

232 Lecture supplement 13

27. A dead battery is charged by connecting it to the live battery of another car with jumper cables (Fig. P28.27). Determine the current in the starter and in the dead battery.

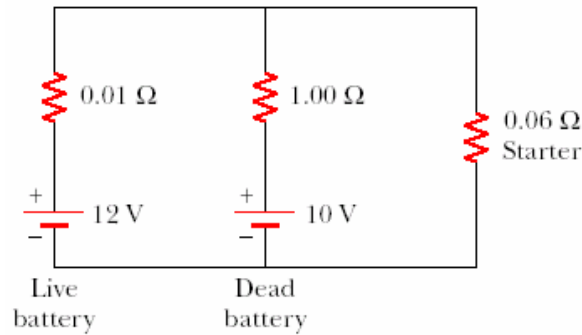


Figure P28.27

P28.27 Using Kirchoff's rules,

$$12.0 - (0.0100) I_1 - (0.0600) I_3 = 0$$

$$10.0 + (1.00) I_2 - (0.0600) I_3 = 0$$

and $I_1 = I_2 + I_3$

$$12.0 - (0.0100) I_2 - (0.0700) I_3 = 0$$

$$10.0 + (1.00) I_2 - (0.0600) I_3 = 0$$

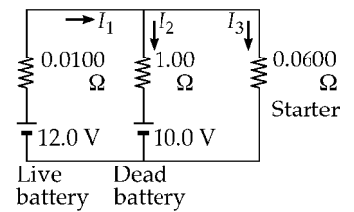


FIG. P28.27

Solving simultaneously,

$$I_2 = \boxed{0.283 \text{ A downward}} \text{ in the dead battery}$$

and $I_3 = \boxed{171 \text{ A downward}} \text{ in the starter.}$

The currents are forward in the live battery and in the starter, relative to normal starting operation. The current is backward in the dead battery, tending to charge it up.