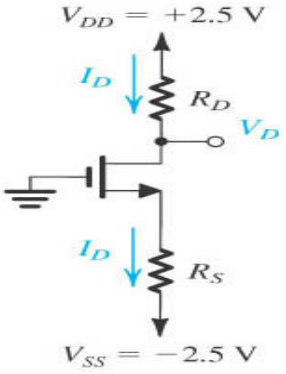
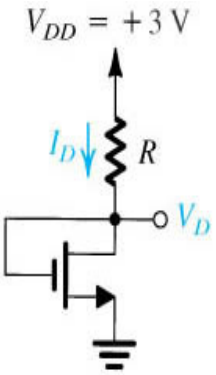
Sheet (6)
MOSFET AC Analysis

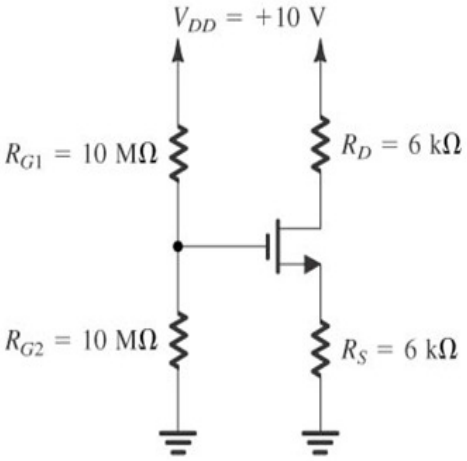
1. For the circuits shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o .
   ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$, $I_D = 0.4\ mA$)



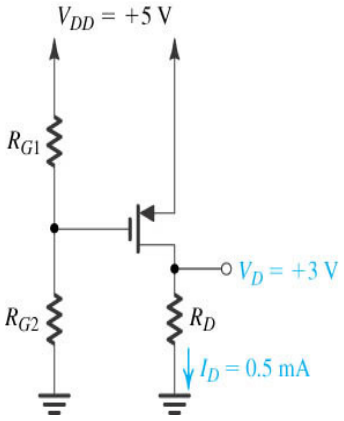
2. For the circuits shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o,
   ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$, $I_D = 0.8\ \mu A$)



3. For the circuits shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o
   ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$, $K_n(w_n/L_n) = 1mA/V^2$)

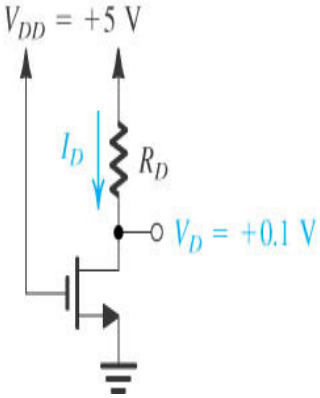


4. For the circuits shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o .
($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$)



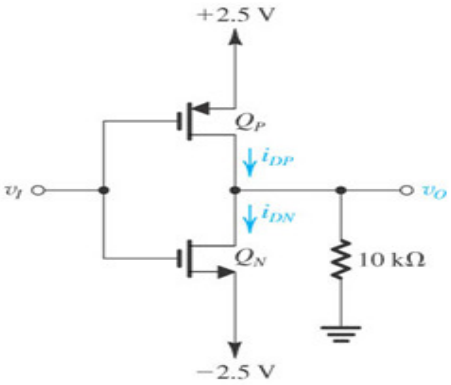
5. For problem 4 determine:
   a. The DC load line and its graphical solution.
   b. The AC load line and compare it with the DC load line.

6. For the circuits shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o.
($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$, $K_p(w_p/L_p) = 1mA/V^2$)

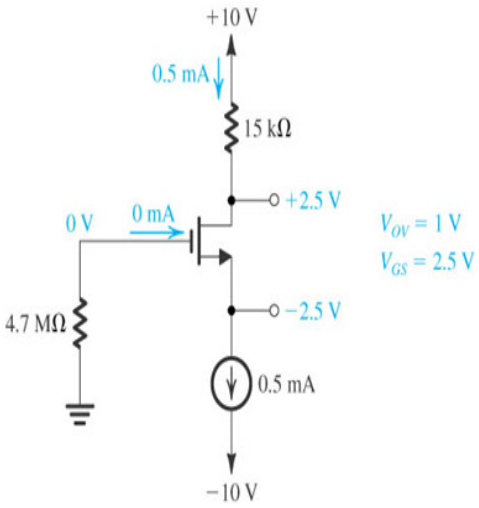


7. For problem 6 determine:
   a. The DC load line and its graphical solution.
   b. The AC load line and compare it with the DC load line.

8. For the circuit shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o.
($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{tn} = -V_{tp} = 1v$, $K_n(w_n/L_n) = K_p(w_p/L_p) = 1mA/V^2$)

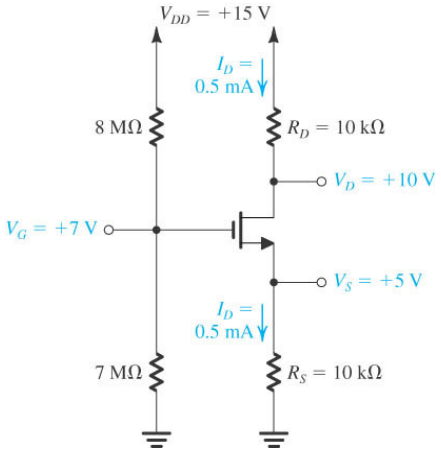


9. For the circuit shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o.
($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$)

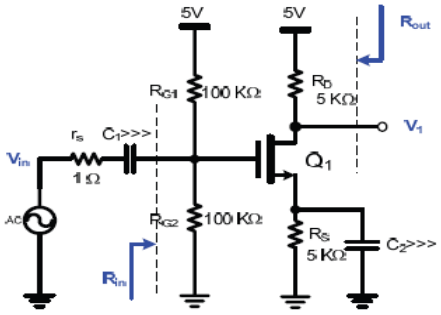


10. For problem 9 determine:
    a. The DC load line and its graphical solution.
    b. The AC load line and compare it with the DC load line

11. For the circuit shown aside, draw the equivalent AC circuit model. Denote on your schematic the values of g_m and r_o.
($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$)

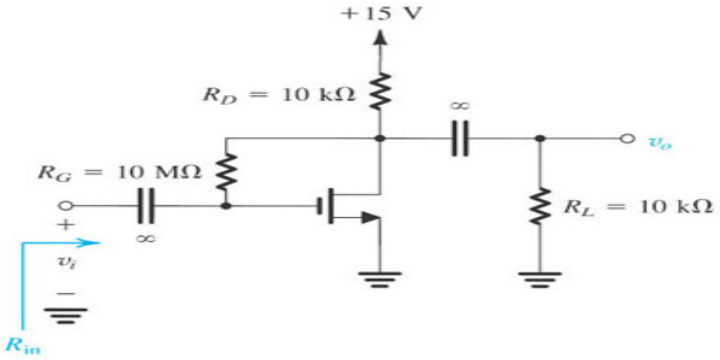


12. For the circuit shown below:
    a. Find the DC solution and calculate g_m and r_o
    ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$)
    b. Find voltage gain V_1/V_{in}
    c. Find R_{in} and R_{out}



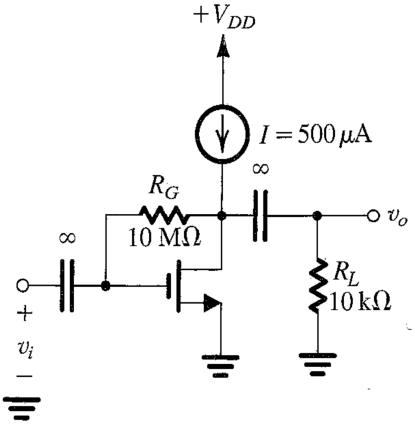
13. For problem 12 determine:
    a. The DC load line and its graphical solution.
    b. The AC load line and compare it with the DC load line.

14. For the circuit shown below
    a. Find the DC solution and calculate g_m and r_o
    ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$)
    b. Find voltage gain V_1/V_{in}
    c. Find R_{in} and R_{out}



15. For problem 14 determine:
    a. The DC load line and its graphical solution.
    b. The AC load line and compare it with the DC load line.

16. For the circuit shown below:
    a. Find the DC solution and calculate g_m and r_o
    ($\mu Cox = 100\ \mu A/V^2$, $\lambda = 0.01\ V^{-1}$, $V_{th} = 1V$, $V_D = 2$ v)
    b. Find voltage gain V_1/V_{in}
    c. Find R_{in} and R_{out}



17. For problem 16 determine:
    a. The DC load line and its graphical solution.
    b. The AC load line and compare it with the DC load line.