



University of California, Los Angeles
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Mon, July 30th, 2012, 1:00 – 3:00 pm

EE115A: Summer 2012—MIDTERM

NAME	SOLUTION
	Last First

SID#	
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PART 1 – MULTIPLE CHOICE QUESTIONS

Please choose **ONLY ONE** answer.

No cheat sheet is allowed.

Mark all your answers in the table below.

Answers marked anywhere else will not be graded.

#	A	B	C	D	E	#	A	B	C	D	E
1						9					
2						10					
3						11					
4						12					
5						13					
6						14					
7						15					
8						Total: _____ / 15					

MC 1: Which of the following equations is correct for a capacitor (C)?

a) $i = v \frac{dC}{dt}$

b) $i = C \frac{dv}{dt}$

c) $v = C \frac{di}{dt}$

d) $C = i \frac{dv}{dt}$

e) None of above.

MC 2: Which of the following equations is correct for an inductor (L)?

a) $i = v \frac{dL}{dt}$

b) $v = L \int i dt$

c) $v = L \frac{di}{dt}$

d) $i = v \frac{dL}{dt}$

e) None of above.

MC 3: Which of the following is correct?

a) $I_{DC} = C \frac{dv_{DC}}{dt}$

b) $I_{DC} = L \frac{dv_{DC}}{dt}$

c) $V_{DC} = C \frac{dI_{DC}}{dt}$

d) $V_{DC} = L \frac{dv_{DC}}{dt}$

e) None of above.

MC 4: Which parameter is calculated using the following equation?

$$? = \left(\frac{2\varepsilon}{q} V_{bi} \frac{N_A + N_D}{N_A N_D} \right)^{\frac{1}{2}}$$

a) C_D

b) W

c) ϵ

d) I_o

e) None of above.

MC 5: In order to carry out the superposition on a circuit with two or more DC power supplies, after connecting all the supplies to the circuit:

a) All power supplies should be short circuited except one.

b) All power supplies should go to zero except one.

c) All DC power supplies should remain as a power supply.

d) All power supplies should remain open except one.

e) None of the above answers are correct.

MC 6: When a PN junction is reverse biased, the dominant carriers which make the current are:

a) Diffusion carriers and recombination.

b) Diffusion carriers and generation.

c) Drift carriers and diffusion carriers.

d) Drift carriers and generations.

e) Drift carriers and recombination.

MC 7: When a diode is in the forward biased condition, the dominant carriers which generate current are:

a) Diffusion carriers and recombination.

b) Diffusion carriers and generation.

c) Drift carriers and diffusion carriers.

d) Drift carriers and generations.

e) Drift carriers and recombination.

MC 8: A resistor value at 20°C is $4\text{k}\Omega$. If its temperature coefficient is $\alpha=0.02/1^\circ\text{C}$, what will be the value of that resistor at 95°F ?

a) $4.8\text{ k}\Omega$

b) $6\text{ k}\Omega$

c) $10\text{ k}\Omega$

d) $5.2\text{ k}\Omega$

e) None of above.

MC 9: Let's assume we have a large capacitor. Now, this capacitor will block:

- a) DC values and AC signals.
- b) Only DC but not AC signals.**
- c) Only AC but not DC voltages.
- d) It will not block either.

(Used for the following 2 questions): A system has the following transfer function:

$$H(s) = \frac{\frac{1}{C}s}{s^2 + \frac{R}{L}s + \frac{1}{LC}}$$

MC 10: What kind of filter is realized by the transfer function $H(s)$?

- a) Low Pass Filter.
- b) High Pass Filter.
- c) Band Pass Filter.**
- d) Band Reject Filter.
- e) None of above.

MC 11: What is the expression for the center frequency ω_o in this filter?

- a) $\omega_o = RC$
- b) $\omega_o = \sqrt{LC}$
- c) $\omega_o = 1/RC$

d) $\omega_o = 1/\sqrt{LC}$

e) None of above.

Which answer best completes the statements in the following 4 questions? (Fill in the blank)

MC 12: An ideal current source has _____ output admittance so the voltage across it is _____ and determined by _____ connected to it.

- a) Zero, fixed, the circuit.
- b) Zero, arbitrary, the circuit.**
- c) Infinite, fixed, source value.
- d) Infinite, arbitrary, the circuit.

e) Infinite, arbitrary, source value.

MC 13: An ideal voltage source has _____ output impedance so the current across it is _____ and determined by _____ connected to it.

a) Zero, fixed, the circuit.

b) Zero, arbitrary, the circuit.

c) Infinite, fixed, source value.

d) Infinite, arbitrary, the circuit.

e) Infinite, arbitrary, source value.

MC 14: Transient response is a _____-domain response to an input stimulus.

a) Frequency.

b) S.

c) Time.

d) Z.

e) None of above.

MC 15: An ideal op-amp has _____ input resistance, _____ output resistance, and _____ voltage gain.

a) Infinite, zero, limited.

b) Zero, infinite, limited

c) Zero, infinite, infinite.

d) Infinite, zero, infinite.

e) Zero, zero, infinite.