Problem 1

A 20-µF capacitor has energy $w(t) = 10sin^2 360t$ J.
Determine the current through the capacitor

Problem 2

A 4-mF capacitor has the terminal voltage

$$v = \begin{cases} 15V, & t \leq 0 \\ Ae^{-100t} + Be^{-500t} \ V, & t \geq 0 \end{cases}$$

If the capacitor has initial current of 2A, find:
(a) the constants A and B,
(b) the energy stored in the capacitor at t=0,
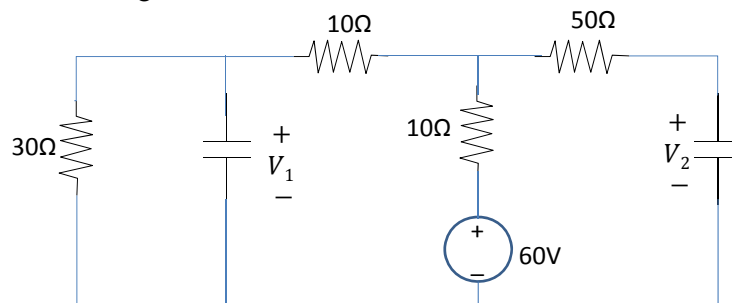(c) the capacitor current for t>0.

Hint: Make two equations for A and B using v(0)=15 and i(0)=2.

Problem 3

The current through a 0.5-F capacitor is $6(1 - e^{-2t})A$.
Determine the voltage and power at t=2s. Assume v(0)=0.

Problem 4

Find the voltage v_1 and v_2 across the capacitors in the
following circuit.

Problem 5

The current through a 12-mH inductor is 4sin200t A. Find the
voltage, and also the energy stored in the inductor for 0<t<π/200 s.

Problem 6

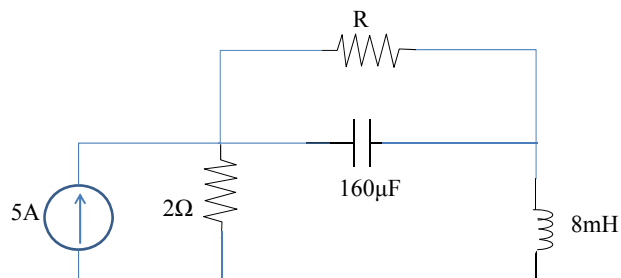The voltage across a 200-mH inductor is given by

$v(t) = 6t^2 + 2t + 3 V$ for t>0

Determine the current i(t)through the inductor. Assume that i(0)=1A.

Problem 7

For the circuit in following circuit, calculate the value of R that
will make the energy stored in the capacitor the same as that
stored in the inductor under dc conditions.

Problem 8

Under steady-state dc conditions, find I and v in the following circuit.

i   2mH

10mA   20KΩ   + V − 6µF   30KΩ