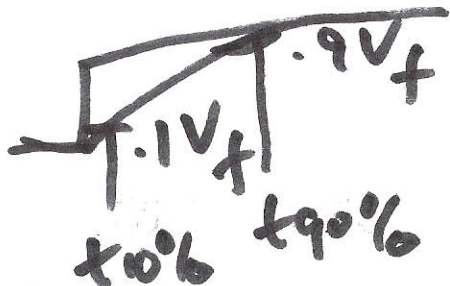
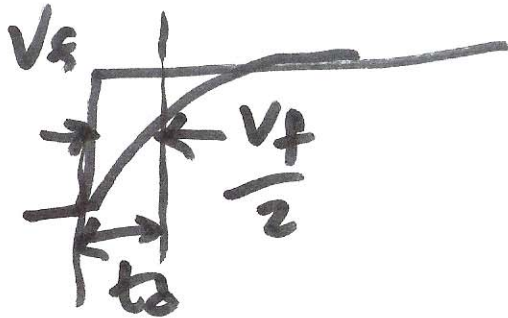
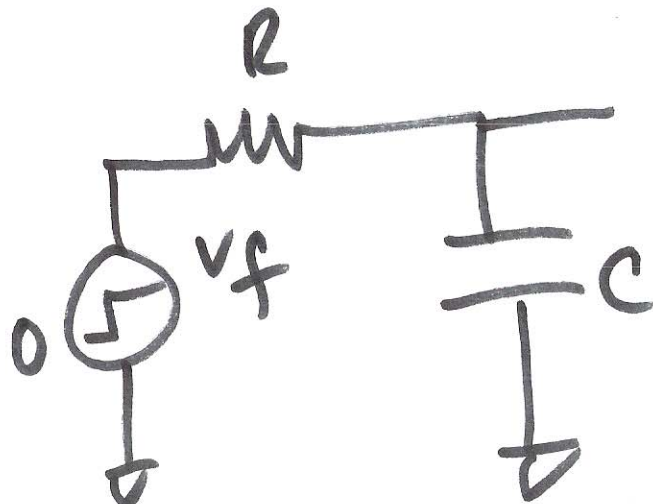


24.1.3



$$v_{out} = V_f (1 - e^{-t/RC})$$

$$\frac{V_f}{2} = V_f (1 - e^{-t_d/RC})$$

$$t_d \approx 0.7 RC$$

$$t_r = t_{90\%} - t_{10\%} = \frac{t_{90\%}}{RC} - \frac{t_{10\%}}{RC}$$

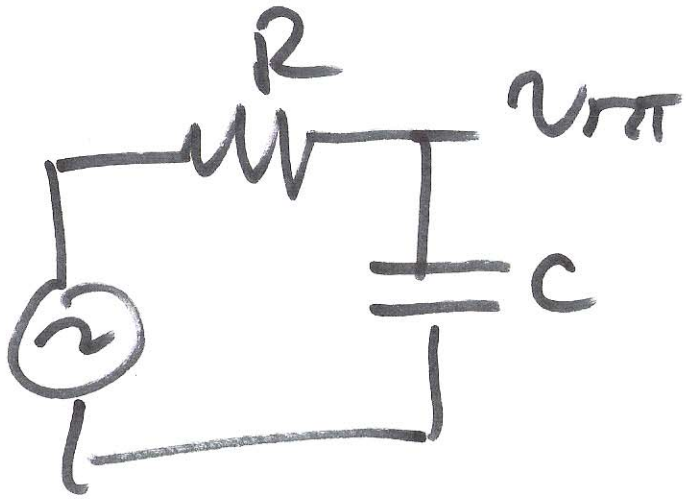
$$.9 V_f = V_f (1 - e^{-t_{90\%}/RC})$$

$$.1 V_f = V_f (1 - e^{-t_{10\%}/RC})$$

$$t_r = 7.2 RC$$

1)

open-loop
 v_{in}



$$f_{3dB} = \frac{1}{2\pi RC}$$

$$RC = \frac{t_r}{2.2}$$

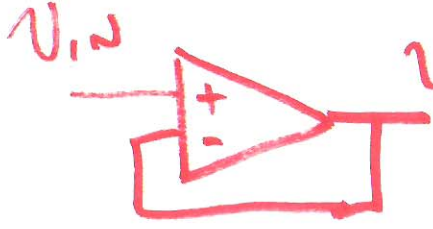
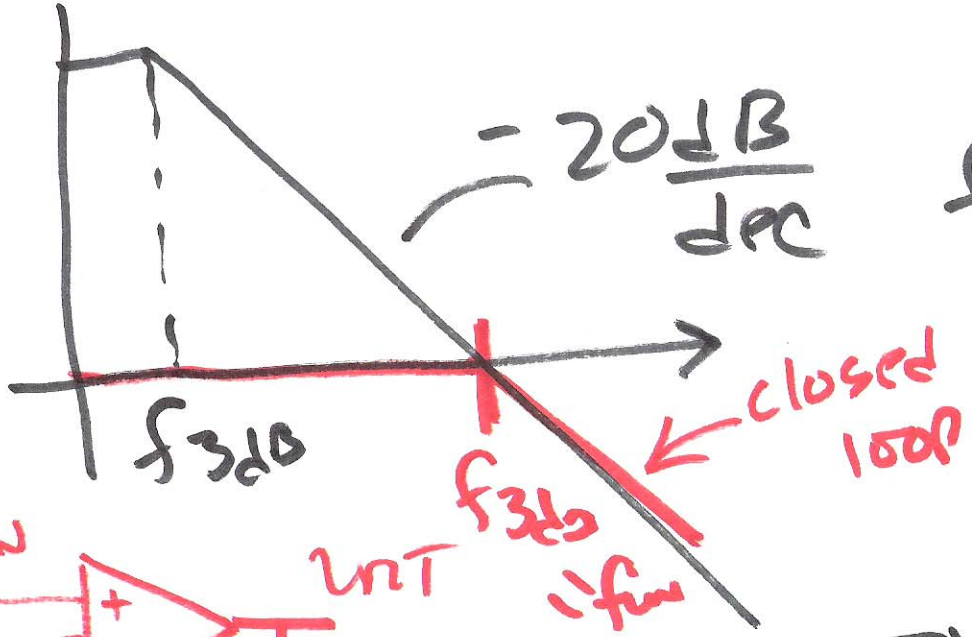
$$f_{3dB} = \frac{2.2}{2\pi \cdot t_r}$$

$$= \frac{0.35}{t_r}$$

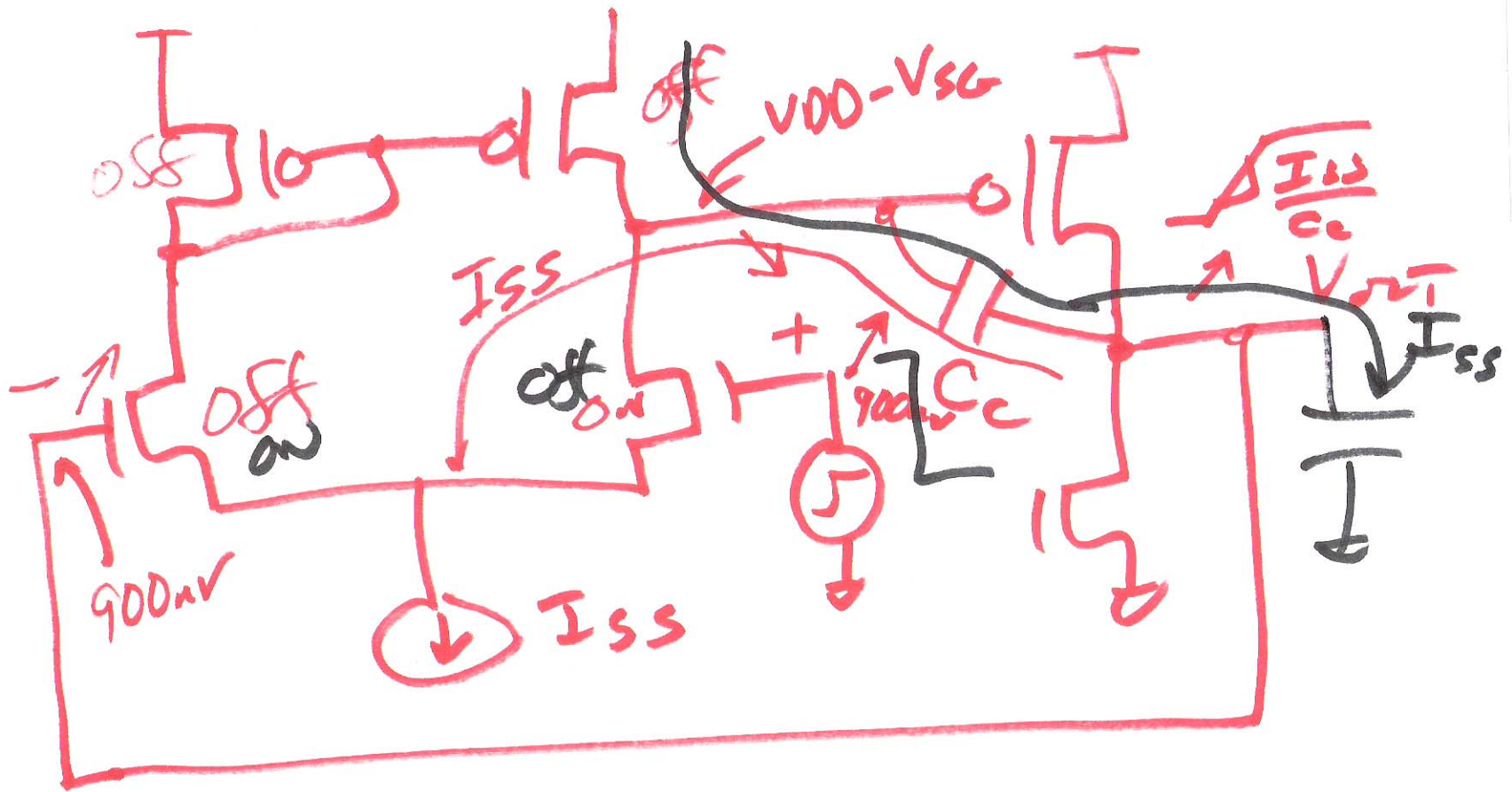
$$t_r = \frac{0.35}{f_{3dB}}$$

$$f_{3dB} = 100\text{MHz} = 10^8 \text{ Hz}$$

$t_r = 3.5\text{ns}$



2)



3)