UNIVERSITY OF CALIFORNIA
College of Engineering
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EEECS100/42, Fall 2009   **T. K. Gustafson**

NAME(PLEASE PRINT CLEARLY):

S.I.D. :

Fall 2009

Due : Oct 28 at lecture

Problem Set No. 4

Based upon Chapters 3-5 of Hambley, further use of LTSpice Basic MOSFET (12.1,12.2),
Diode (10.4-10.7) ,and Transistor (13.1-13.4).

Problem Number one) Given initial current find voltage!
a) Hambley 3.11. In addition sketch the stored energy versus time.
b) Hambley 4.45
c)Hambley 3.71. Why do you get v(t) =0 for the answer?

Problem Number two) Transient and Steady State Capacitors and inductors
a) Hambley 4.27
b) Hambley 4.11
c) Hambley 4.49

Problem No 3) Transient and Steady State Sinusoidal Excitation of an R-L Circuit
Hambley 4.48

Problem No 4) Transient and Steady State Sinusoidal Excitation of a series resonant circuit
a) Hambley 4.64 Do this any way you wish.
b) Verify the result of a) using LTSpice by plotting the amplitude (lg-lg) (and phase) of
$v_c(t)$ over a frequency range of 1 Hz to 1 kHz. What is the slope of the line beyond 100 Hz
(dB/decade). (Note LTSpice does this automatically when you ask it to plot $v_c(t)$.

Problem No 5) Basic Amplifier Parameters
Problem 11.7 of Hambley

Problem No 6) Field Effect Transistor
a) Problem 12.2 of Hambley
b) Using LTSpice obtain the drain characteristics of the Infineon BSS145 n-channel FET (its
listed). To do this place voltage sources between the gate and ground (source) and between

the drain and ground (source). Do a d. c. sweep of the 1st voltage source (drain-source) between 0 and 5 volts. Use an increment of .01. Also ask for a sweep of the 2nd voltage source (drain-source) between 2 and 5 volts with an increment of .5 V. Then simulate-run and finally under "view" click Id(M1)

Problem No 7) Diode Circuit
Problem 10.71 of Hambley. If you wish to simulate it, a frequency of 1000 rad / sec , C values of .001 F and R= 1k will show the results. A transient analysis out to 10 ms. is sufficient