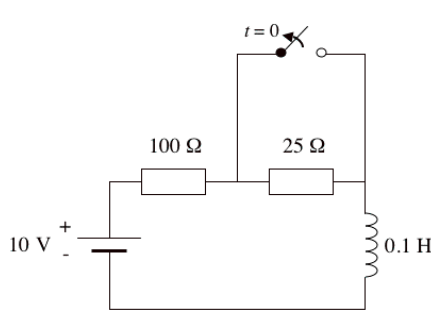


## Inductors

### Problem 1:

**Example 1**

• Find the voltage across the inductor after the switch opens.

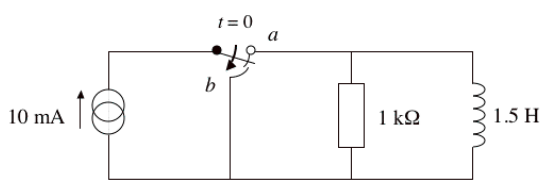


Answer:  $v_L(t) = 2.5 e^{-t/0.8 \text{ ms}} \text{ V}$

### Problem 2:

**Example 2**

• Find the voltage across the inductor when the switch is moved from a to b.



Answer:  $v_L(t) = 10 e^{-t/1.5 \text{ ms}} \text{ V}$

At time  $t = 0$  the switch is moved from  $a$  to  $b$ . Notice that this switch looks a bit unusual. It is known as a make-before-break switch. You have to be careful when disconnecting current sources (and energised inductors) from a circuit. The reason is that both devices try to maintain a constant current. You cannot therefore just let them go open-circuit. This switch allows the current source to be shorted before breaking contact with the rest of the circuit.

To solve this problem you must determine the initial current in the inductor. You may assume that the switch has been at position  $a$  a long time before the switch is moved to position  $b$ .