Lista IV EN2719 Prof Marcelo Perotoni

1. For the fixed-bias configuration of Fig. 6.67:
   (a) Sketch the transfer characteristics of the device.
   (b) Superimpose the network equation on the same graph.
   (c) Determine I_{D_Q} and V_{DS_Q}.
   (d) Using Shockley's equation, solve for I_{D_Q} and then find V_{DS_Q}. Compare with the solutions of part (c).

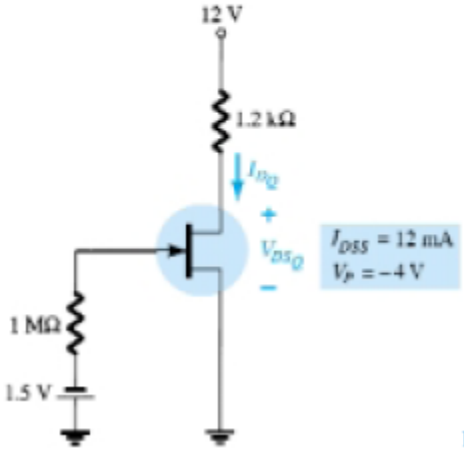


Figure 6.67 Problems 1, 35

Observação – ignore o pedido de solução gráfica, resolva o ponto quiescente apenas pela equação de Schockley
R: Vgs=1.5V e Idq=4.68mA, Vdsq=6.48

3. Given the measured value of V_D in Fig. 6.69, determine:
   (a) I_D.
   (b) V_{DS}.
   (c) V_{GG}.

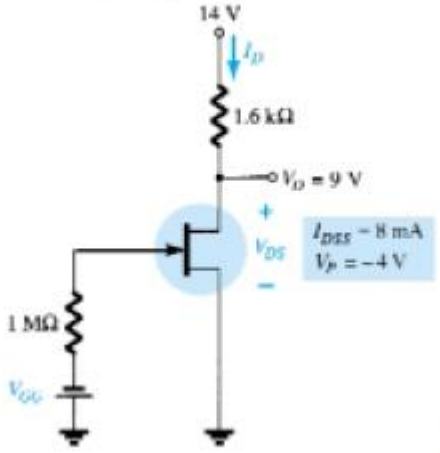


Figure 6.69 Problem 3

R: (a) Idq=3.125mA (b) Vds=9 (c) Vgg=1.5V

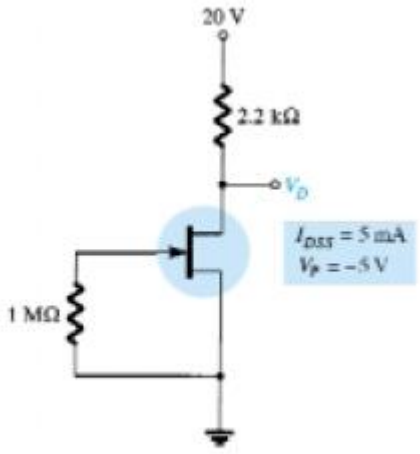


Figure 6.70 Problem 4

4. Determine V_D for the fixed-bias configuration of Fig. 6.70.

R: (a) Idq=5mA Vd=9

* 7. Determine I_{D_Q} for the network of Fig. 6.72 using a purely mathematical approach. That is, establish a quadratic equation for I_D and choose the solution compatible with the network characteristics. Compare to the solution obtained in Problem 6.

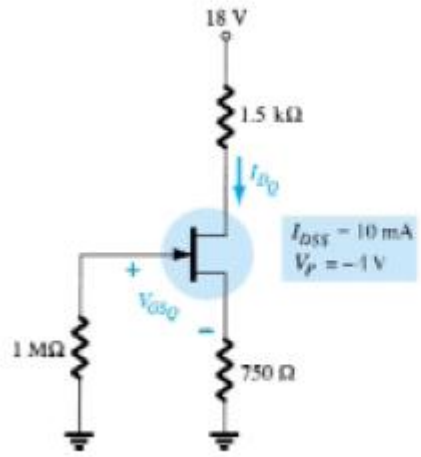
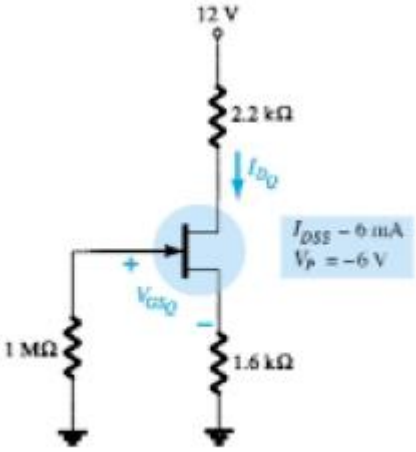


Figure 6.72 Problems 6, 7, 36

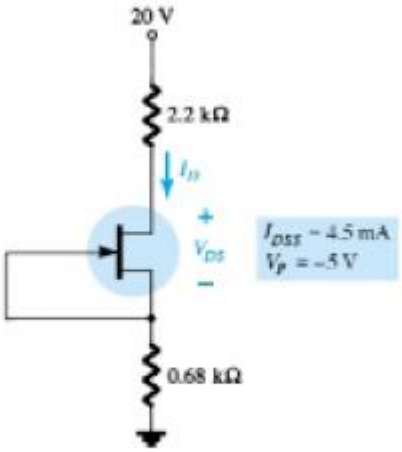
Observação – ignore o pedido de comparação com solução gráfica (problema 6)
R: (a) Idq=2.6mA Vgs=-1.95



8. For the network of Fig. 6.73, determine:
   (a) V_{GS_Q} and I_{D_Q}.
   (b) V_{DS}, V_D, V_G, and V_S.

Figure 6.73 Problem 8

R: (a) Idq=1.73mA (b) Vgs=-2.76 Vds=5.42 Vd=8.19 Vs=2.77 Vg=0



* 10. For the network of Fig. 6.75, determine:
   (a) I_D.
   (b) V_{DS}.
   (c) V_D.
   (d) V_S.

Figure 6.75 Problem 10

R: (a) Idq=Idss=4. 5mA (b) Vds=7.04 (c) Vd=10.1V (d)Vs=3.06

* **11.** Find V_S for the network of Fig. 6.76.

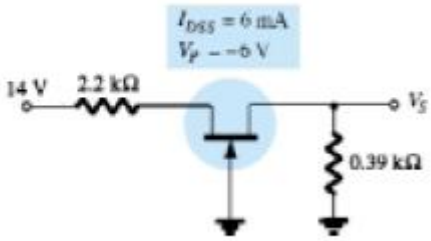


Figure 6.76 Problem 11

R: (a) Idq=3.55mA Vs=1.38V

12. For the network of Fig. 6.77, determine:
(a) V_G.
(b) I_{D_Q} and V_{GS_Q}.
(c) V_D and V_S.
(d) V_{DS_Q}.

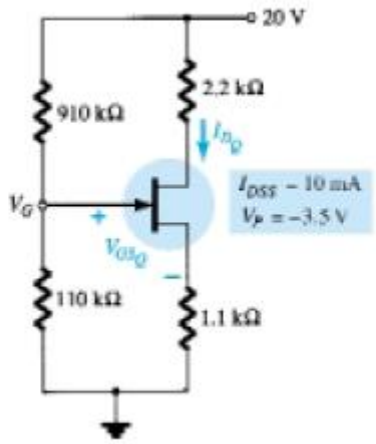
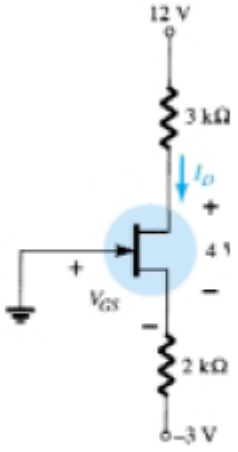


Figure 6.77 Problems 12, 13

Façam esse, matematicamente! Vão ter que ralar miúdo e pensar um pouco. Qquer coisa me consultem

R: Idq=3.3mA Vg=2.13 Idq=3.3mA Vgsq= -1.5 Vd=12.74V Vs=3.63 Vdsq=9.11



* **16.** Given $V_{DS} = 4$ V for the network of Fig. 6.80, determine:
(a) I_D.
(b) V_D and V_S.
(c) V_{GS}.

Figure 6.80 Problem 16

R: (a) Idq=2.2mA (b) Vd=5.4V Vs=1.4V (c) Vgs=-1.4V

* **23.** Design a self-bias network using a JFET transistor with $I_{DSS} = 8$ mA and $V_P = -6$ V to have a Q-point at $I_{D_Q} = 4$ mA using a supply of 14 V. Assume that $R_D = 3R_S$ and use standard values.

R: Vgs=-1.75V Rs=440 Ohms e Rd=1K32