Answer the following questions:

1. What type of transistor has an insulated gate?

2. An *n*-channel JFET is biased such that $V_{GS} = -2$ V using self-bias. The gate resistor is connected to ground.

    a. What is V_S?

    b. What is the value of $V_{GS(off)}$ if V_P is specified to be 6 V?

3. Assume a JFET has the transconductance curve shown in the following figure.

    a. What is I_{DSS}?

    b. What is $V_{GS(off)}$?

    c. What is the transconductance at a drain current of 2.0 mA?
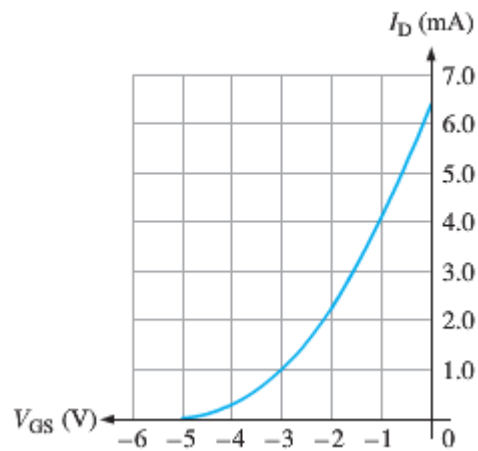

4. Assume that the JFET with the transconductance curve shown in the figure for Problem 3 is connected in the circuit shown in the following figure.

    a. What is VS?

   b. What is ID?

    c. What is VDS?
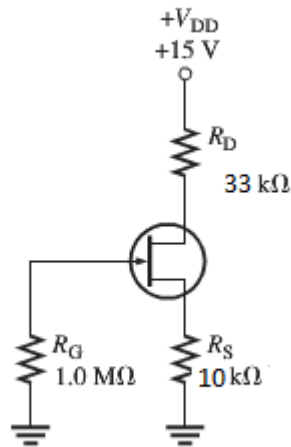
5. Assume that the JFET in the following figure is replaced with one with a lower transconductance.

    a. What will happen to V_{GS}?

    b. What will happen to V_{DS}?
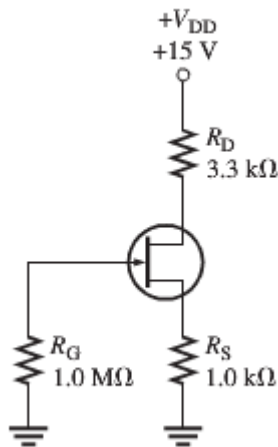
6. In what mode is an *n*-channel D-MOSFET with a positive V_{GS} operating?

7. Each E-MOSFET in the following figure has a $V_{GS(th)}$ of +10 V or −10 V, depending on whether it is an *n*-channel or a *p*-channel device. Determine whether each MOSFET is on or off.

(a)   (b)
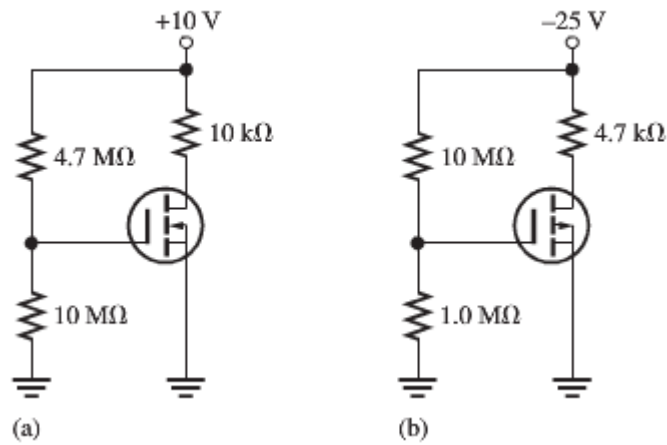
8. The drain current for the E-MOSFET shown in the following figure is 3.0 mA. What type of bias is this?

    a. Can a JFET use this type of bias?

    b. Compute the value of V_D.

    c. Compute the value of V_G.
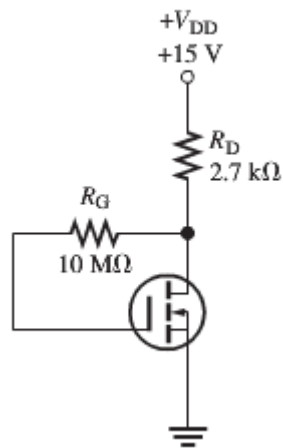
Source: Floyd, T. L., & Buchla, D. M. (2013). *Analog fundamentals: A systems approach* (1st ed.). Upper Saddle River, NJ: Prentice Hall.