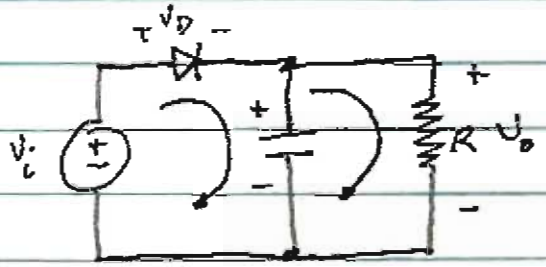


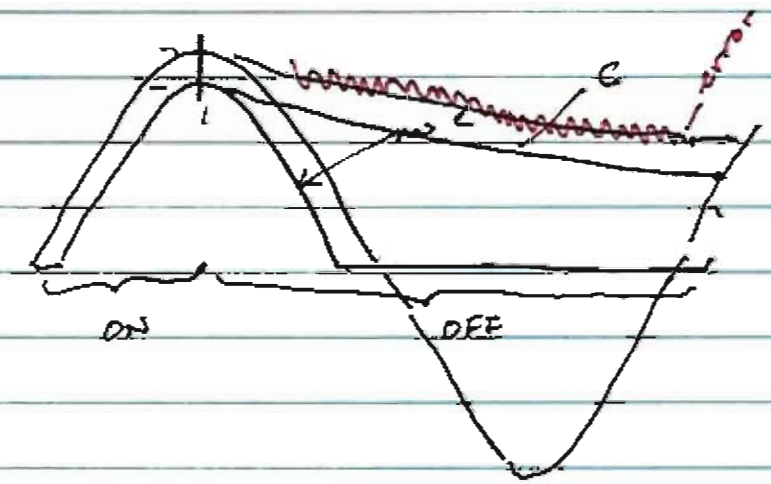
Diode "ON"

$V_o = V_c$

$V_o = V_i - V_D$ (protects V_D conduct)

$i_L = \frac{V_o}{R}$

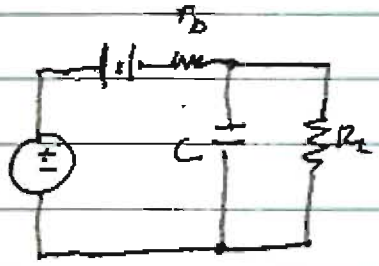
$i_D = i_C + i_L$



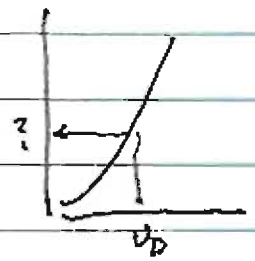
just after turnoff $-i_C = i_L$

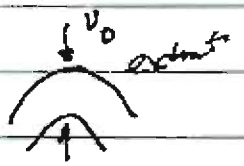
Diode "OFF"

just before turn on $-i_C = i_L$



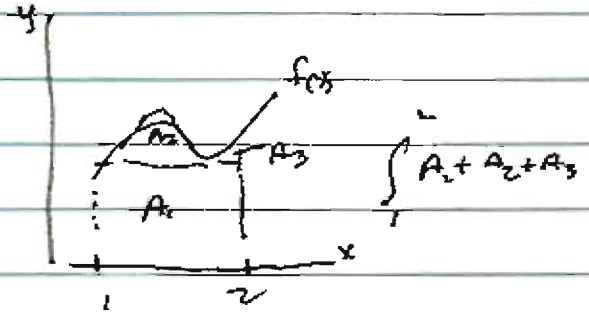
Question





i_D same for each

Graphical integration



$$\text{Avg over } T = \frac{1}{T}\int_T f(t)\,dt$$

$$\text{Avg over } x = \frac{1}{x_2 - x_1}\int_{x_1}^{x_2} f(x)\,dx$$

$$= \frac{A_1 + A_2 + A_3}{2-1} \checkmark$$

Device imbeded in circuit.

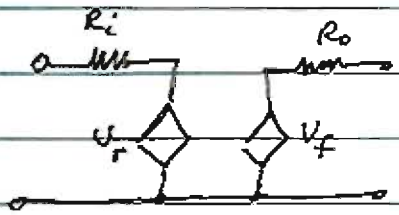
Circuit: 1. bias the device
2. provide input signal path
3 provide output signal path

} must agree

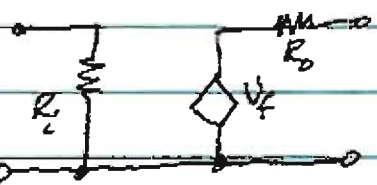
use a circuit model for device

result: a new and larger circuit → analysis

reduce larger circuit to a simple Thev'or Norton model at input and output.

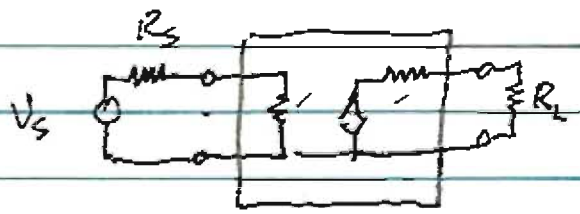


usually $V_r \simeq 0$



3 specifics

loading < input / output



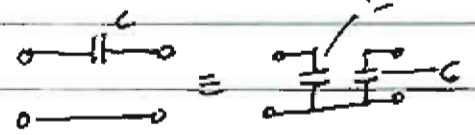
input amp output

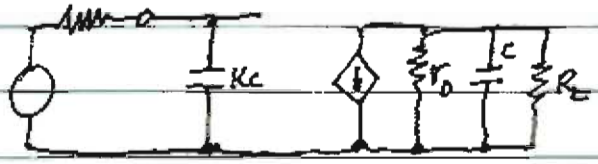
✓

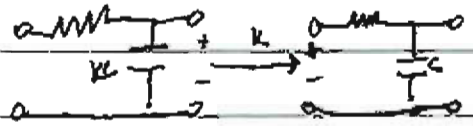
Common Source amp (CS)

Suppose $R_s = 0$

Miller Effect





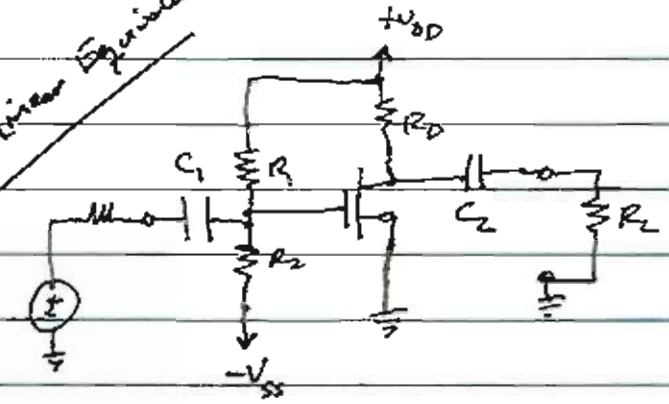


ω_0 for STC is $\frac{1}{RC}$

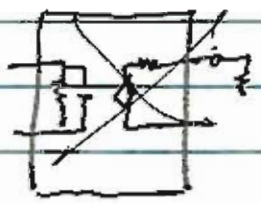
cutoff ω @ input is approx K times lower than at output

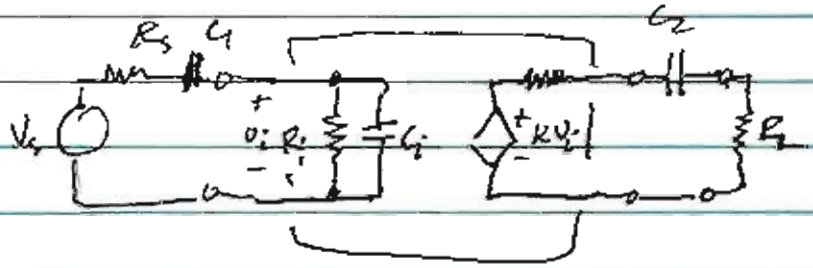
IGNORE OUTPUT CUTOFF

Schematic to linear Equivalent



1. Remove DC supplies
2. Determine freq of analysis





3. Draw appropriate equivalent circuit

coupling caps determine LF cutoff

parasitic caps (device) determine HF cutoff

4. Perform Analysis

both input & output affect LF cutoff

Use Thevenin or Norton models @ input & output

4 permutations

Voltage output: open circuit output gain

current output: short circuit output gain

refer to table in text

$i_n = i_{sc}$

$V_t = V_{oc}$

Transistor Gain Bandwidth

"Short-circuit cutoff freq for a transistor

$f_T \quad f_I$

measure of bandwidth of transistor (refer to text)