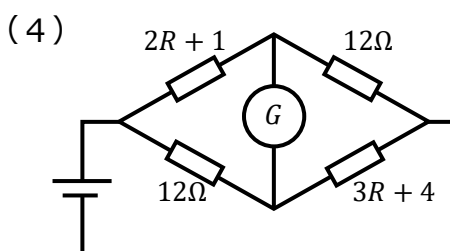
$$(2R + 1) \cdot (2R + 3) = 7 \cdot 9$$

Ans. $R =$ _____



$$2R \cdot (R + 3) = 2 \cdot 40$$

Ans. $R =$ _____



$$(2R + 1) \cdot (3R + 4) = 12 \cdot 12$$

Ans. $R =$ _____

Ans. $R =$ _____

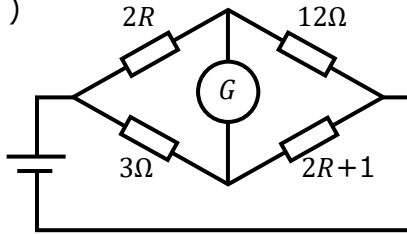
二次方程式（４）



各問に答えなさい。

ただし、検流器Gの電流は0とする。

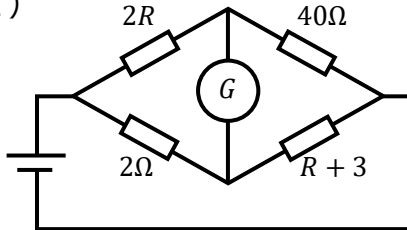
(1)



$$\begin{aligned} 2R \cdot (2R + 5) &= 3 \cdot 12 \\ 4R^2 + 10R &= 36 \\ 4R^2 + 10R - 36 &= 0 \\ 2R^2 + 5R - 18 &= 0 \\ (2R + 9)(R - 2) &= 0 \\ R &= -\frac{9}{2}, 2 \end{aligned}$$

Ans. $R = 2 \Omega$

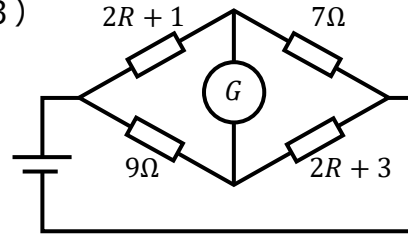
(2)



$$\begin{aligned} 2R \cdot (R + 3) &= 2 \cdot 40 \\ 2R^2 + 6R &= 80 \\ 2R^2 + 6R - 80 &= 0 \\ R^2 + 3R - 40 &= 0 \\ (R + 8)(R - 5) &= 0 \\ R &= -8, 5 \end{aligned}$$

Ans. $R = 5 \Omega$

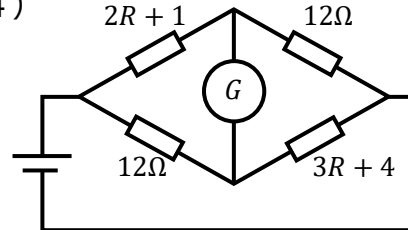
(3)



$$\begin{aligned} (2R + 1) \cdot (2R + 3) &= 7 \cdot 9 \\ 4R^2 + 8R + 3 &= 63 \\ 4R^2 + 8R + 3 - 63 &= 0 \\ 4R^2 + 8R - 60 &= 0 \\ R^2 + 2R - 15 &= 0 \\ (R + 5)(R - 3) &= 0 \\ R &= -5, 3 \end{aligned}$$

Ans. $R = 3 \Omega$

(4)



$$\begin{aligned} (2R + 1) \cdot (3R + 4) &= 12 \cdot 12 \\ 6R^2 + 11R + 4 &= 144 \\ 6R^2 + 11R + 4 - 144 &= 0 \\ 6R^2 + 11R - 140 &= 0 \\ (6R + 35)(R - 4) &= 0 \\ R &= -\frac{35}{6}, 4 \end{aligned}$$

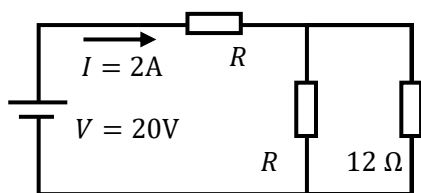
Ans. $R = 4 \Omega$

二次方程式（５）

各問に答えなさい。

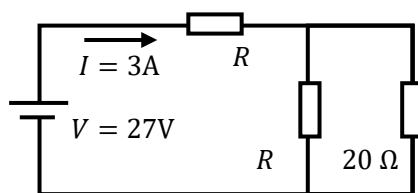


(1)



$$\frac{V}{I} = R + \frac{12R}{R + 12}$$

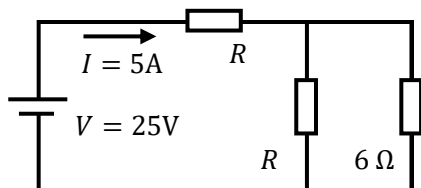
(3)



$$\frac{V}{I} = R + \frac{20R}{R + 20}$$

Ans. $R =$ _____

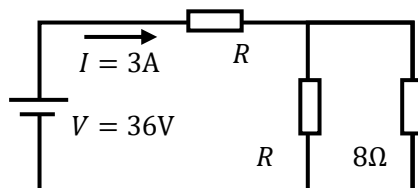
(2)



$$\frac{V}{I} = R + \frac{6R}{R + 6}$$

Ans. $R =$ _____

(4)



$$\frac{V}{I} = R + \frac{8R}{R + 8}$$

Ans. $R =$ _____

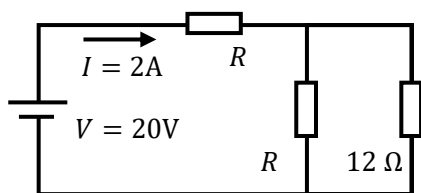
Ans. $R =$ _____

二次方程式 (5)

各問に答えなさい。



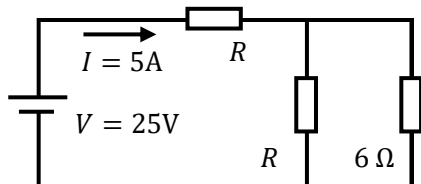
(1)



$$\begin{aligned}\frac{V}{I} &= R + \frac{12R}{R+12} \\ \frac{20}{2}(R+12) &= R(R+12) + 12R \\ 10R + 120 &= R^2 + 12R + 12R \\ R^2 + 24R - 10R - 120 &= 0 \\ R^2 + 14R - 120 &= 0 \\ (R+20)(R-6) &= 0 \\ R &= -20, 6\end{aligned}$$

Ans. $R = 6 \Omega$

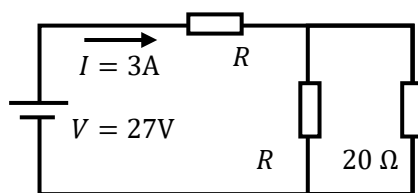
(2)



$$\begin{aligned}\frac{V}{I} &= R + \frac{6R}{R+6} \\ \frac{25}{5}(R+6) &= R(R+6) + 6R \\ 5R + 30 &= R^2 + 6R + 6R \\ R^2 + 12R - 5R - 30 &= 0 \\ R^2 + 7R - 30 &= 0 \\ (R+10)(R-3) &= 0 \\ R &= -10, 3\end{aligned}$$

Ans. $R = 3 \Omega$

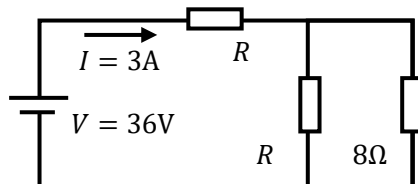
(3)



$$\begin{aligned}\frac{V}{I} &= R + \frac{20R}{R+20} \\ \frac{27}{3}(R+20) &= R(R+20) + 20R \\ 9R + 180 &= R^2 + 20R + 20R \\ R^2 + 40R - 9R - 180 &= 0 \\ R^2 + 31R - 180 &= 0 \\ (R+36)(R-5) &= 0 \\ R &= -36, 5\end{aligned}$$

Ans. $R = 5 \Omega$

(4)



$$\begin{aligned}\frac{V}{I} &= R + \frac{8R}{R+8} \\ \frac{36}{3}(R+8) &= R(R+8) + 8R \\ 12R + 96 &= R^2 + 8R + 8R \\ R^2 + 16R - 12R - 96 &= 0 \\ R^2 + 4R - 96 &= 0 \\ (R+12)(R-8) &= 0 \\ R &= -12, 8\end{aligned}$$

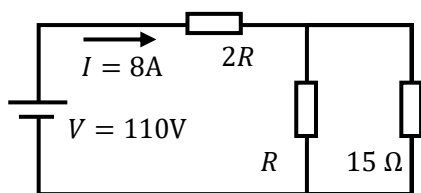
Ans. $R = 8 \Omega$

二次方程式（6）

各問に答えなさい。

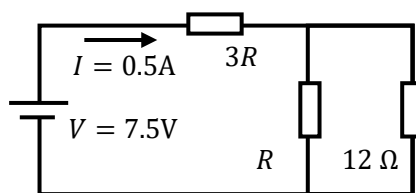


(1)



$$\frac{V}{I} = 2R + \frac{15R}{R + 15}$$

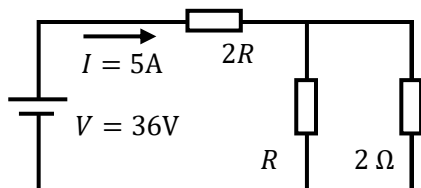
(3)



$$\frac{V}{I} = 3R + \frac{12R}{R + 12}$$

Ans. $R =$ _____

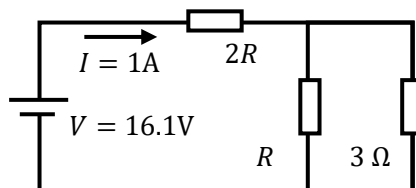
(2)



$$\frac{V}{I} = 2R + \frac{2R}{R + 2}$$

Ans. $R =$ _____

(4)



$$\frac{V}{I} = 2R + \frac{3R}{R + 3}$$

Ans. $R =$ _____

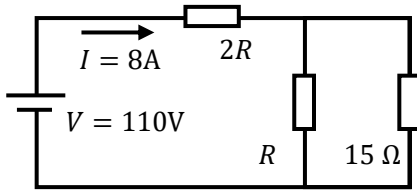
Ans. $R =$ _____

二次方程式 (6)



各問に答えなさい。

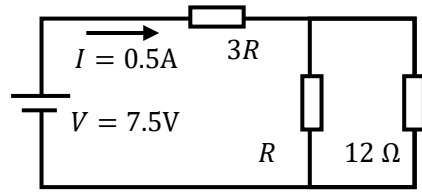
(1)



$$\begin{aligned} \frac{V}{I} &= 2R + \frac{15R}{R+15} \\ \frac{110}{8} (R+15) &= 2R(R+15) + 15R \\ \frac{55}{4} (R+15) &= 2R^2 + 30R + 15R \\ 55(R+15) &= 4(2R^2 + 45R) \\ 55R + 55 \cdot 15 &= 8R^2 + 180R \\ 8R^2 + 180R - 55R - 55 \cdot 15 &= 0 \\ 8R^2 + 125R - 55 \cdot 15 &= 0 \\ (8R + 165)(R - 5) &= 0 \\ R &= -\frac{165}{8}, 5 \end{aligned}$$

Ans. $R = 5 \Omega$

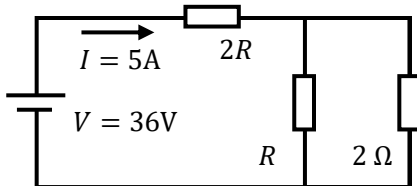
(3)



$$\begin{aligned} \frac{V}{I} &= 3R + \frac{12R}{R+12} \\ \frac{7.5}{0.5} (R+12) &= 3R(R+12) + 12R \\ 15(R+12) &= 3R^2 + 36R + 12R \\ 15R + 180 &= 3R^2 + 48R \\ 3R^2 + 48R - 15R + 180 &= 0 \\ 3R^2 + 33R - 180 &= 0 \\ R^2 + 11R - 60 &= 0 \\ (R+15)(R-4) &= 0 \\ R &= -15, 4 \end{aligned}$$

Ans. $R = 4 \Omega$

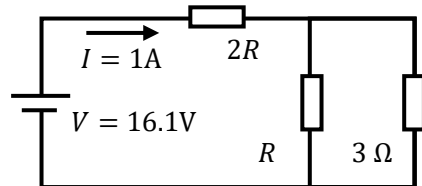
(2)



$$\begin{aligned} \frac{V}{I} &= 2R + \frac{2R}{R+2} \\ \frac{36}{5} (R+2) &= 2R(R+2) + 2R \\ \frac{36}{5} (R+2) &= 2R^2 + 4R + 2R \\ 36(R+2) &= 5(2R^2 + 6R) \\ 36R + 72 &= 10R^2 + 30R \\ 10R^2 + 30R - 36R - 72 &= 0 \\ 10R^2 - 6R - 72 &= 0 \\ (10R + 24)(R - 3) &= 0 \\ R &= -\frac{12}{5}, 3 \end{aligned}$$

Ans. $R = 3 \Omega$

(4)



$$\begin{aligned} \frac{V}{I} &= 2R + \frac{3R}{R+3} \\ 16.1(R+3) &= 2R(R+3) + 3R \\ 16.1(R+3) &= 2R^2 + 6R + 3R \\ 16.1(R+3) &= 2R^2 + 9R \\ 161(R+3) &= 20R^2 + 90R \\ 161R + 161 \cdot 3 &= 20R^2 + 90R \\ 20R^2 + 90R - 161R - 161 \cdot 3 &= 0 \\ 20R^2 - 71R - 7 \cdot 23 \cdot 3 &= 0 \\ (20R + 69)(R - 7) &= 0 \\ R &= -\frac{69}{20}, 7 \end{aligned}$$

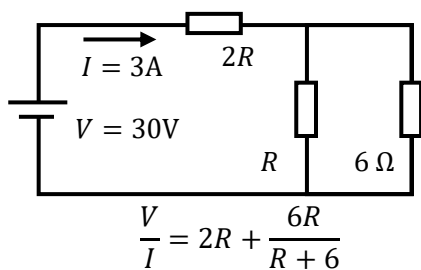
Ans. $R = 7 \Omega$

二次方程式（7）

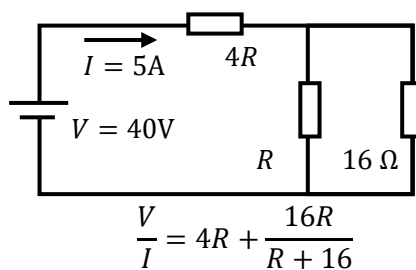
各問に答えなさい。



(1)

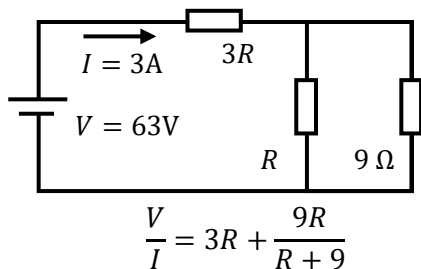


(3)



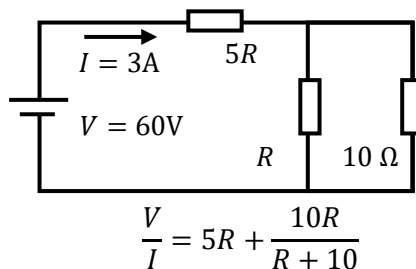
Ans. $R =$ _____

(2)



Ans. $R =$ _____

(4)



Ans. $R =$ _____

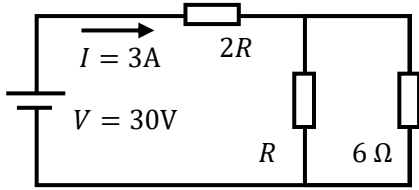
Ans. $R =$ _____

二次方程式 (7)



各問に答えなさい。

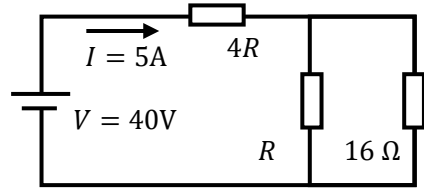
(1)



$$\begin{aligned}\frac{V}{I} &= 2R + \frac{6R}{R+6} \\ \frac{30}{3}(R+6) &= 2R(R+6) + 6R \\ 10(R+6) &= 2R^2 + 12R + 6R \\ 10R + 60 &= 2R^2 + 18R \\ 2R^2 + 18R - 10R - 60 &= 0 \\ 2R^2 + 8R - 60 &= 0 \\ R^2 + 4R - 30 &= 0 \\ R &= \frac{-4 \pm \sqrt{16 + 120}}{2} \\ R &= \frac{-4 \pm 2\sqrt{34}}{2} \\ R &= -2 - \sqrt{34}, -2 + \sqrt{34}\end{aligned}$$

Ans. $R = -2 + \sqrt{34} \Omega$

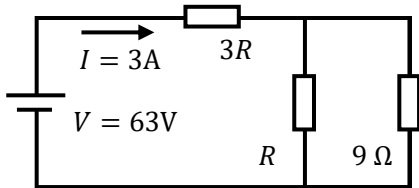
(3)



$$\begin{aligned}\frac{V}{I} &= 4R + \frac{16R}{R+16} \\ \frac{40}{5}(R+16) &= 4R(R+16) + 16R \\ 8(R+16) &= 4R^2 + 64R + 16R \\ 8R + 128 &= 4R^2 + 80R \\ 4R^2 + 80R - 8R - 128 &= 0 \\ 4R^2 + 72R - 128 &= 0 \\ R^2 + 18R - 32 &= 0 \\ R &= \frac{-18 \pm \sqrt{18 \cdot 18 + 4 \cdot 32}}{2} \\ R &= \frac{-18 \pm 2\sqrt{81 + 32}}{2} \\ R &= -9 - \sqrt{113}, -9 + \sqrt{113}\end{aligned}$$

Ans. $R = -9 + \sqrt{113} \Omega$

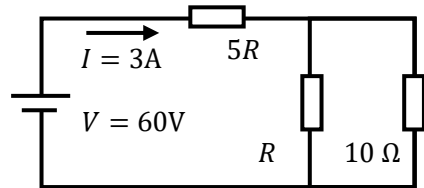
(2)



$$\begin{aligned}\frac{V}{I} &= 3R + \frac{9R}{R+9} \\ \frac{63}{3}(R+9) &= 3R(R+9) + 9R \\ 21(R+9) &= 3R^2 + 27R + 9R \\ 21R + 189 &= 3R^2 + 36R \\ 3R^2 + 36R - 21R - 189 &= 0 \\ 3R^2 + 15R - 189 &= 0 \\ R^2 + 5R - 63 &= 0 \\ R &= \frac{-5 \pm \sqrt{25 + 252}}{2} \\ R &= \frac{-5 \pm \sqrt{277}}{2}\end{aligned}$$

Ans. $R = \frac{-5 + \sqrt{277}}{2} \Omega$

(4)



$$\begin{aligned}\frac{V}{I} &= 5R + \frac{10R}{R+10} \\ \frac{60}{3}(R+10) &= 5R(R+10) + 10R \\ 20(R+10) &= 5R^2 + 50R + 10R \\ 20R + 200 &= 5R^2 + 60R \\ 5R^2 + 60R - 20R - 200 &= 0 \\ 5R^2 + 40R - 200 &= 0 \\ R^2 + 8R - 40 &= 0 \\ R &= \frac{-8 \pm \sqrt{64 + 160}}{2} \\ R &= \frac{-8 \pm 4\sqrt{14}}{2} \\ R &= -4 - 2\sqrt{14}, -4 + 2\sqrt{14}\end{aligned}$$

Ans. $R = -4 + 2\sqrt{14} \Omega$

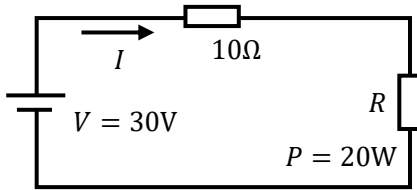
二次方程式（８）



各問に答えなさい。

ただし、抵抗 R の消費電力を P とする。

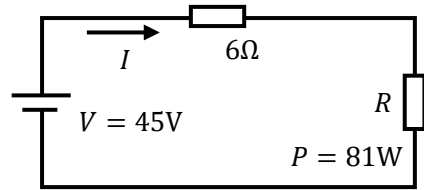
(1)



$$P = RI^2$$

$$20 = R \left(\frac{30}{10 + R} \right)^2$$

(3)

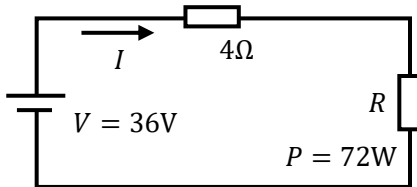


$$P = RI^2$$

$$81 = R \left(\frac{45}{6 + R} \right)^2$$

Ans. $R =$ _____

(2)

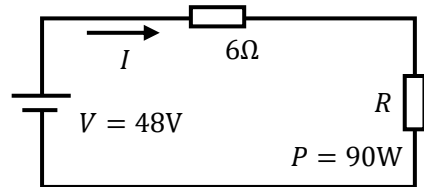


$$P = RI^2$$

$$72 = R \left(\frac{36}{4 + R} \right)^2$$

Ans. $R =$ _____

(4)



$$P = RI^2$$

$$90 = R \left(\frac{48}{6 + R} \right)^2$$

Ans. $R =$ _____

Ans. $R =$ _____

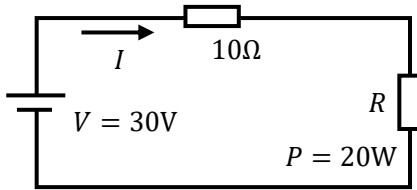
二次方程式 (8)



各問に答えなさい。

ただし、抵抗 R の消費電力を P とする。

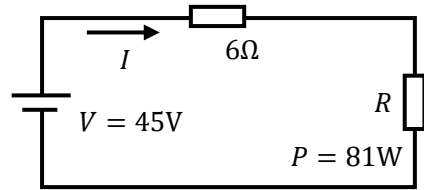
(1)



$$\begin{aligned}
 P &= RI^2 \\
 20 &= R \left(\frac{30}{10 + R} \right)^2 = \frac{900R}{(10 + R)^2} \\
 20(10 + R)^2 &= 900R \\
 R^2 + 20R + 100 &= 45R \\
 R^2 + 20R - 45R + 100 &= 0 \\
 R^2 - 25R + 100 &= 0 \\
 (R - 5)(R - 20) &= 0 \\
 R &= 5, 20
 \end{aligned}$$

Ans. $R = 5, 20 \Omega$

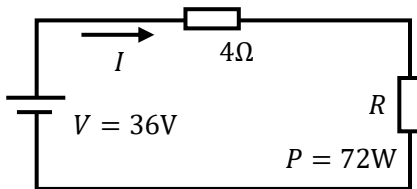
(3)



$$\begin{aligned}
 P &= RI^2 \\
 81 &= R \left(\frac{45}{6 + R} \right)^2 = \frac{45 \cdot 45R}{(6 + R)^2} \\
 81(6 + R)^2 &= 45 \cdot 45R \\
 R^2 + 12R + 36 &= 25R \\
 R^2 + 12R - 25R + 36 &= 0 \\
 R^2 - 13R + 36 &= 0 \\
 (R - 4)(R - 9) &= 0 \\
 R &= 4, 9
 \end{aligned}$$

Ans. $R = 4, 9 \Omega$

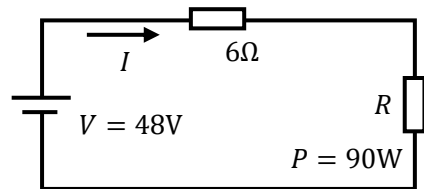
(2)



$$\begin{aligned}
 P &= RI^2 \\
 72 &= R \left(\frac{36}{4 + R} \right)^2 = \frac{36 \cdot 36R}{(4 + R)^2} \\
 72(4 + R)^2 &= 36 \cdot 36R \\
 R^2 + 8R + 16 &= 18R \\
 R^2 + 8R - 18R + 16 &= 0 \\
 R^2 - 10R + 16 &= 0 \\
 (R - 2)(R - 8) &= 0 \\
 R &= 2, 8
 \end{aligned}$$

Ans. $R = 2, 8 \Omega$

(4)



$$\begin{aligned}
 P &= RI^2 \\
 90 &= R \left(\frac{48}{6 + R} \right)^2 = \frac{48 \cdot 48R}{(6 + R)^2} \\
 90(R^2 + 12R + 36) &= 48 \cdot 48R \\
 5(R^2 + 12R + 36) &= 8 \cdot 16R \\
 5R^2 + 60R - 128R + 180 &= 0 \\
 5R^2 - 68R + 180 &= 0 \\
 (5R - 18)(R - 10) &= 0 \\
 R &= \frac{18}{5}, 10
 \end{aligned}$$

Ans. $R = \frac{18}{5}, 10 \Omega$

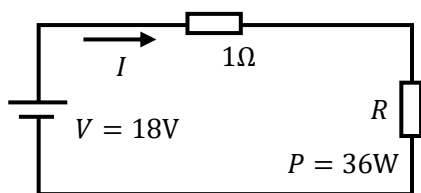
二次方程式（9）



各問に答えなさい。

ただし、抵抗 R の消費電力を P とする。

(1)

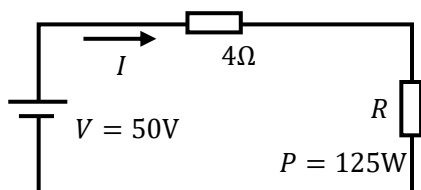


$$P = RI^2$$

$$36 = R \left(\frac{18}{1 + R} \right)^2$$

Ans. $R =$ _____

(2)

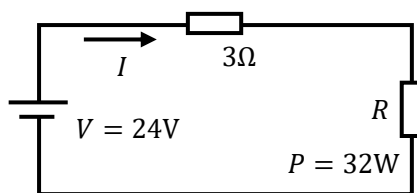


$$P = RI^2$$

$$125 = R \left(\frac{50}{4 + R} \right)^2$$

Ans. $R =$ _____

(3)

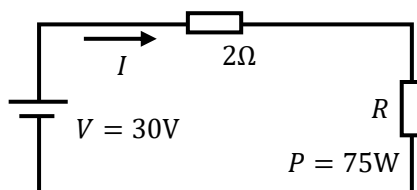


$$P = RI^2$$

$$32 = R \left(\frac{24}{3 + R} \right)^2$$

Ans. $R =$ _____

(4)



$$P = RI^2$$

$$75 = R \left(\frac{30}{2 + R} \right)^2$$

Ans. $R =$ _____

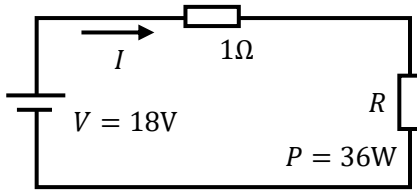
二次方程式 (9)



各問に答えなさい。

ただし、抵抗 R の消費電力を P とする。

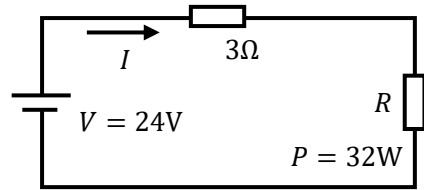
(1)



$$\begin{aligned}
 P &= RI^2 \\
 36 &= R \left(\frac{18}{1+R} \right)^2 = \frac{18 \cdot 18R}{(1+R)^2} \\
 36(1+R)^2 &= 18 \cdot 18R \\
 R^2 + 2R + 1 &= 9R \\
 R^2 + 2R - 9R + 1 &= 0 \\
 R^2 - 7R + 1 &= 0 \\
 R &= \frac{7 \pm \sqrt{49 - 4}}{2} \\
 R &= \frac{7 \pm 3\sqrt{5}}{2}
 \end{aligned}$$

Ans. $R = \frac{7 \pm 3\sqrt{5}}{2} \Omega$

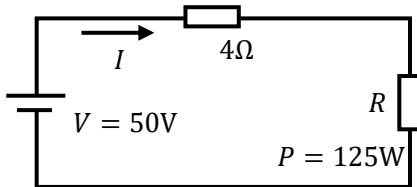
(3)



$$\begin{aligned}
 P &= RI^2 \\
 32 &= R \left(\frac{24}{3+R} \right)^2 = \frac{24 \cdot 24R}{(3+R)^2} \\
 32(3+R)^2 &= 24 \cdot 24R \\
 R^2 + 6R + 9 &= 18R \\
 R^2 + 6R - 18R + 9 &= 0 \\
 R^2 - 12R + 9 &= 0 \\
 R &= \frac{12 \pm \sqrt{144 - 36}}{2} \\
 R &= \frac{12 \pm \sqrt{108}}{2} = \frac{12 \pm 6\sqrt{3}}{2} \\
 R &= 6 \pm 3\sqrt{3}
 \end{aligned}$$

Ans. $R = 6 \pm 3\sqrt{3} \Omega$

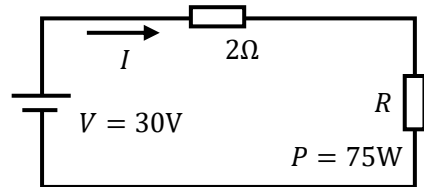
(2)



$$\begin{aligned}
 P &= RI^2 \\
 125 &= R \left(\frac{50}{4+R} \right)^2 = \frac{50 \cdot 50R}{(4+R)^2} \\
 125(4+R)^2 &= 50 \cdot 50R \\
 R^2 + 8R + 16 &= 20R \\
 R^2 + 8R - 20R + 16 &= 0 \\
 R^2 - 12R + 16 &= 0 \\
 R &= \frac{12 \pm \sqrt{144 - 64}}{2} \\
 R &= \frac{12 \pm \sqrt{80}}{2} = \frac{12 \pm 4\sqrt{5}}{2} \\
 R &= 6 \pm 2\sqrt{5}
 \end{aligned}$$

Ans. $R = 6 \pm 2\sqrt{5} \Omega$

(4)



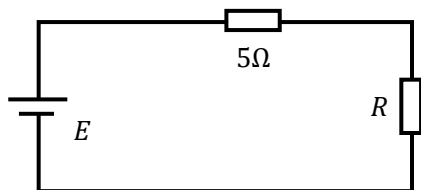
$$\begin{aligned}
 P &= RI^2 \\
 75 &= R \left(\frac{30}{2+R} \right)^2 = \frac{30 \cdot 30R}{(2+R)^2} \\
 75(R^2 + 4R + 4) &= 30 \cdot 30R \\
 R^2 + 4R + 4 &= 12R \\
 R^2 + 4R - 12R + 4 &= 0 \\
 R^2 - 8R + 4 &= 0 \\
 R &= \frac{8 \pm \sqrt{64 - 16}}{2} \\
 R &= \frac{8 \pm \sqrt{48}}{2} = \frac{8 \pm 4\sqrt{3}}{2} \\
 R &= 4 \pm 2\sqrt{3}
 \end{aligned}$$

Ans. $R = 4 \pm 2\sqrt{3} \Omega$

二次方程式（10）

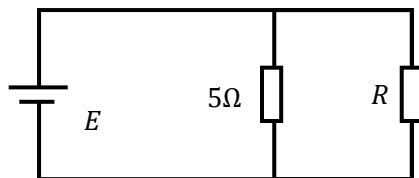


各問に答えなさい。



- (1) 直列回路の消費電力 P_1 を文字式で表せ

$$P_1 = \frac{E^2}{5 + R}$$



- (2) 並列回路の消費電力 P_2 を文字式で表せ

$$P_2 =$$

Ans. $P_1 = \frac{E^2}{5 + R}$

Ans. $P_2 =$

- (3) 並列回路の消費電力 P_2 が直列回路の消費電力 P_1 の6倍であった。このときの抵抗 R を求めよ。

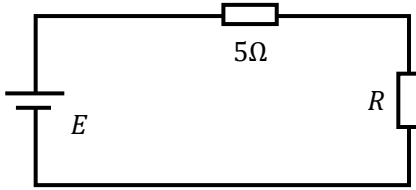
$$P_2 = 6P_1$$

Ans. $R =$

二次方程式 (10)



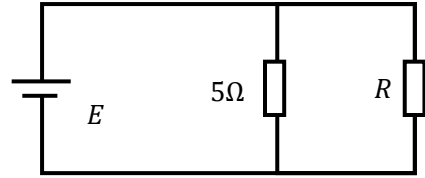
各問に答えなさい。



- (1) 直列回路の消費電力 P_1 を文字式で表せ

$$P_1 = \frac{E^2}{5 + R}$$

Ans. $P_1 = \frac{E^2}{5 + R}$



- (2) 並列回路の消費電力 P_2 を文字式で表せ

$$P_2 = \frac{E^2}{\frac{5R}{5 + R}} = \frac{E^2(5 + R)}{5R}$$

Ans. $P_2 = \frac{E^2(5 + R)}{5R}$

- (3) 並列回路の消費電力 P_2 が直列回路の消費電力 P_1 の6倍であった。このときの抵抗 R を求めよ。

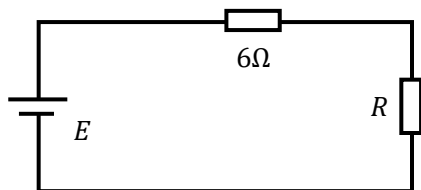
$$\begin{aligned} P_2 &= 6P_1 \\ \frac{E^2(5 + R)}{5R} &= \frac{6E^2}{5 + R} \\ (5 + R)^2 &= 6 \cdot 5R \\ R^2 + 10R + 25 &= 30R \\ R^2 + 10R - 30R + 25 &= 0 \\ R^2 - 20R + 25 &= 0 \\ R &= \frac{20 \pm \sqrt{400 - 100}}{2} \\ R &= \frac{20 \pm 10\sqrt{3}}{2} \\ R &= 10 \pm 5\sqrt{3} \end{aligned}$$

Ans. $R = 10 \pm 5\sqrt{3} \Omega$

二次方程式（１１）

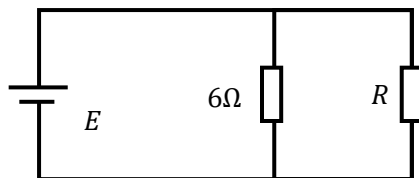


各問に答えなさい。



- (1) 直列回路の消費電力 P_1 を文字式で表せ

$$P_1 = \frac{E^2}{6 + R}$$



- (2) 並列回路の消費電力 P_2 を文字式で表せ

$$P_2 =$$

Ans. $P_1 = \frac{E^2}{6 + R}$

Ans. $P_2 =$

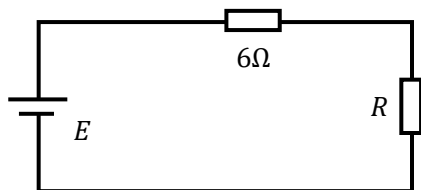
- (3) 並列回路の消費電力 P_2 が直列回路の消費電力 P_1 の4.5倍であった。このときの抵抗 R を求めよ。

$$P_2 = 4.5P_1$$

Ans. $R =$

二次方程式 (1 1)

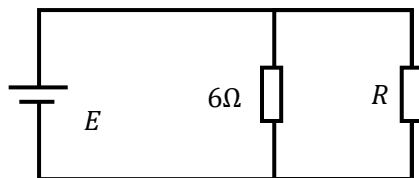
各問に答えなさい。



- (1) 直列回路の消費電力 P_1 を文字式で表せ

$$P_1 = \frac{E^2}{6 + R}$$

Ans. $P_1 = \frac{E^2}{6 + R}$



- (2) 並列回路の消費電力 P_2 を文字式で表せ

$$P_2 = \frac{E^2}{\frac{6R}{6 + R}} = \frac{E^2(6 + R)}{6R}$$

Ans. $P_2 = \frac{E^2(6 + R)}{6R}$

- (3) 並列回路の消費電力 P_2 が直列回路の消費電力 P_1 の4.5倍であった。このときの抵抗 R を求めよ。

$$\begin{aligned} P_2 &= 4.5P_1 \\ \frac{E^2(6 + R)}{6R} &= \frac{4.5E^2}{6 + R} \\ (6 + R)^2 &= 4.5 \cdot 6R \\ R^2 + 12R + 36 &= 27R \\ R^2 + 12R - 27R + 36 &= 0 \\ R^2 - 15R + 36 &= 0 \\ (R - 3)(R - 12) &= 0 \\ R &= 3, 12 \end{aligned}$$

Ans. $R = 3, 12 \Omega$