M R
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فيزياء	استاتيكا
دوائر كهربية	الكـــترونيات
ميكانيكا الانشائات	هيدروليكا

مدرس خصوصي

اونلاين حضوري

يحصل الطالب علي

- مقاطع فيديوهات لشرح المقرر بشكل وافي
- ملخص للمادة Pdf للمذكرة والمراجعة
- محاضرات مباشرة علي برنامج زووم
- لمناقشة الأجزاء الغير مفهومة
- تواصل مستمر مع معلم المادة

للتواصل

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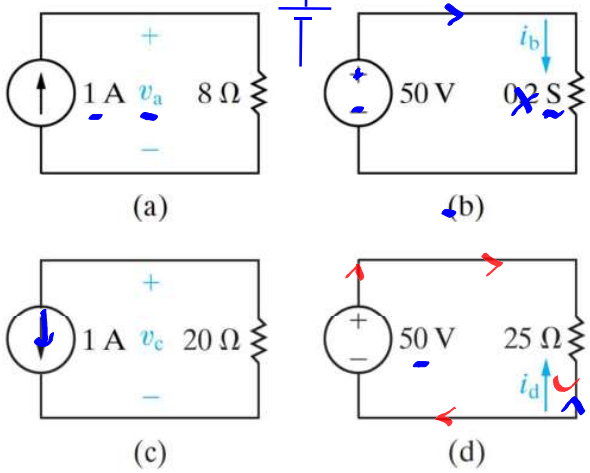
Question 1:
In each circuit, either the value of (v) or (i) is not known.

a) Calculate the values of (v) and (i).

b) Determine the power dissipated in each resistor.



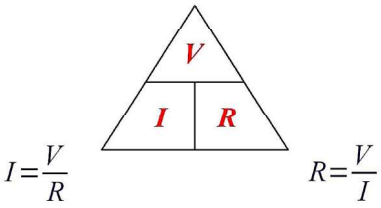
$G = \frac{1}{R} \Rightarrow R = \frac{1}{G} = \frac{1}{0.2} = 5\Omega$

(a) $V = 1 \times 8 = 8V \Rightarrow P = 1 \times 8 = 8W$

(b) $I_b = \frac{V}{R} = \frac{50}{5} = 10A \Rightarrow 10 \times 50 = 500W$

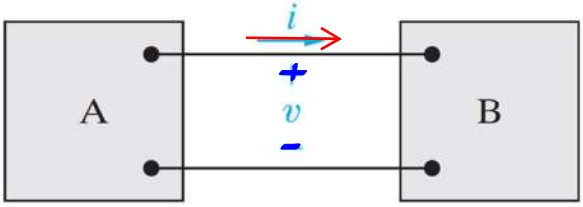
(c) $V = -1 \times 20 = -20V \Rightarrow (-1)(-20) = 20W$

(d) $I = -\frac{50}{25} = -2A \Rightarrow (-2)(50) = 100W$



Question 2:
Two electric circuits, represented by boxes A and B, are connected as shown. The reference direction for the current i in the interconnection and the reference polarity for the voltage v across the interconnection are as shown in the figure. For each of the following sets of numerical values, calculate the power in the interconnection and state whether the power is flowing from A to B or vice versa

a) i = 6 A v = 30 V
b) i = -9 A v = 40 V
c) i = 4 A v = -60 V
d) i = -8 A v = -20 V



$P_a = I \cdot V = 6 \times 30 = 180W$ A → B

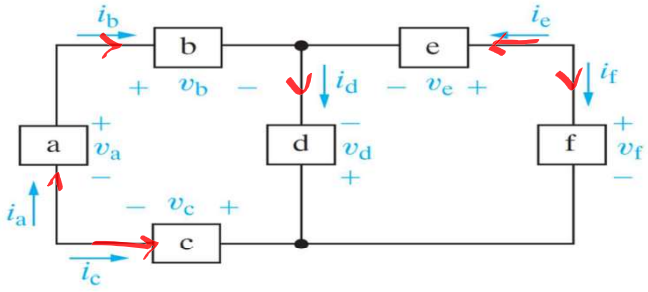
$P_b = (-9)(40) = -360W$ B → A

$P_c = 4(-60) = -240W$ B → A

$P_d = -8(-20) = +160$ A → B

Question 3:
The numerical values for the currents and voltages in the circuit are given in the table. Find the total power developed in the circuit.

Element	Voltage (V)	Current (mA)
a	40	−4
b	−24	−4
c	−16	4
d	−80	−1.5
e	40	2.5
f	120	−2.5



Elements	Calculation	Supply or absorb power
A	$-(-4)(40$	160mW absorb
B	$-4(-24)$	96mW absorb
C	$-4(-16)$	64mW absorb
D	$-(-1.5)(-80)$	−120 supply
E	2.5×40	100mW absorb
F	$1(-2.5)(120)$	−300mW absorb

$= 0$

$\sum P = 0$ $\quad \sum P_{supply} = \sum P_{absorb}$

Question 4:
There are approximately 260 million passenger vehicles registered in the United States. Assume that the battery in the average vehicle stores 540 watthours (Wh) of energy. Estimate (in gigawatt-hours) the total energy stored in U.S. passenger vehicles.

$260 \times 10^6 \times \frac{540\ w.h}{10^9} = 104.4\ Gw.h$

Question 5: w $\quad e = 1.6 \times 10^{-19} C$
How much energy is imparted to an electron as it flows through a 6 V battery from the positive to the negative terminal? Express your answer in attojoules

$V = \frac{w}{q} \Rightarrow w = QV = 1.6 \times 10^{-19} \times 6 = 9.6 \times 10^{-19} J$

Question 6:
A 1.8-kW electric heater takes 15 min to boil a quantity of water. If this is done once a day and power costs 10 cents/kWh, what is the cost of its operation for 30 days?

$P = 1.8\ kW$ $\quad t = 15\ min = \frac{15}{60}\ h * 30 = 7.5\ h$

$E = Pt = (1.8\ kW)(7.5\ h) = 13.5\ kW.h$

$C = 13.5\ C = 1.35\ \$$

Question 7:
A utility company charges 8.2 cents/kWh. If a consumer operates a 60-W light bulb continuously for one day, how much is the consumer charged?

$P = \frac{60}{1000} kW$ $\quad t = 24\ h$

$E = Pt = \frac{60}{1000} * 24 = 1.44\ kW.h$

$C = 1.44 * 8.2 = 11.808\ CENTS$

Question 8:
A 1.5-kW toaster takes roughly 3.5 minutes to heat four slices of bread. Find the cost of operating the toaster once per day for 1 month (30 days). Assume energy costs 8.2 cents/kWh.

$P = 1.5\ kW$ $\quad t = \frac{3.5}{60} * 30$

$C = E \cdot 8.2 = Pt\ (8.2) = 1.5 * (\frac{3.5}{60} * 30)(8.2) = 21.52\ CENTS$

Question 9:

A flashlight battery has a rating of 0.8 ampere-hours (Ah) and a lifetime of 10 hours.

(a) How much current can it deliver?

(b) How much power can it give if its terminal voltage is 6 V?

(c) How much energy is stored in the battery in Wh?

$i = \frac{0.8\ A.h}{10\ h} = 0.08\ A = 80\ mA$

(b) $P = 0.08 \times 6 = 0.48\ W = 48\ mW$

(c) $E = Pt = 0.48 \times 10 = 4.8\ W.h = 0.0048\ kW.h$