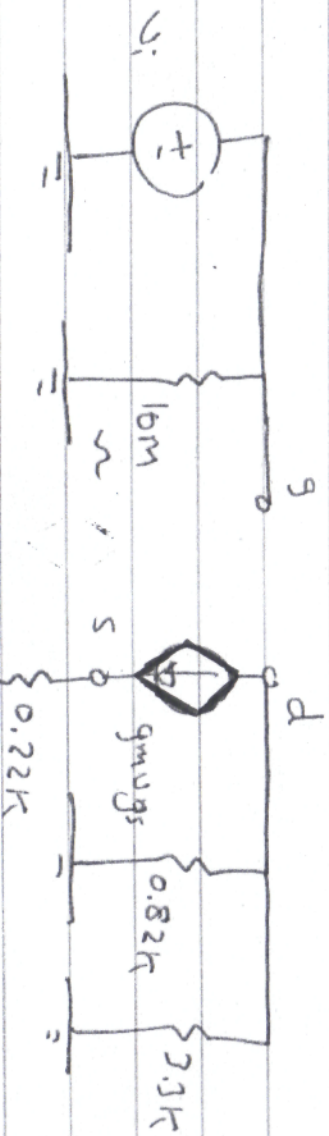


8.16 ac Small Signal Equivalent CRT



given $I_{DSS} = \frac{I_{DSS}}{2} = 6.35 \text{ mA}$

$$g_m = \frac{2I_{DSS}}{|V_P|} \left(1 - \frac{V_{GS}}{V_P} \right)$$

$$V_{GS} = V_G - V_S = -(0.22\text{k})(6.35\text{mA}) = -1.397\text{V}$$

$$\therefore g_m = 4.13 \text{ mS}$$

$$V_{GS} = -g_m v_{gs} \quad (0.82\text{k} \parallel 3.3\text{k})$$

$$v_{gs} = v_g - v_s$$

$$v_{gs} = v_i - g_m v_{gs} \quad (0.22\text{k})$$

$$v_{gs} = \frac{v_i}{1 + g_m(0.22\text{k})}$$

$$\therefore A_v = -1.4219$$