1. At an instant of time during the oscillations of an \( LC \) circuit, the current is at its maximum value. At this instant, the voltage across the capacitor

- is identical to that across the inductor
- has half its maximum value
- is zero
- has its maximum value
- is impossible to determine

2. A switch controls the current in a circuit that has a large inductance. Is a spark more likely to be produced at the switch when:

- the switch is being closed
- the switch is being opened
- it doesn’t matter?

3. If the current in an inductor is doubled, by what factor does the stored energy change?

- \( \frac{1}{4} \) (decrease)
- \( \frac{1}{2} \)
- \( 2 \) (increase)
- \( 4 \)

4. Suppose you are designing a high-fidelity system containing both large loudspeakers (woofers) and small loudspeakers (tweeters). If you wish to deliver low-frequency signals to a woofer, what device would you place in series with it?

- an inductor
- a capacitor
- a resistor

5. An \( LC \) circuit can be considered analogous to a mass-spring system. In fact, the equations are the same, with the appropriate substitution of symbols:

\[
LC \text{ circuit: } L \frac{d^2Q}{dt^2} + \frac{Q}{C} = 0 \quad \text{Mass-spring: } m \frac{d^2x}{dt^2} + kx = 0
\]

Pushing this analogy, we would say that current and velocity are analogous variables between the two systems (that is, the current in an \( LC \) circuit behaves like the velocity of the mass in the mass-spring system), as are voltage and force, or charge and position. What then does the inductor correspond to in the mass-spring system?

- the mass
- the spring
- friction
- kinetic energy