UNIVERSITY OF MANITOBA

DEPARTMENT:	Electrical & Computer Engineering	DATE & TIME:	4th March 2014 at 18:30
PAPER NO.:	—	PAGE NO.:	1 of 8
COURSE:	ENG 1450–Intro. Elect. & Comp. Eng.	EXAMINATION:	Mid-term (20%)
DURATION:	1 Hour	EXAMINERS:	S. Sherif/J. Cai

INSTRUCTIONS:

- Write your full name, student number, and lecture section on both this test paper and the bubble sheet.
- Do not remove the staple.
- Closed-book exam. No books/notes allowed.
- Non-programmable calculators are 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. Sherif) A02 (Prof. Cai)

CIRCLE YOUR SECTION

E2-105 E2-165 E3-270

CIRCLE YOUR EXAMINATION ROOM

(n/a)

SEAT NUMBER

Mark	
Out of	15

1 What does the halogen gas in a halogen incandescent lamp do?

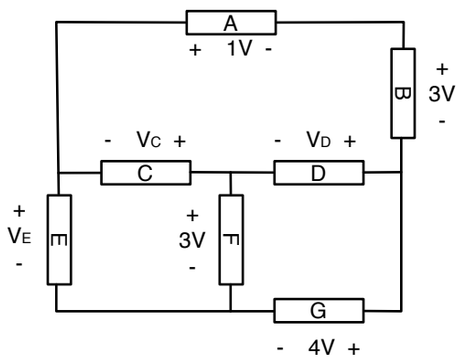
A) Coats the tungsten filament and prevents it evaporating quickly.
B) Re-deposits evaporated tungsten back on the filament.
C) Cools the filament so it lasts longer.
D) Makes the light brighter by absorbing infrared light from the filament and converting it to visible light.
E) None of the above.

2 If 5×10^{16} electrons are pushed by the energy of 20 mJ, what is the voltage? (Each electron carries a negative charge equal to -1.6×10^{-19} C.)

A) 4 V
B) 12.5 V
C) 2.5 V
D) 1 V
E) None of the above

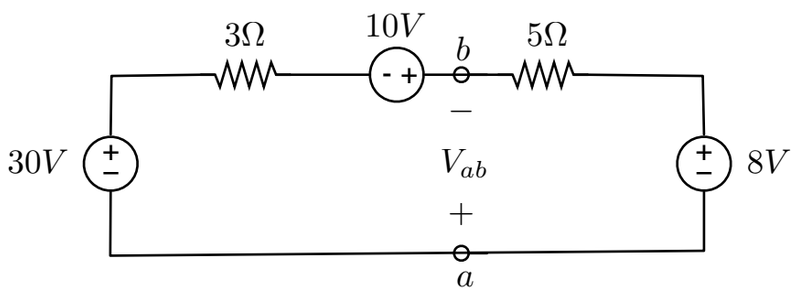
3 What is the value of V_c?

A) 5 V
B) 3 V
C) -4 V
D) -5 V
E) -3 V



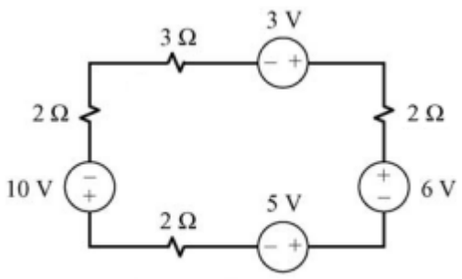
4 In the given circuit, what is the value of V_{ab}?

A) 28 V
B) -28 V
C) 12 V
D) -12 V
E) 20 V



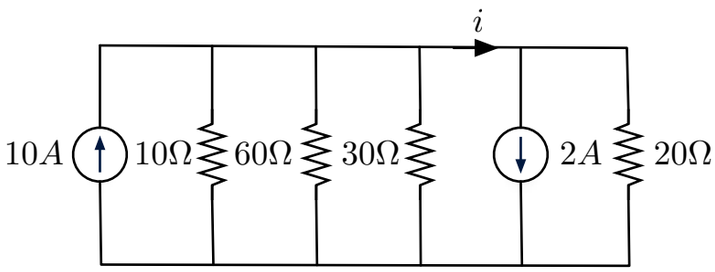
5 How much power is delivered/absorbed by the 3V voltage source?

A) 6 W, delivered.
B) 6 W, absorbed.
C) 18 W, delivered.
D) 18 W, absorbed.
E) -6 W, absorbed.



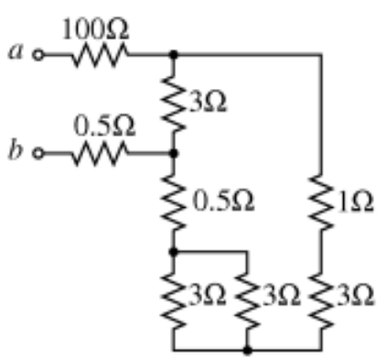
6 For the given circuit, what is the value of i?

A) 4 A
B) 3 A
C) 2 A
D) 1 A
E) None of the above



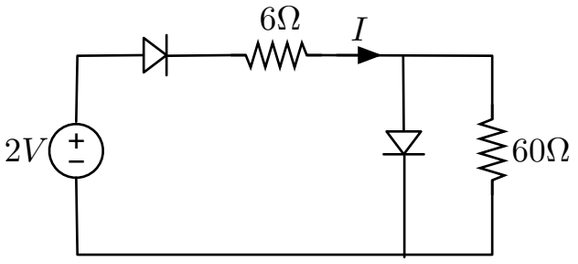
7 What is the equivalent resistance at terminals ab?

A) 103.5 Ohms
B) 114 Ohms
C) 106 Ohms
D) 102.5 Ohms
E) None of the above.



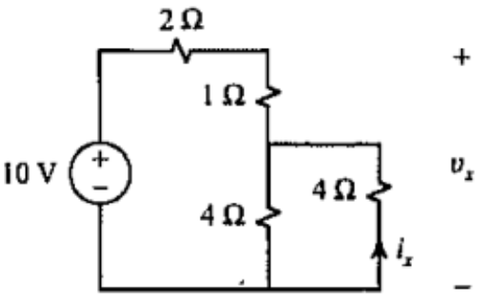
8 In the given circuit, what is the value of *I*?

A) 0.1 A
B) 0.3 A
C) -1 A
D) 0.03 A
E) None of the above



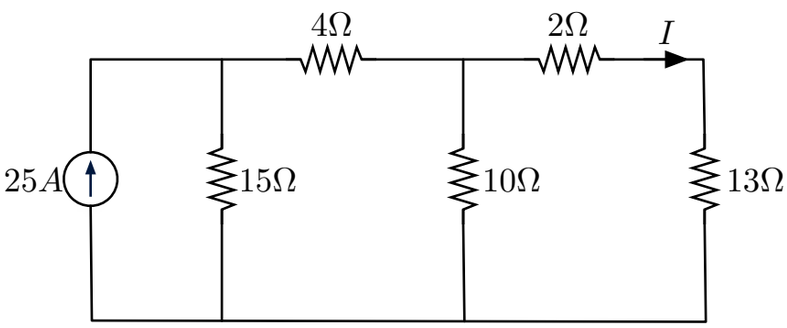
9 What are the values of v_x and i_x in the given circuit?

A) 4 V and -1 A
B) - 6 V and 1 A
C) 4 V and -1 A
D) 4 V and 1 A
E) 6 V and -1 A



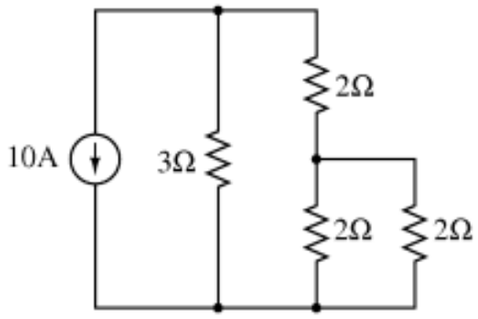
10 What is the current *I* in the given circuit?

A) 0.8 A
B) 2.6 A
C) 9 A
D) 6 A
E) None of the above



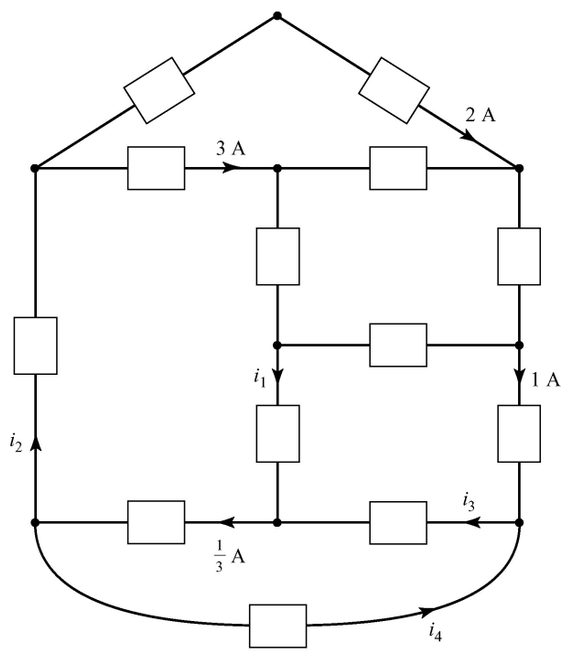
11 How much power is absorbed by the 3 Ohms resistor?

A) 15 W.
B) 100/3 W.
C) 75 W.
D) 100 W.
E) None of the above.



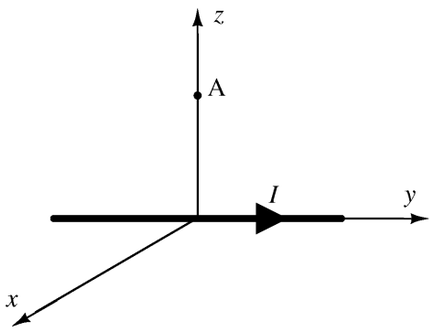
12 In the given circuit, what is the value if i_1?

A) 1 A
B) 3 A
C) -1 A
D) 2 A
E) 4 A



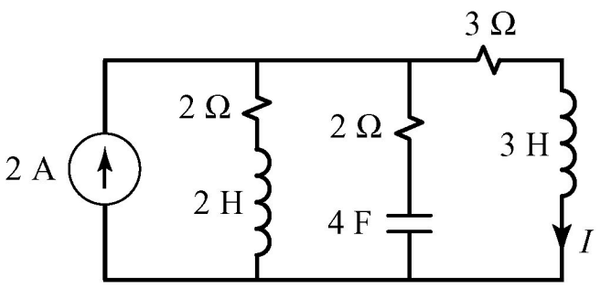
13 A wire carries an electric current, I, that is flowing in the $+y$ direction as shown below. What is the direction of the magnetic field generated by this current at point A?

A) +y
B) +x
C) -x
D) +z
E) *-z*



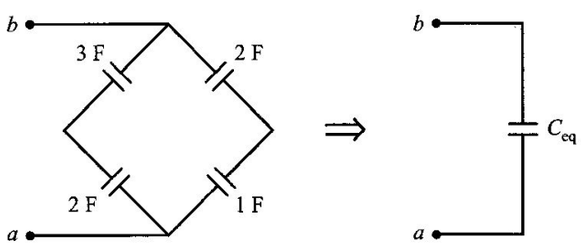
14 In the given circuit, what is the energy stored in 3H inductor at the steady state?

A) 3.375 J
B) 2/3 J
C) 0.96 J
D) 0 J
E) None of the above



15 Determine the equivalent capacitance C_{eq}.

A) C_{eq} = 1.875 F
B) C_{eq} = 2.22 F
C) C_{eq} = 1.8667 F
D) C_{eq} = 2 F
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 capacitors $$W = \frac{1}{2} C V^2$$

Energy stored in inductors $$W = \frac{1}{2} L I^2$$

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