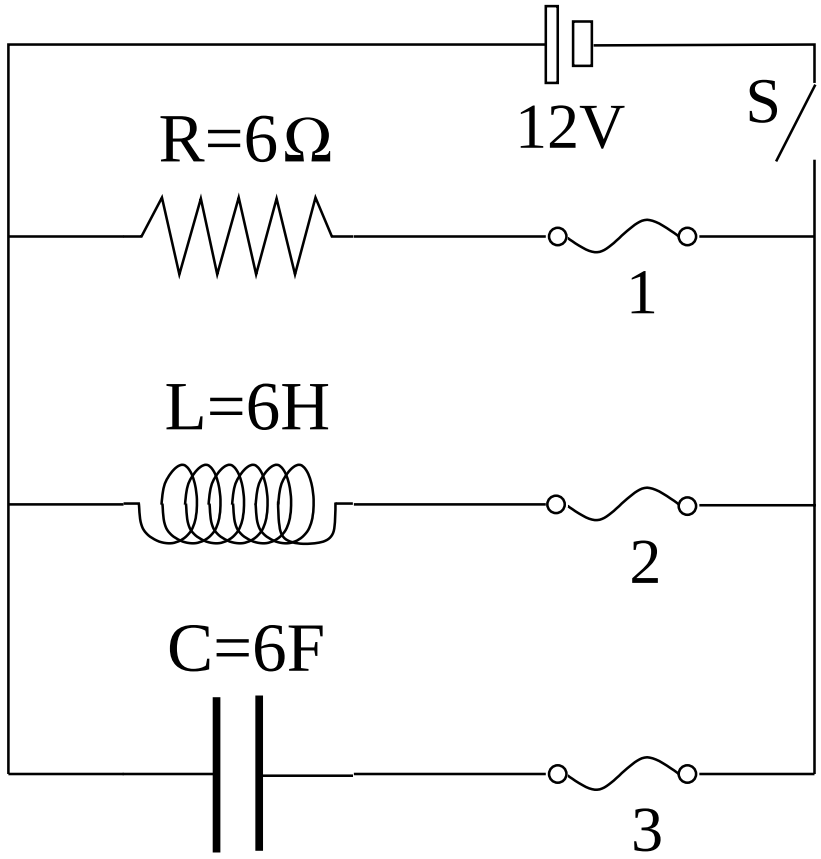
RL Circuit: Application (1)

Each branch in the circuit shown contains a 3A fuse. The switch is closed at time $t = 0$.

(a) Which fuse is blown in the shortest time?

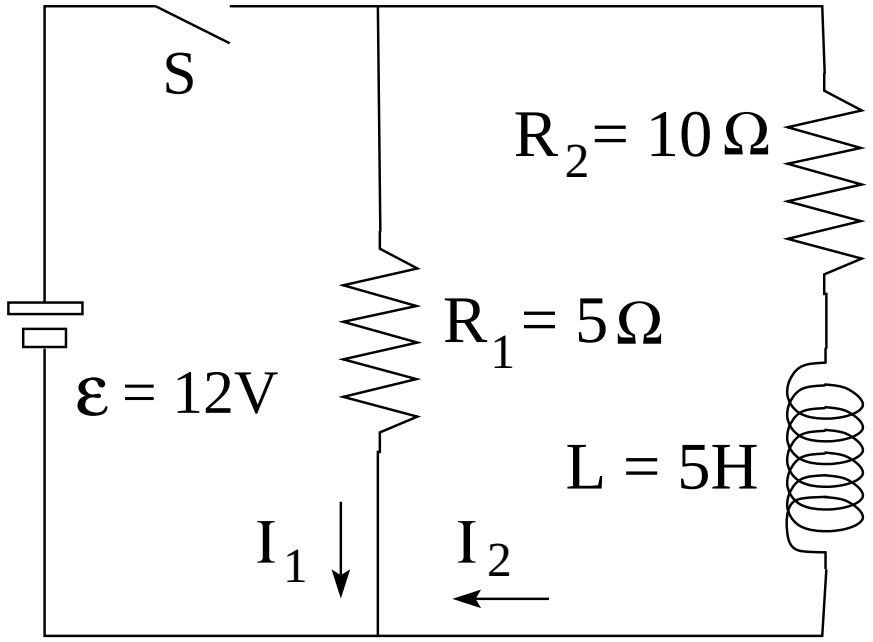
(b) Which fuse lasts the longest time?



RL Circuit: Application (8)

In the circuit shown the switch has been open for a long time.
Find the currents I_1 and I_2

- just after the switch has been closed,
- a long time later,
- as functions of time for $0 < t < \infty$.

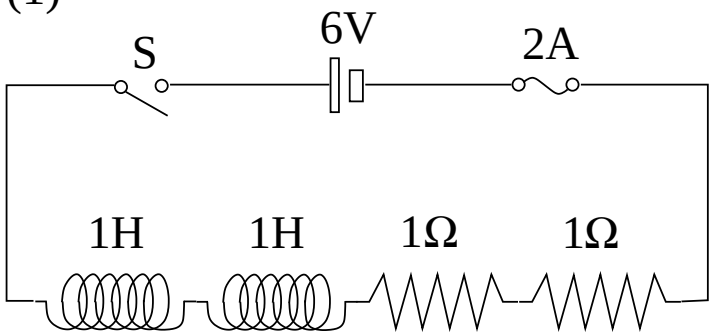


RL Circuit: Application (5)

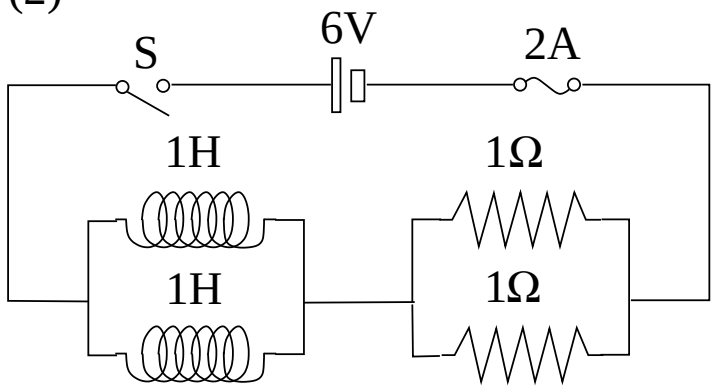
Each RL circuit contains a 2A fuse. The switches are closed at $t = 0$.

- In what sequence are the fuses blown?

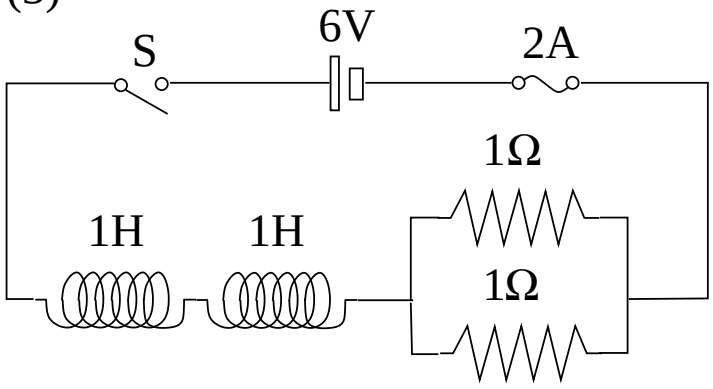
(1)



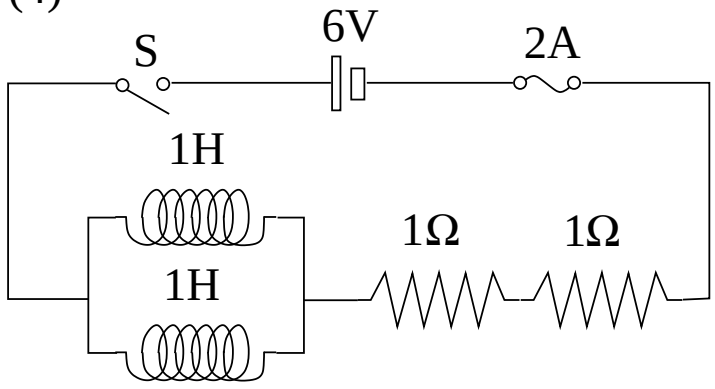
(2)



(3)



(4)



RL Circuit: Application (6)

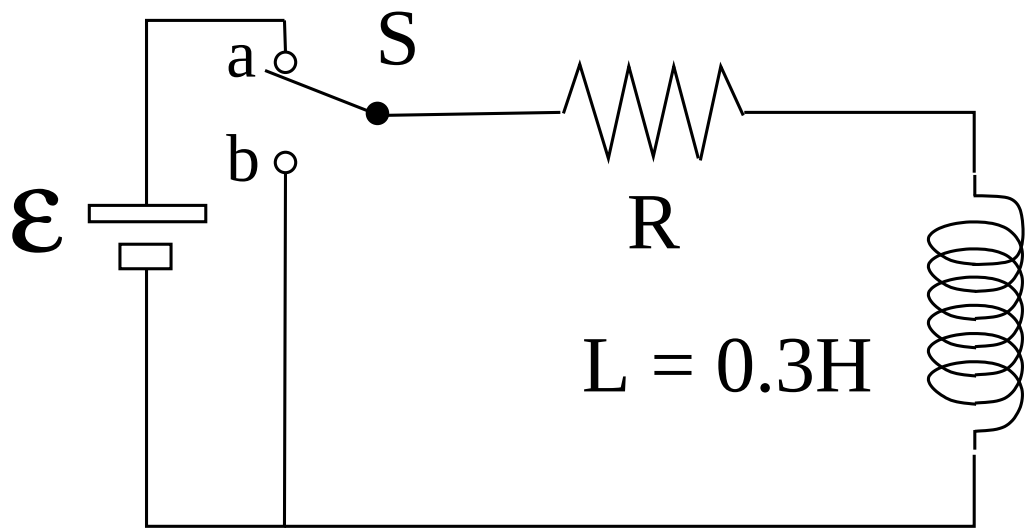
In the RL circuit shown the switch has been at position a for a long time and is thrown to position b at time $t = 0$. At that instant the current has the value $I_0 = 0.7$A and decreases at the rate $dI/dt = -360$A/s.

(a) Find the EMF $\mathcal{E}$ of the battery.

(b) Find the resistance R of the resistor.

(c) At what time t_1 has the current decreased to the value $I_1 = 0.2$A?

(d) Find the voltage across the inductor at time t_1.



RL Circuit: Application (3)

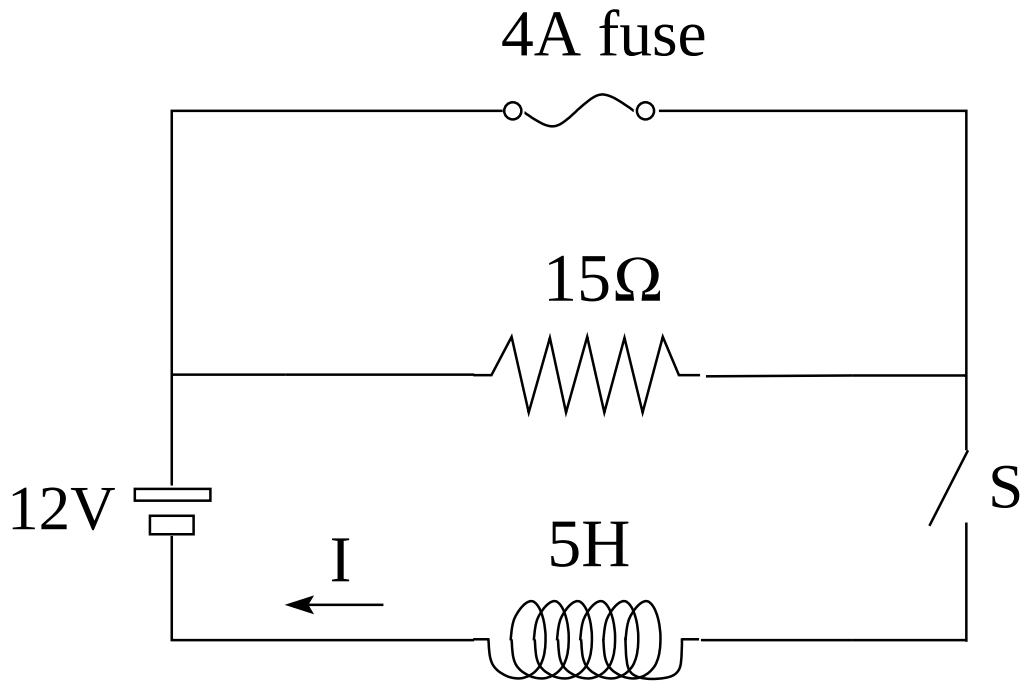
The switch is closed at $t = 0$. Find the current I

(a) immediately after the switch has been closed,

(b) immediately before the fuse breaks,

(c) immediately after the fuse has broken,

(d) a very long time later.

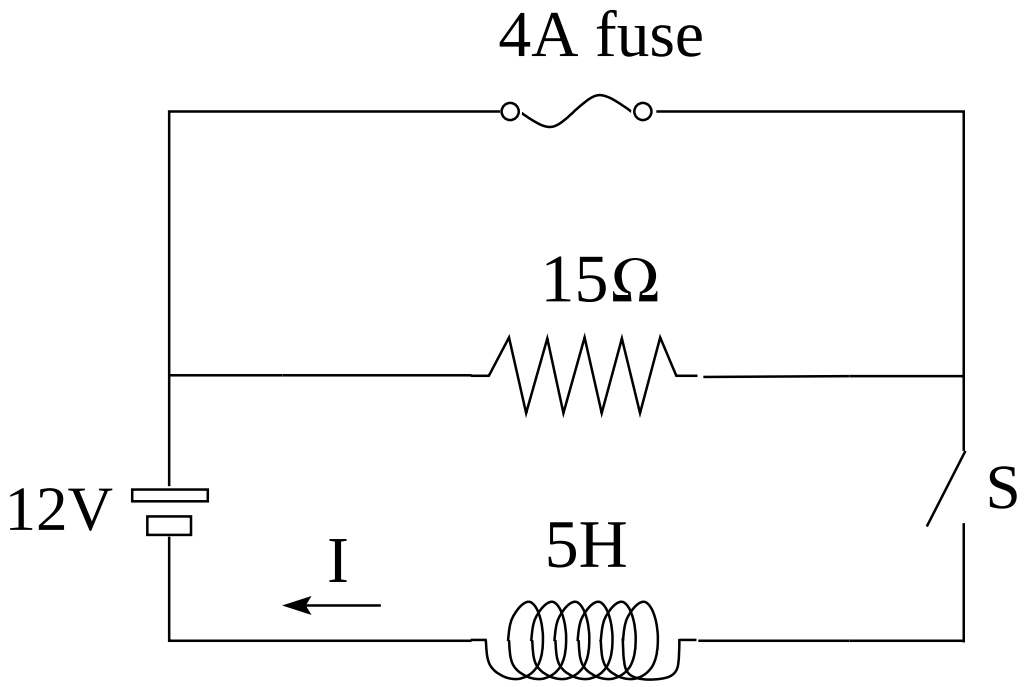


RL Circuit: Application (7)

In the circuit shown the switch S is closed at time $t = 0$.

(a) Find the current I as a function of time for $0 < t < t_F$, where t_F marks the instant the fuse breaks.

(b) Find the current I as a function of time for $t > t_F$.

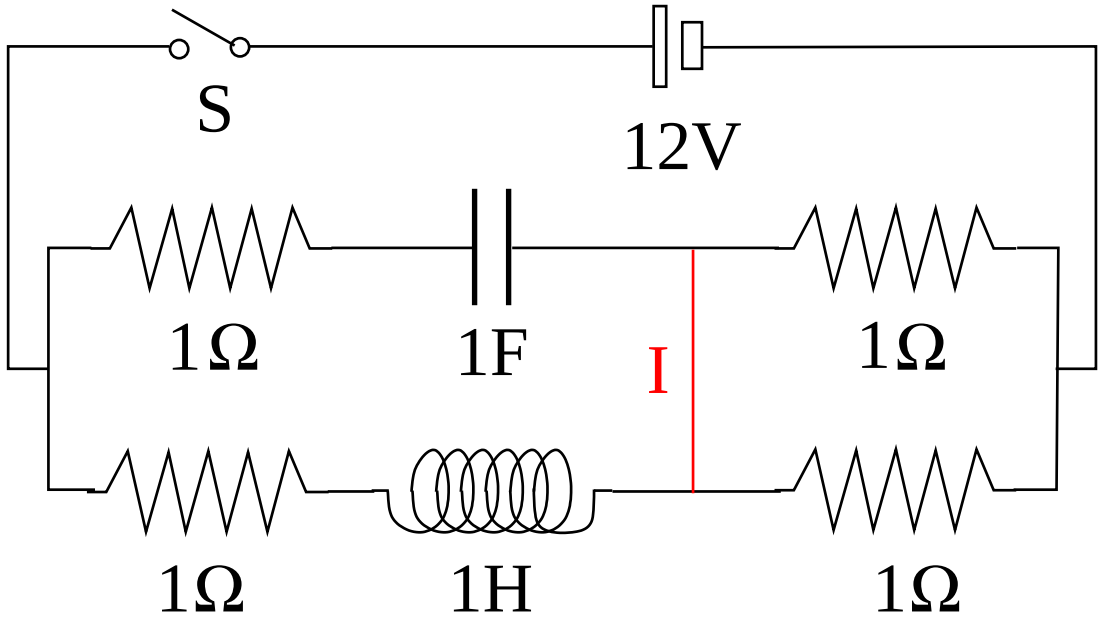


RL Circuit: Application (4)

Find the magnitude (in amps) and the direction $(\uparrow, \downarrow)$ of the current I

(a) right after the switch has been closed,

(b) a very long time later.



RL Circuit: Application (2)

The switch in each RL circuit is closed at $t = 0$.
Rank the circuits according to three criteria:

(a) magnitude of current at t =1ms,

(b) magnitude of current at $t = \infty$,

(c) time it takes I to reach 63% of its ultimate value.