UNIVERSITY OF MANITOBA

DEPARTMENT:	Electrical & Computer Engineering	DATE & TIME:	7th March 2011 at 1800
PAPER NO.:	—	PAGE NO.:	1 of 5
COURSE:	ENG 1450–Intro. Elect. & Comp. Eng.	EXAMINATION:	Mid-term (20%)
DURATION:	1 Hour	EXAMINERS:	A. Gole / A. Major

INSTRUCTIONS:

- Do not remove the staple.
- Closed-book exam. No books/notes allowed.
- Calculators are NOT allowed.
- Return both this booklet and the bubble sheet at the end of the examination.
- This is a multiple choice examination and consists of 15 questions.
- Mark your answer in pencil on the bubble sheet provided.
- No marks will be given for working on this booklet.
- Each correct answer has one mark and each wrong answer has zero marks.
- No negative marks for wrong answer.

STUDENT NUMBER

PRINT YOUR NAME IN FULL ON THIS LINE

SIGNATURE

A01 (Prof. Gole) A02 (Prof. Major)

CIRCLE YOUR SECTION

E2-105 E2-110 E3-270

CIRCLE YOUR EXAMINATION ROOM

(n/a)

SEAT NUMBER

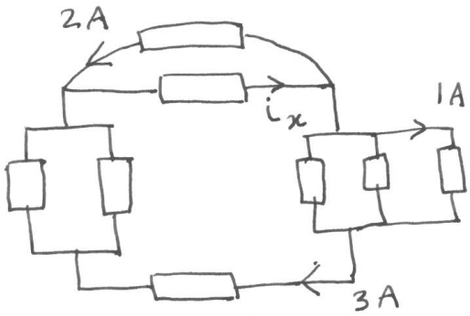
Mark	
Out of	15

1 What is V_{AB} if we have to spend 10 J of energy in order to move a charge of 1 mC from point B to point A?

A) 10 V
B) 600 V
C) 10,000 V
D) 36,000 V
E) 120,000 V

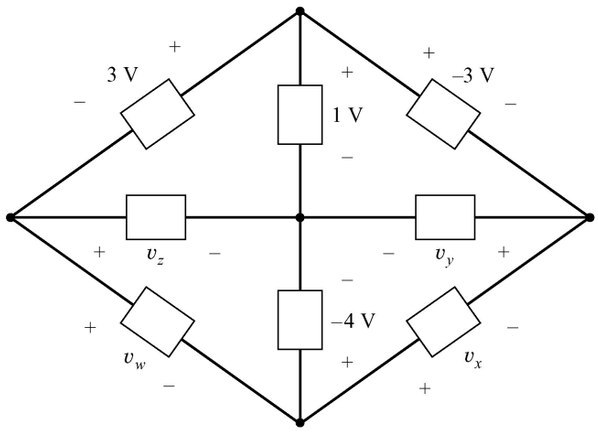
2 In the circuit shown below the current i_x is?

A) 4 A
B) 1 A
C) -1 A
D) -6 A
E) 5 A



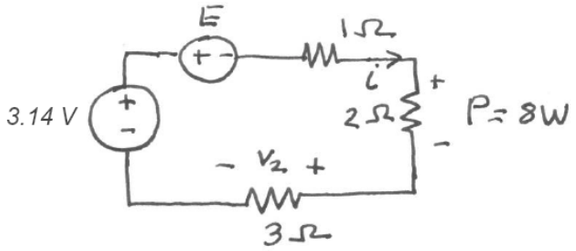
3 What is $v_z + v_w$ in the circuit shown below?

A) 0 V
B) 4 V
C) 2 V
D) -2 V
E) None of the above.

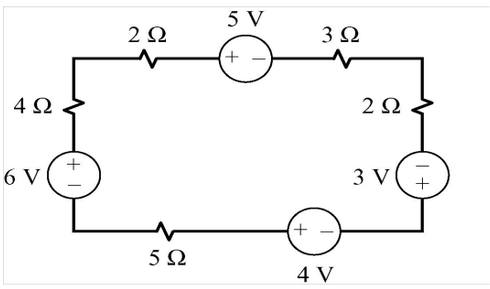


4 The power P absorbed by the 2 Ω resistor is 8W. The current i can be assumed to be positive. The voltage v_2 is ?

A) 3 V
B) 6 V
C) $3\sqrt{8}$ V
D) 12 V
E) -12 V



5 How much is the total power absorbed in the 4 Ω resistor?

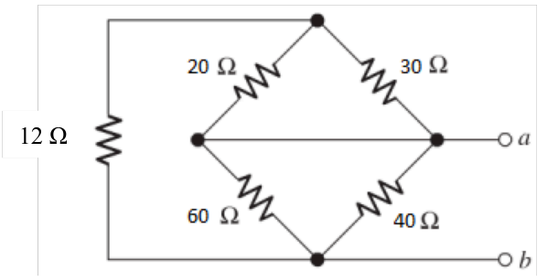


A) 0 W
B) 2 W
C) 36 W
D) 1 W
E) 8.32 W

6 We have two unknown resistors R_1 and R_2. It is known that $R_2 = R_1/2$. It is also known that when we connect them in parallel the equivalent resistance is 2 Ω. Find the resistance of R_2. (*Read question carefully…we are asking for R_2 only!*)

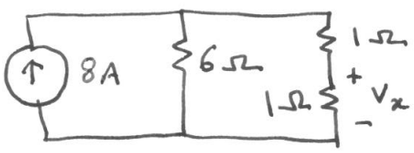
A) 6 Ω
B) 1 Ω
C) 3 Ω
D) 20 Ω
E) None of the above.

7 What is the equivalent resistance at terminals *ab*?



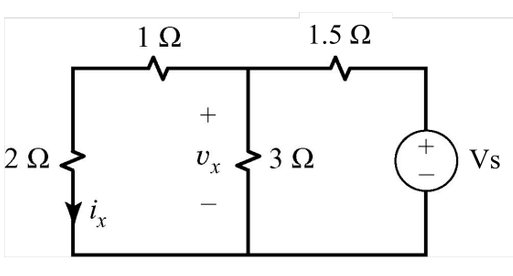
A) 12 Ω
B) 11.4 Ω
C) 15 Ω
D) 10 Ω
E) 28 Ω

8 What is v_x in the circuit shown below?



A) 4 V
B) 2 V
C) -4 V
D) 6 V
E) None of the above.

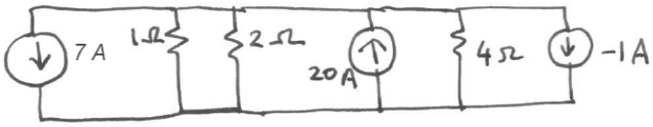
9 Determine the value of *Vs* if the $v_x = 5$ V.



A) 6 V
B) 10 V
C) 8 V
D) 12 V
E) None of the above.

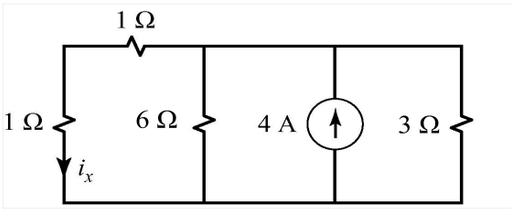
10 How much power is absorbed/delivered by the (-1) A current source?

A) 7 W, delivered.
B) 8 W, delivered.
C) 3 W, delivered.
D) 15 W, absobred.
E) 8 W, absorbed.



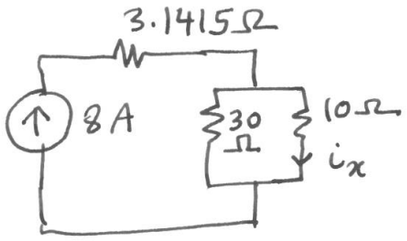
11 How much power is absorbed by a single 1-Ω resistor?

A) 1 W
B) 33 W
C) 16 W
D) 10 W
E) 4 W



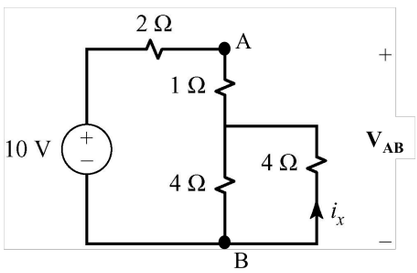
12 What is the current i_x in the circuit given below?

A) 6 A
B) -3 A
C) -1.214 A
D) 14 A
E) None of the above.



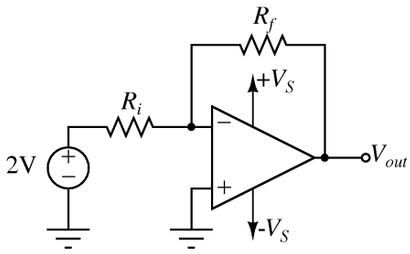
13 What is V_{AB} in the circuit shown below?

A) 10 V
B) -4 V
C) 1 V
D) 6 V
E) -3 V



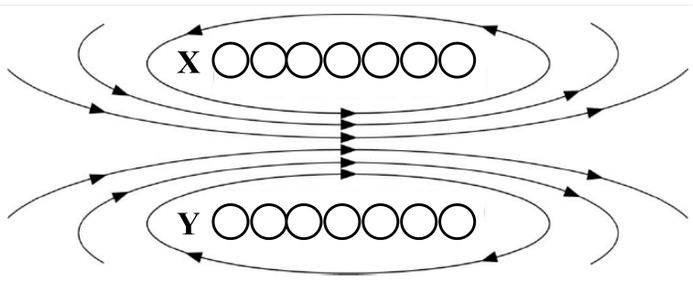
14 In the opamp circuit shown, $R_i = 1\ k\Omega$, $R_f = 10\ k\Omega$, and $Vs = 25\ V$. The output voltage V_{out} is:

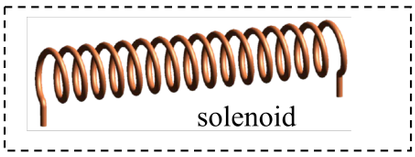
A) -20 V
B) 20 V
C) 2 V
D) 0.2 V
E) -0.2 V



15 A cross section of solenoid (a wire coil wrapped in a cylinder shape) is shown below. X and Y represent the upper and lower coil sections respectively. The magnetic field lines are as shown in the figure. What is the direction of a current flowing through the coil sections X and Y? (Directions: towards you, i.e. out of the page and the opposite one).

A) **X**: towards you, **Y**: towards you.
B) **X**: away from you, Y: towards you.
C) **X**: away from you, **Y**: away from you.
D) **X**: towards you, **Y**: away from you.
E) None of the above.





Formula Sheet

Ohm's law	$V = RI$
Power	$P = VI$
Energy	$W = VQ$
Voltage division	$V_k = \frac{R_k}{\sum R_i} V_S$
Current division	$I_k = \frac{\frac{1}{R_k}}{\sum \frac{1}{R_i}} I_S$
Resistors in series	$R_{eq} = \sum R_i$
Resistors in parallel	$\frac{1}{R_{eq}} = \sum \frac{1}{R_i}$
Energy stored in a capacitor	$W = \frac{1}{2} CV^2$