Formative Solutions

① $P = RI^2$

$P = 400I^2$

$P = ?$ watts $\quad \frac{dP}{dt} = 8$ watt/sec

$R = 400$ ohm $\quad \frac{dR}{dt} = 0$

$I = ?$ amps $\quad \frac{dI}{dt}$ ← look for this

$$\frac{dP}{dt} = 2(400I)\frac{dI}{dt}$$

$$8 = 800I\frac{dI}{dt}$$

$$\boxed{\frac{dI}{dt} = \frac{8}{800I} = \frac{1}{100I}}$$

(2) $P = RI^2$

$P = 275I^2$

$P = ?$ $\quad \frac{dP}{dt}$ ← looking for this

$I = ?$ $\quad \frac{dI}{dt} = 50$ amp/sec

$R = 275$ ohms (constant)

$$\frac{dP}{dt} = 2(275I)\frac{dI}{dt}$$

$$\frac{dP}{dt} = 550I(50)$$

$$\boxed{\frac{dP}{dt} = 27500I}$$

(3) $\frac{dV}{dt} = 3 \text{ V/sec}$

(4) $\frac{dI}{dt} = -\frac{1}{5} \text{ amp/sec}$

$V = IR$

$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$

$3 = -\frac{1}{5}R + \frac{dR}{dt}I$

$3 + \frac{1}{5}R = \frac{dR}{dt}I$

$\frac{3 + \frac{1}{5}R}{I} = \frac{dR}{dt}$

$\frac{15 + 3R}{5I} = \frac{dR}{dt}$

Formative Assessment solutions 2/21/19

① $P = RI^2$

$P = ?$ $\frac{dP}{dt} = 5 \text{ watts/sec}$

$I = ?$ $\frac{dI}{dt}$ ← looking for

$R =$ 240 ohms (constant)

↓

$P = 240 I^2$

$\frac{dP}{dt} = 240(2I)\frac{dI}{dt}$

$5 = 480I \frac{dI}{dt}$

$\frac{5}{480I} = \frac{dI}{dt}$

$\boxed{\frac{1}{96I} = \frac{dI}{dt}}$

② $P = RI^2$ $P = ?$ $\frac{dP}{dt} = ?$ (asking for this)

$R = 135$ ohms ← constant

$I = ?$ $\frac{dI}{dt} = 20$

$P = 135I^2$

$\frac{dP}{dt} = 2(135I)\frac{dI}{dt}$

$\frac{dP}{dt} = 270I(20)$

$\boxed{\frac{dP}{dt} = 5400I}$

③ $V = IR$

$V = ?$ $\quad \frac{dV}{dt} = 1 \text{ V/sec}$ ②

$I = ?$ $\quad \frac{dI}{dt} = -\frac{1}{3} \text{ amp/sec}$ ①

$R = ?$

$$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$$

$$1 = -\frac{1}{3}R + \frac{dR}{dt}I$$

$$1 + \frac{1}{3}R = \frac{dR}{dt}I$$

$$\boxed{\frac{1 + \frac{1}{3}R}{I} = \frac{dR}{dt}}$$

$$\boxed{\frac{3 + 1R}{3I} = \frac{dR}{dt}}$$

also ✓

Formative Assessment Solutions 2/21/19

① $P = RI^2$ $\quad P = ?$ $\quad \frac{dP}{dt} = 6$ watt/sec

$R = 300$ ohms (constant)

$I =$ amps $\quad \frac{dI}{dt}$ ← looking for this

$P = 300I^2$

$$\frac{dP}{dt} = 2(300I)\frac{dI}{dt}$$

$$6 = 600I\frac{dI}{dt}$$

$$\frac{6}{600I} = \boxed{\frac{dI}{dt} = \frac{1}{100I}}$$

Formative Assessment Solution

(2) $P = RI^2$

$P = 255 I^2$

$\frac{dP}{dt} = 2(255I)\frac{dI}{dt}$

$\frac{dP}{dt} = 510I\frac{dI}{dt}$

$\frac{dP}{dt} = 510I(40)$

$\boxed{\frac{dP}{dt} = 20400I}$

$P = ?$ $\frac{dP}{dt}$ ← looking for

$I = ?$ $\frac{dI}{dt} = 40$ amp/sec

$R = 255$ ohms (constant)

(3) $V = IR$

$$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$$

$\frac{dV}{dt} = 2$ V/sec $\quad \frac{dI}{dt} = -\frac{1}{4}$ amp/sec

$$2 = -\frac{1}{4}R + \frac{dR}{dt}I$$

$$2 + \frac{1}{4}R = \frac{dR}{dt}I$$

$$\boxed{\frac{2 + \frac{1}{4}R}{I} = \frac{dR}{dt}}$$

$$\boxed{\frac{8 + 1R}{4I} = \frac{dR}{dt}}$$

Formative Solutions

① $P = RI^2$

$P = 400I^2$

$P = ?$ watts $\quad \frac{dP}{dt} = 8$ watt/sec

$R = 400$ ohm $\quad \frac{dR}{dt} = 0$

$I = ?$ amps $\quad \frac{dI}{dt}$ ← look for this

$$\frac{dP}{dt} = 2(400I)\frac{dI}{dt}$$

$$8 = 800I\frac{dI}{dt}$$

$$\boxed{\frac{dI}{dt} = \frac{8}{800I} = \frac{1}{100I}}$$

(2) $P = RI^2$

$P = 275I^2$

$P = ?$ $\quad \frac{dP}{dt}$ ← looking for this

$I = ?$ $\quad \frac{dI}{dt} = 50$ amp/sec

$R = 275$ ohms (constant)

$$\frac{dP}{dt} = 2(275I)\frac{dI}{dt}$$

$$\frac{dP}{dt} = 550I(50)$$

$$\boxed{\frac{dP}{dt} = 27500I}$$

(3) $\frac{dV}{dt} = 3 \text{ V/sec}$

(4) $\frac{dI}{dt} = -\frac{1}{5} \text{ amp/sec}$

$V = IR$

$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$

$3 = -\frac{1}{5}R + \frac{dR}{dt}I$

$3 + \frac{1}{5}R = \frac{dR}{dt}I$

$\frac{3 + \frac{1}{5}R}{I} = \frac{dR}{dt}$

$\frac{15 + 3R}{5I} = \frac{dR}{dt}$

Formative Assessment solutions 2/21/19

① $P = RI^2$

$P = ?$ $\frac{dP}{dt} = 5 \text{ watts/sec}$

$I = ?$ $\frac{dI}{dt}$ ← looking for

$R =$ 240 ohms (constant)

↓

$P = 240 I^2$

$\frac{dP}{dt} = 240(2I)\frac{dI}{dt}$

$5 = 480I \frac{dI}{dt}$

$\frac{5}{480I} = \frac{dI}{dt}$

$\boxed{\frac{1}{96I} = \frac{dI}{dt}}$

② $P = RI^2$ $P = ?$ $\frac{dP}{dt} = ?$ (asking for this)

$R = 135$ ohms ← constant

$I = ?$ $\frac{dI}{dt} = 20$

$P = 135I^2$

$\frac{dP}{dt} = 2(135I)\frac{dI}{dt}$

$\frac{dP}{dt} = 270I(20)$

$\boxed{\frac{dP}{dt} = 5400I}$

③ $V = IR$

$V = ?$ $\quad \frac{dV}{dt} = 1 \text{ V/sec}$ ②

$I = ?$ $\quad \frac{dI}{dt} = -\frac{1}{3} \text{ amp/sec}$ ①

$R = ?$

$$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$$

$$1 = -\frac{1}{3}R + \frac{dR}{dt}I$$

$$1 + \frac{1}{3}R = \frac{dR}{dt}I$$

$$\boxed{\frac{1 + \frac{1}{3}R}{I} = \frac{dR}{dt}}$$

$$\boxed{\frac{3 + 1R}{3I} = \frac{dR}{dt}}$$

also ✓

Formative Assessment Solutions 2/21/19

① $P = RI^2$ $\quad P = ?$ $\quad \frac{dP}{dt} = 6$ watt/sec

$R = 300$ ohms (constant)

$I =$ amps $\quad \frac{dI}{dt}$ ← looking for this

$P = 300I^2$

$$\frac{dP}{dt} = 2(300I)\frac{dI}{dt}$$

$$6 = 600I\frac{dI}{dt}$$

$$\frac{6}{600I} = \boxed{\frac{dI}{dt} = \frac{1}{100I}}$$

Formative Assessment Solution

(2) $P = RI^2$

$P = 255 I^2$

$\frac{dP}{dt} = 2(255I)\frac{dI}{dt}$

$\frac{dP}{dt} = 510I\frac{dI}{dt}$

$\frac{dP}{dt} = 510I(40)$

$\boxed{\frac{dP}{dt} = 20400I}$

$P = ?$ $\frac{dP}{dt}$ ← looking for

$I = ?$ $\frac{dI}{dt} = 40$ amp/sec

$R = 255$ ohms (constant)

(3) $V = IR$

$$\frac{dV}{dt} = \frac{dI}{dt}R + \frac{dR}{dt}I$$

$\frac{dV}{dt} = 2$ V/sec $\quad \frac{dI}{dt} = -\frac{1}{4}$ amp/sec

$$2 = -\frac{1}{4}R + \frac{dR}{dt}I$$

$$2 + \frac{1}{4}R = \frac{dR}{dt}I$$

$$\boxed{\frac{2 + \frac{1}{4}R}{I} = \frac{dR}{dt}}$$

$$\boxed{\frac{8 + 1R}{4I} = \frac{dR}{dt}}$$