Started on	Tuesday, 6 September 2016, 2:06 PM
State	Finished
Completed on	Tuesday, 6 September 2016, 3:29 PM
Time taken	1 hour 23 mins
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00

SI-05

In a science fiction show, an hour is 1/10 of a day and a minute is 1/100 of an hour (Centons). How many Centons are in two days of this science fiction show?

2000 ✓ Centons

Question 2

Correct

Mark 10.00 out of 10.00

SI-04

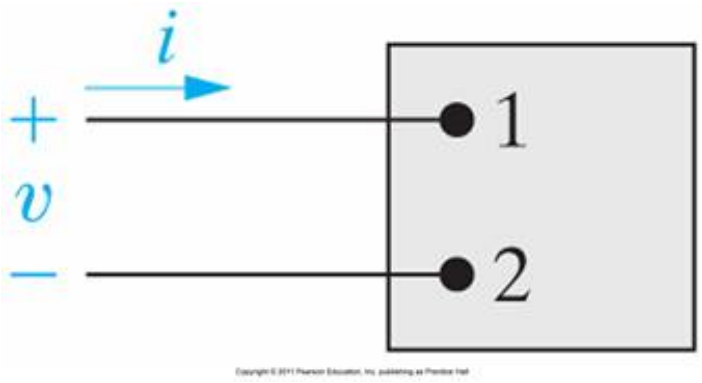
A political rally in 1995 known as the "Million Man March" occurred on the National Mall. Assume the Washington DC subway was the sole means of transport. A subway train arrives every 1 minute (not really - just for this problem) and delivered 1,000 men each time. How long in minutes did it take for all the million men to arrive?

Arrival time period: 1000 ✓ minutes.

Question 3

Correct

Mark 10.00 out of 10.00



P1.07_10ed

There is no charge at the upper terminal of the ideal element in the above figure for $t < 0$.

At $t = 0$ a current of $125\ e^{-2{,}500t}$ mA enters the upper terminal and will accumulate at the upper terminal.

a) Be able to derive the expression for the charge that accumulates at the upper terminal for $t \geq 0$.

$q(t) = 50\ (1\text{-}e^{-2{,}500t})$ μC (micro Coulomb)

b) Find the total charge that accumulates at the upper terminal, i.e. let $t \rightarrow \infty$.

$q(t \rightarrow \infty) =$ 50(1-e^(-2500t)) ✓ μC (micro Coulomb)

c) If the current is abruptly stopped at $t = 0.5$ ms, how much charge has accumulated at the upper terminal?

$q(t \rightarrow 0.5\text{ms}) =$ 35(1-e^-2500t) ✓ μC (micro Coulomb)

Coulomb)

Numeric Answer

a) $q(t) = 50\ (1\text{-}e^{-2{,}500t})$ μC (micro Coulomb)

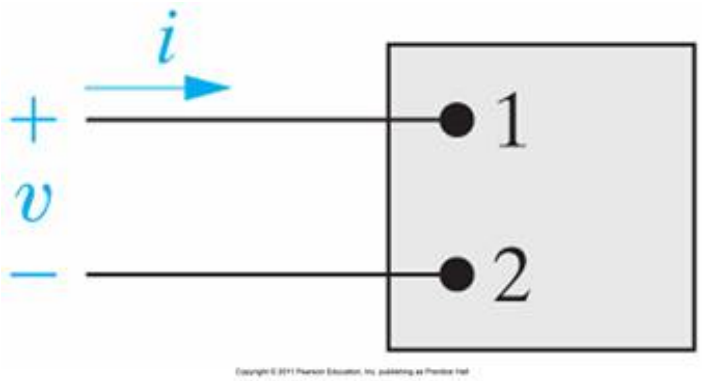
b) $q(t \rightarrow \infty) = 50$ μC (micro Coulomb)

c) $q(t \rightarrow 0.5\text{ms}) = 35.674$ μC (micro Coulomb)

Question 4

Correct

Mark 10.00 out of 10.00



P1.07_10ed

There is no charge at the upper terminal of the ideal element in the above figure for $t < 0$.

At $t = 0$ a current of $125\ e^{-2{,}500t}$ mA enters the upper terminal and will accumulate at the upper terminal.

a) Be able to derive the expression for the charge that accumulates at the upper terminal for $t \geq 0$.

$q(t) = 50\ (1\text{-}e^{-2{,}500t})$ μC (micro Coulomb)

b) Find the total charge that accumulates at the upper terminal, i.e. let $t \rightarrow \infty$.

$q(t \rightarrow \infty) =$ 50(1-e^(-2500t)) ✓ μC (micro Coulomb)

c) If the current is abruptly stopped at $t = 0.5$ ms, how much charge has accumulated at the upper terminal?

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Coulomb)

Numeric Answer

a) $q(t) = 50\ (1\text{-}e^{-2{,}500t})$ μC (micro Coulomb)

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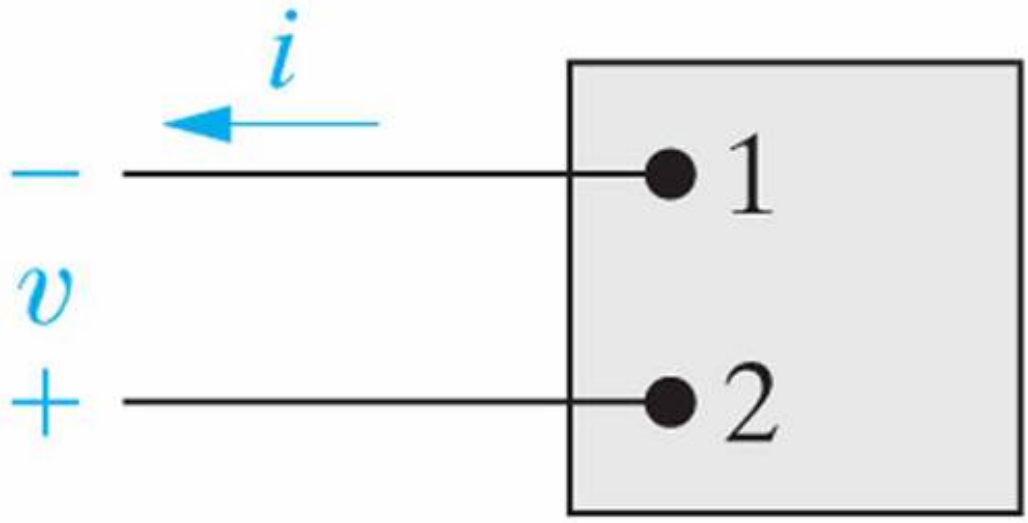
c) $q(t \rightarrow 0.5\text{ms}) = 35.674$ μC (micro Coulomb)

Question 5

Correct

Mark 10.00 out of 10.00



PSS-1

Select the correct expression for power at the terminals 1,2 of the figure.

Select one:

- A. p = (+) vi ✓ Great! Current in the direction of voltage drop.
- B. p = (-) vi

Your answer is correct.

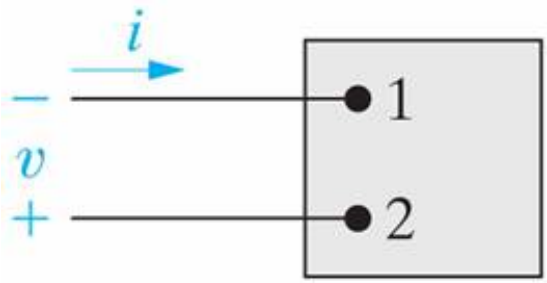
A. p = (+) vi

The correct answer is: p = (+) vi

Question 6

Correct

Mark 10.00 out of 10.00



PSS-1

Select the correct expression for power at the terminals 1,2 of the figure.

Select one:

- A. p = (+) vi
- B. p = (-) vi ✓
  Great! You noticed that current is in the direction of voltage rise.

Your answer is correct.

A. p = (-) vi

The correct answer is: p = (-) vi

Question 7

Correct

Mark 10.00 out of 10.00

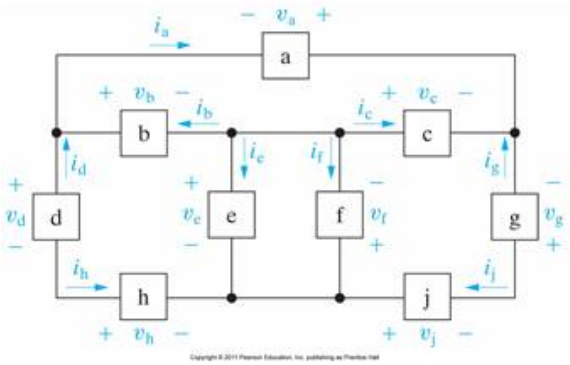


TABLE P1.30

Element	Voltage (V)	Current (mA)
a	1.6	80
b	2.6	60
c	−4.2	−50
d	1.2	20
e	1.8	30
f	−1.8	−40
g	−3.6	−30
h	3.2	−20
j	−2.4	30

P1.30_9ed

To be valid, the total power delivered in a complete circuit MUST equal the power absorbed by the circuit.

Pabs + Pdel = zero In other words, all energy is accounted for.

Use the circuit diagram and table to prove the circuit obeys this conservation-of-energy principle.

p_a = -128 ✓ mW

p_b = -156 ✓ mW

p_c = 210 ✓ mW

p_d = -24 ✓ mW

p_e = 54 ✓ mW

p_f = -72 ✓ mW

p_g = 108 ✓ mW

p_h = -64 ✓ mW

p_j = 72 ✓ mW

Solution

$p_a = -v_a i_a = -(1.6)(0.080) = -128$ mW

$p_b = -v_b i_b = -(2.6)(0.060) = -156$ mW

$p_c = v_c i_c = (-4.2)(-0.050) = 210$ mW

$p_d = -v_d i_d = -(1.2)(0.020) = -24$ mW

$p_e = v_e i_e = (1.8)(0.030) = 54$ mW

$p_f = -v_f i_f = -(-1.8)(-0.040) = -72$ mW

$p_g = v_g i_g = (-3.6)(-0.030) = 108$ mW

$p_h = v_h i_h = (3.2)(-0.020) = -64$ mW

$p_j = -v_j i_j = -(-2.4)(0.030) = 72$ mW

Question 8

Correct

Mark 10.00 out of 10.00

P1.12_9ed

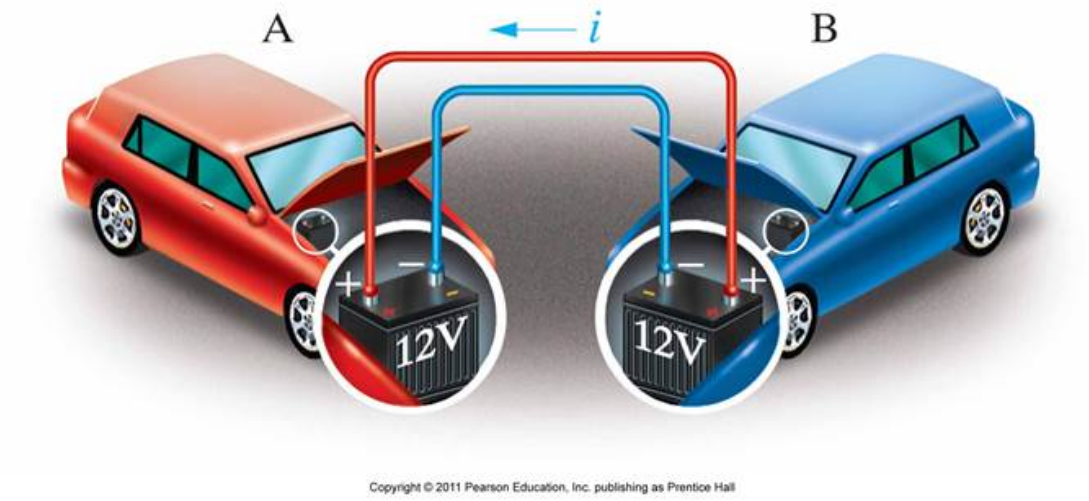
One 12V battery supplies 100 mA to a music player.
How much energy does the battery supply in 4 hours?

W = 17280 ✓ J

Question 9

Correct

Mark 10.00 out of 10.00



P1.11a_9ed

You find out that your car's battery is dead. A friend "jumps" your battery as shown in the figure.

What is the color of your car? {Red} Red or Blue?

Select one:

- A. Red - Car A ✓
  You correctly noted that the current is flowing into battery A and is thus receiving energy (i.e. being charged).
- B. Blue - Car B
- C. Not enough information shown.

Your answer is correct.

Correct answer text

Car A - red.

The correct answer is: Red - Car A

Question 10

Correct

Mark 10.00 out of 10.00

P1.12_9ed

One 12V battery supplies 100 mA to a music player.
How much energy does the battery supply in 4 hours?

W = 17280 ✓ J