

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 $V_G = 10$ V, $R_L = 2$ Ω , $K = 0.5$ A/V², $V_T = 4$ V.
- If the power rating of the MOSFET is 50 W, how small can R_L be?

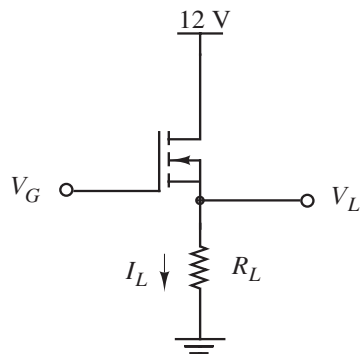


Figure P11.18

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

- Determine the output current for the given biased audio tone input, $V_G = 10 + 0.1 \cos(500t)$ V. Let $K = 2$ mA/V² and $V_T = 3$ 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.

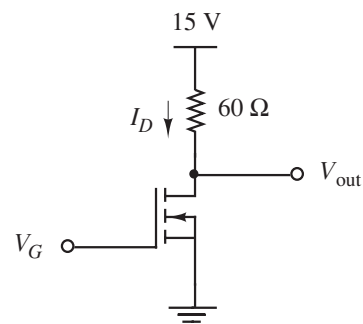


Figure P11.19

11.20 The circuit of Figure P11.20 is a source-follower amplifier. Let $K = 30$ mA/V², $V_T = 4$ V, and $V_G = 9 + 0.1 \cos(500t)$ 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 .

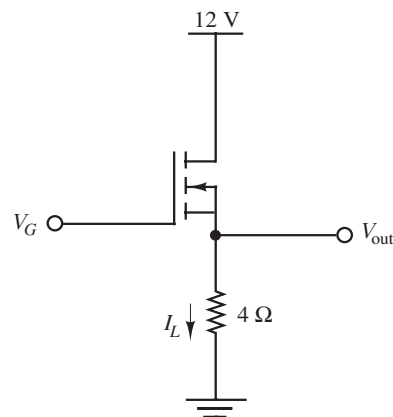


Figure P11.20

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 $K = 4$ A/V², $V_T = 3$ V, and $V_G = 8$ V, determine the discharging current I_D and the required MOSFET power rating.