HW01 1.(14,26), 2.(7,21) | EENG-281E | 28AUG13 | Wm. BAHN | 1/4

PROB. 1.14

Course & Section

Due Date (any format)

Name

Assignment (first page)

P/N
P: this page number
N: total number of pages

HW ID (on each page)

Problem ID
If continued from a proir page, use

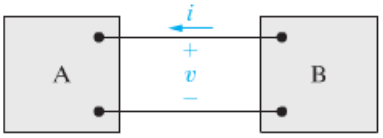
Prob. 1.14 (CONT'D)

PROBLEM
Can copy/tape
scan/print
or handwrite/draw

1.14 Two electric circuits, represented by boxes A and B, [illegible] 14. The reference direction for the current i in the interconnection and the reference polarity for the voltage v across the [illegible]ion are as shown in the figure. For each [illegible] of the following sets of numerical values, calculate [illegible] power in the interconnection and state whether [illegible] power is flowing from A to B or vice versa.

a) $i = 10$ A, $v = 125$ V
b) $i = 5$ A, $v = -240$ V
c) $i = -12$ A, $v = 480$ V
d) $i = -25$ A, $v = -660$ V

Figure P1.14



Text must be neat and readable. Print is prefered, but cursive is acceptable if neat and legible.

FOR THE GIVEN POLARITIES OF v & i, IF $p = v \cdot i > 0$, THEN THE POWER IS FLOWING FROM B TO A

Answer ID

Arrow to answer

	i(A)	v(V)	P	DIRECTION	
a	10	125	1250 W	B→A	(1.14a)
b	5	-240	-1200 W	A→B	(1.14b)
c	-12	480	-5760 W	A→B	(1.14c)
d	-25	-660	14000 W	B→A	(1.14d)

Double underline answer

Table columns or individual entries may contain units (not both)

USE GREEN E-2 PAPER
(Engineering Paper)

Generally start a new problem on a new page. Only put multiple problems on a page if they can be finished on that page.

About 1" margin inside work area beyond which are only Answer IDs.

TOPS 35500

PROB 1.26

1.26 The numerical values for the currents and voltages in the circuit in Fig. P1.26 are given in Table P1.26. Find the total power developed in the circuit.

Figure P1.26

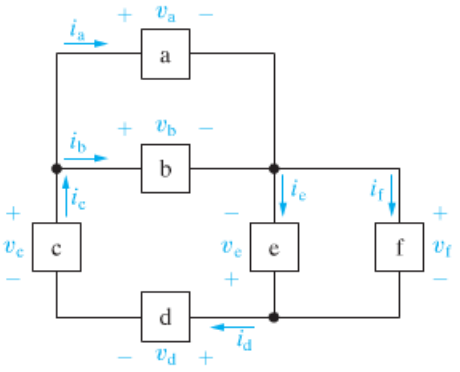


TABLE P1.26

Element	Voltage (kV)	Current (mA)
a	150	0.6
b	150	−1.4
c	100	−0.8
d	250	−0.8
e	300	−2.0
f	−300	1.2

EACH ELEMENT IS DECLARED A "SOURCE" OR "LOAD" ACCORDING TO THE RELATIVE POLARITY OF THE ASSIGNED v & i

THEN, DEPENDING ON THE SIGN OF $p = v \cdot i$, IT IS DETERMINED WHETHER IT IS ACTUALLY DEVELOPING OR ABSORBING POWER

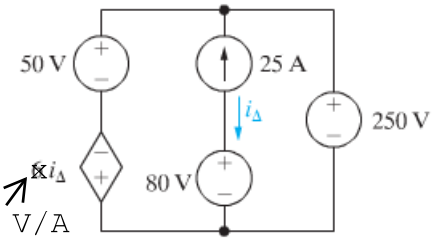
ELEMENT	TYPE	v(kV)	i(mA)	p(W)	DEVELOP(W)	ABSORB(W)
a	LOAD	150	0.6	90		90
b	LOAD	150	−1.4	−210	210	
c	SOURCE	100	−0.8	−80		80
d	LOAD	250	−0.8	−200	200	
e	SOURCE	300	−2.0	−600		600
f	LOAD	−300	1.2	−360	360	
TOTAL					770W	770 W

THE TOTAL POWER DEVELOPED BY THE CIRCUIT IS 770W ←

PROB. 2.7

2.7 If the interconnection in Fig. P2.7 is valid, find the total power developed in the circuit. If the interconnection is not valid, explain why.

Figure P2.7



Correct the author's poor attention to units.

When an answer is "obvious", so indicate.

Keep values intact (negative signs stay with number) until the operation is carried out.

When an answer spans multiple lines (of paper), indicate vertical extents with curly braces.

BY INSPECTION, $\Delta i = -25A$

DEPENDENT SOURCE VOLTAGE IS $(6\frac{V}{A})(-25A) = -150\,V$

THE VOLTAGE OF TOP NODE RELATIVE TO BOTTOM NODE

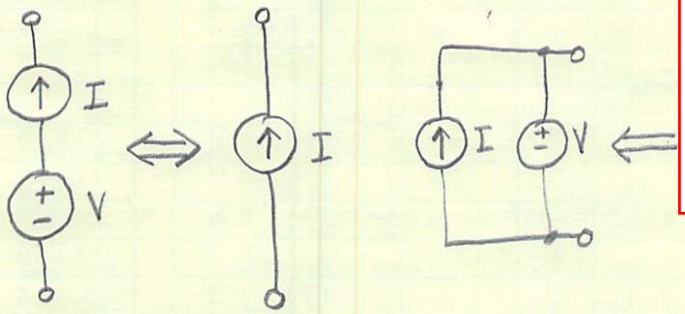
LEFT BRANCH: $50V - -150V = 200V$

MIDDLE BRANCH: COMPLIANT DUE TO CURRENT SOURCE

RIGHT BRANCH: $250V$

CIRCUIT IS NOT VALID BECAUSE THE VOLTAGE FROM THE TOP NODE TO THE BOTTOM NODE IS NOT THE SAME FOR ALL POSSIBLE PATHS, THUS VIOLATING KVL } (2.7)

NOTE A VOLTAGE SOURCE IN SERIES WITH A CURRENT SOURE HAS NO EFFECT WHLE A CURRENT SOURCE IN PARALLEL WITH A VOLTAGE SOURCE HAS NO EFFECT



Give detailed explanations. Remember, your goal is to convince the grader that you KNOW the answer. Don't rely on getting the "benefit of the doubt" if your answer is incomplete or ambiguous.

PROB 2.21

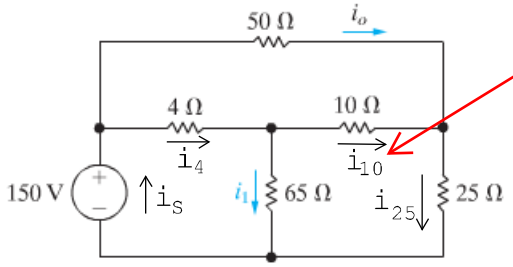
2.21 PSPICE MULTISIM The current i_o in the circuit in Fig. P2.21 is 1 A.

a) Find i_1.

b) Find the power dissipated in each resistor.

c) Verify that the total power dissipated in the circuit equals the power developed by the 150 V source.

Figure P2.21



Add labels and polarities for any quantities you use.

Units to be included and tracked properly throughout the work.

$V_C = 150V - i_o \cdot 50\Omega = 150V - (1A)(50\Omega) = 150V - 50V = 100V$

$i_{25} = \frac{V_C}{25\Omega} = \frac{100V}{25\Omega} = 4A$

$i_{10\Omega} = i_{25} - i_o = 4A - 1A = 3A$

$V_B = V_C + i_{10} \cdot 10\Omega = 100V + 3A \cdot 10\Omega = 100V + 30V = 130V$

$i_1 = \frac{V_B}{65\Omega} = \frac{130V}{65\Omega} = 2A$ ← (2.21a)

$i_4 = i_1 + i_{10} = 2A + 3A = 5A$

$V_S = V_B + i_4 \cdot 4\Omega = 130V + 5A \cdot 4\Omega = 130V + 20V = 150V$ ✓

$i_S = i_o + i_4 = 1A + 5A = 6A$

Work symbolically as far as practical.

$R(\Omega)$	i (A)	I^2R = P
4	5	$(5A)^2 \cdot (4\Omega) = 100W$
10	3	$(3A)^2 \cdot (10\Omega) = 90W$
25	4	$(4A)^2 \cdot (25\Omega) = 400W$
50	1	$(1A)^2 \cdot (50\Omega) = 50W$
65	2	$(2A)^2 \cdot (65\Omega) = 260W$
TOTAL		900W

For numerical results, transition from symbol to all numeric using same format.

(2.21b)

$P_{SOURCE} = 150V \cdot 6A = 900W$ (EQUALS LOADS) ← (2.21c)

Include notations that are relevant to answer the question asked.