## Lecture \#28

## Midterm Exam \#2

- Monday 11/3 11:10AM - 12:00PM
- Closed book; 2 sheets of notes \& calculator allowed
- Locations:
- Students with last names beginning A - K: 4 LeConte
- Students with last names beginning L - Z: Sibley Aud.


## OUTLINE

- Common-source amplifier example
- $1^{\text {st}}$-order circuit examples
-Diode circuit examples


## CS Amplifier Example

The MOSFET in the inverter circuit shown below has $W / L=3, k^{\prime}=50 \mu \mathrm{~A} / \mathrm{V}^{2}, V_{T}=1 \mathrm{~V}$, and $\lambda=0 \mathrm{~V}^{-1}$
a) Sketch $i_{D}$ vs. $v_{D S}$ for $v_{G S}=3 \mathrm{~V}$
b) Sketch the load line on the same plot
c) What is $v_{\text {OUT }}$, for $v_{G S}=3 \mathrm{~V}$ ?
d) Draw the small-signal equivalent circuit for $V_{G S}=3 \mathrm{~V}$
e) Find the incremental change in the output voltage, $v_{\text {out }}$, for a 0.1 V incremental change in the input voltage (i.e. $v_{g s}=0.1 \mathrm{~V}$ )
f) How would your answer to part (e) change if $R_{D}$ is changed to $25 \mathrm{k} \Omega$ ?



## Diode Circuit Examples

Find the values of $I$ and $V$, assuming that the diodes are perfect rectifiers:


