

Figure P11.17

**11.18** The circuit of Figure P11.18 is called a *source follower*, and acts as a voltage-controlled current source (VCCS).

- Determine  $I_L$  if  $V_G = 10\text{ V}$ ,  $R_L = 2\ \Omega$ ,  $K = 0.5\text{ A/V}^2$ ,  $V_T = 4\text{ V}$ .
- If the power rating of the MOSFET is  $50\text{ W}$ , how small can  $R_L$  be?

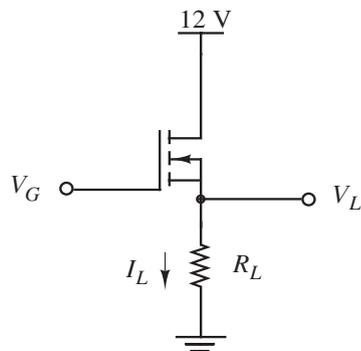


Figure P11.18

**11.19** The circuit of Figure P11.19 is a Class A amplifier.

- Determine the output current for the given biased audio tone input,  $V_G = 10 + 0.1 \cos(500t)\text{ V}$ . Let  $K = 2\text{ mA/V}^2$  and  $V_T = 3\text{ V}$ .
- Determine the output voltage.
- Determine the voltage gain of the  $\cos(500t)$  signal.
- Determine the DC power consumption of the resistor and the MOSFET.

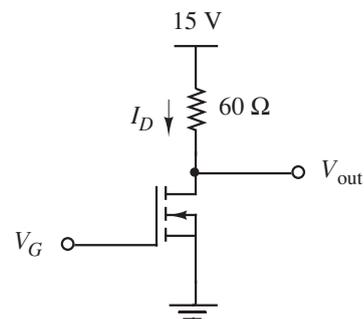


Figure P11.19

**11.20** The circuit of Figure P11.20 is a source-follower amplifier. Let  $K = 30\text{ mA/V}^2$ ,  $V_T = 4\text{ V}$ , and  $V_G = 9 + 0.1 \cos(500t)\text{ V}$ .

- Determine the load current  $I_L$ .
- Determine the output voltage  $V_{out}$ .
- Determine the voltage gain for the  $\cos(100t)$  signal.
- Determine the DC power consumption of the MOSFET and  $R_L$ .

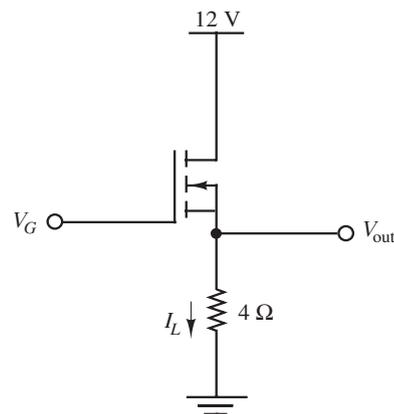


Figure P11.20

**11.21** Sometimes it is necessary to discharge batteries before recharging. To do this, an electronic load can be used. A high-power electronic load is shown in Figure P11.21, for the battery discharge application. With  $K = 4\text{ A/V}^2$ ,  $V_T = 3\text{ V}$ , and  $V_G = 8\text{ V}$ , determine the discharging current  $I_D$  and the required MOSFET power rating.