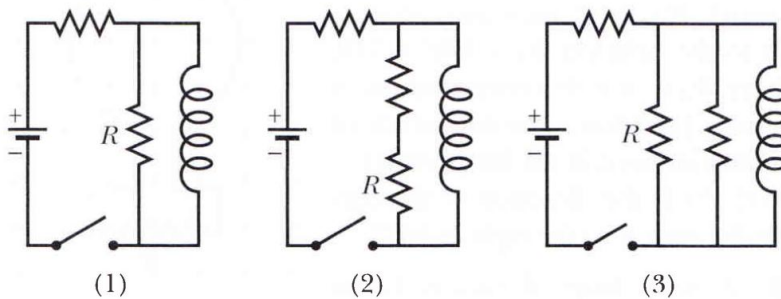A- Read all the quiz once, or twice, before beginning to write. Make sure to comprehend all questions and start with those you feel most confident.
B – Be clear and concise. There are no extra points for being verbose or writing extra.
C –Only use the white pages that I will provide. You have 60 minutes to answer the quiz.

Problem 1

The Figure shows three circuits with identical batteries, inductors, and resistors. Rank the circuits, greatest first, according to the current through the resistor labeled R (a) long after the switch is closed. (b) just after the switch is reopened a long time later, and (c) long after it is reopened.
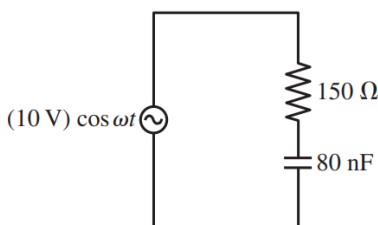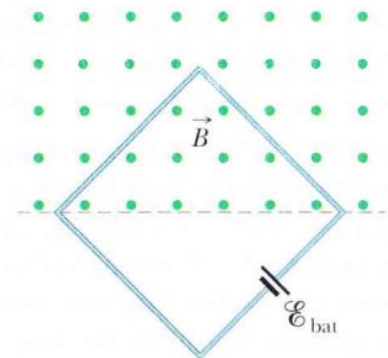

(1)   (2)   (3)

Problem 2

A square wire loop with 2.00 m sides is perpendicular to a uniform magnetic field, with half the area of the loop in the field as shown in the figure. The loop contains an ideal battery with emf V = 20.0 V. If the magnitude of the field varies with time according to

B=- 0.0420 - 0.870t,

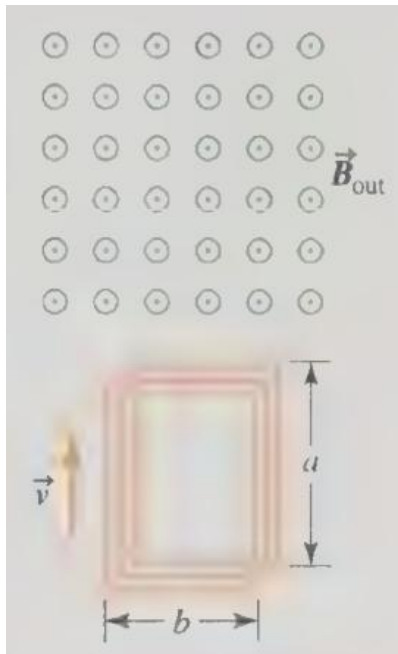with B in teslas and t in seconds, what is the net emf in the circuit?

Problem 3

What are V_R and V_C if the emf frequency in the figure is 10 kHz?

$(10\ V)\cos\omega t$ $150\ \Omega$ $80\ nF$

Problem 4

The figure shows an N-turn rectangular coil of length a and width b entering a region of uniform magnetic field of uniform magnitude B, directed into the page. The velocity of the coil is constant and is upward in the figure. The total resistance of the coil is R. What is the induced emf when (a) only a portion of the coil has entered the region with the field, (b) the whole coil has entered the field.

Problem 5

What is the peak voltage across the 3.0 mF capacitor?

$3.0 \, \mu F$

$\mathcal{E}_0 = 10 \, V$
$f = 200 \, Hz$

$4.0 \, \mu F$

$2.0 \, \mu F$