

Mid-Term Exam, ECE-137B

May 12 , 2006

Closed-Book Exam

There are 2 problems on this exam , and you have 50 minutes.

1) show all work. Full credit will not be given for correct answers if supporting work is not shown.

2) please write answers in provided blanks

3) Don't Panic !

4) 137a, 137b crib sheets, and 2 pages personal sheets permitted.

Do not turn over the cover page until requested to do so.

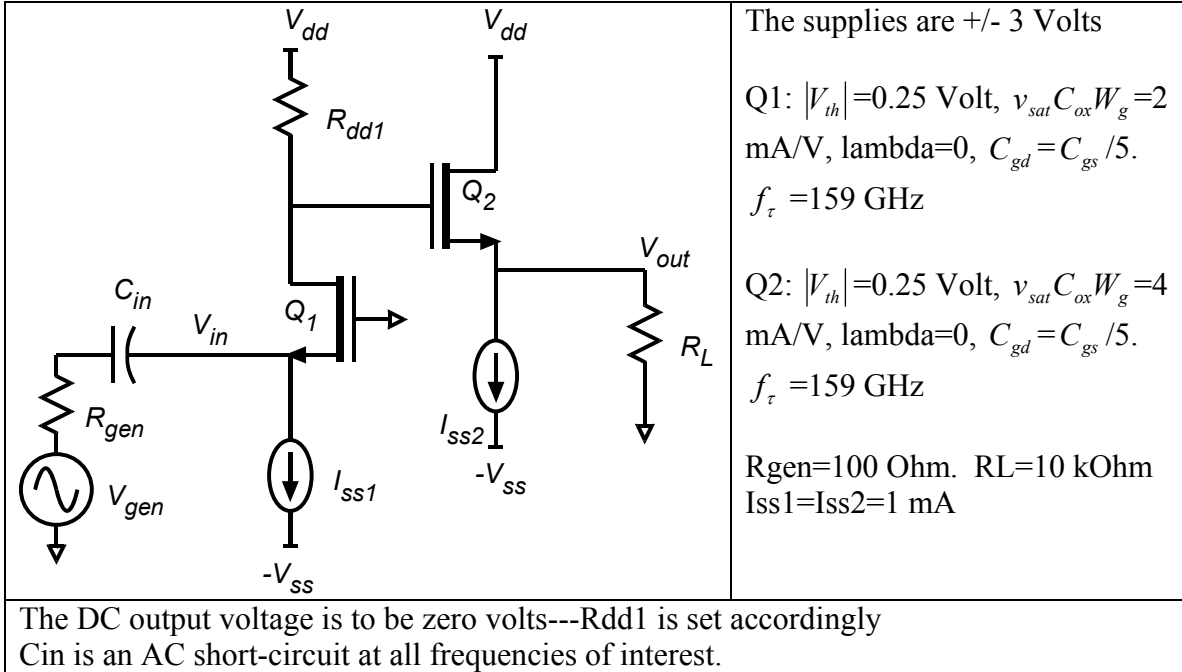
Name:

Use any and all reasonable approximations. 5% accuracy is fine if the method is correct.

Time function	LaPlace Transform
$\delta(t)$	1
$U(t)$	$1/s$
$e^{-\alpha t}U(t)$	$\frac{1}{s + \alpha}$
$e^{-\alpha t} \cos(\omega_d t)U(t)$	$\frac{s + \alpha}{(s + \alpha)^2 + \omega_d^2}$
$e^{-\alpha t} \sin(\omega_d t)U(t)$	$\frac{\omega_d}{(s + \alpha)^2 + \omega_d^2}$

Problem	Points Received	Points Possible
1a		25
1b		25
1c		50
total		100

Problem 1, 100 points



Part a, 25 points

Find the following

$R_{dd1} =$ _____ DC voltage at the drain of Q1 = _____

C_{gd} of Q1 = _____ C_{gs} of Q1 = _____

C_{gd} of Q2 = _____ C_{gs} of Q2 = _____

Part b, 25 points

Mid Band Analysis:

Find the mid-band small signal voltage gain of Q2 (the small signal voltage at the source of Q2 divided by the small signal voltage at the gate of Q2)

$A_{v2} = \underline{\hspace{2cm}}$

Find the mid-band small signal voltage gain of Q1 (the small signal voltage at the drain of Q1 divided by the small signal voltage at the source of Q1)

$A_{v1} = \underline{\hspace{2cm}}$

Find V_{in}/V_{gen}

$V_{in}/V_{gen} = \underline{\hspace{2cm}}$

Part c: 50 points

The circuit has 3 poles and one zero in its transfer function.

Give the frequencies of these in Hz:

$$f_{p1} = \underline{\hspace{2cm}}, \quad f_{p2} = \underline{\hspace{2cm}}$$

$$f_{p3} = \underline{\hspace{2cm}}, \quad f_z = \underline{\hspace{2cm}}$$

