ECE 201 – Spring 2009
Exam #2
March 10, 2009

Division 0101: Elliott (9:30am)
Division 0201: Capano (10:30 am)
Division 0301: Jung (11:30 am)
Division 0401: Capano (3:30 pm)

Instructions

1. DO NOT START UNTIL TOLD TO DO SO.
2. Write your Name, division, professor, and student ID# (PUID) on your scantron sheet.
3. This is a CLOSED BOOKS and CLOSED NOTES exam.
4. There is only one correct answer to each question.
5. Calculators are allowed (but not necessary).
6. If extra paper is needed, use back of test pages.
7. Cheating will not be tolerated. Cheating in this exam will result in an F in the course.
8. If you cannot solve a question, be sure to look at the other ones and come back to it if time permits.
9. As described in the course syllabus, we must certify that every student who receives a passing grade in this course has satisfied each of the course outcomes. On this exam, you have the opportunity to satisfy outcomes i, iii, iv, and viii. (See the course syllabus for a complete description of each outcome.) On the chart below, we list the criteria we use for determining whether you have satisfied these course outcomes. Outcome i is a repeat. We use this outcome result only if you did not satisfy it previously.

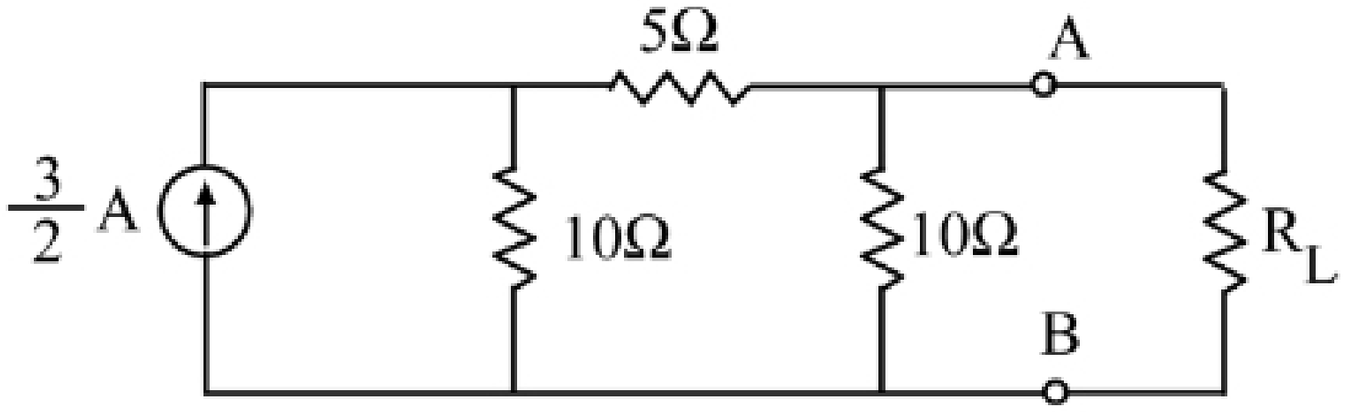
Course Outcome	Exam Questions	# of Questions	Minimum correct answers required to satisfy course outcome
i	2-6	5	3
iii	1, 2, 5, 7, 8	5	3
iv	7-13	7	3
viii	1	1	1

If you fail to satisfy any of the course outcomes, don't panic. There will be more opportunities for you to do so.

Potentially useful formulas are:

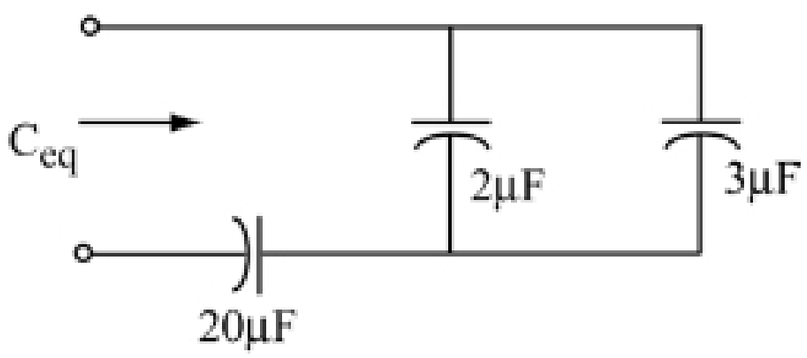
$$x(t) = x(\infty) + \left[x(t_0^+) - x(\infty)\right] e^{-(t-t_0)/\tau} \qquad \tau = L/R \qquad \tau = RC$$

1. The network shown delivers power to a load resistor R_L. Determine the resistor R_L that absorbs the maximum power from the source, and the power absorbed.



	$R_L(\Omega)$	$P_{L,opt}(W)$
(1)	6	6
(2)	6	3
(3)	6	1.5
(4)	10	22.5
(5)	10	15
(6)	10	10
(7)	25	56.25
(8)	25	12.5
(9)	25	10

2. Determine the equivalent capacitance of the network shown.

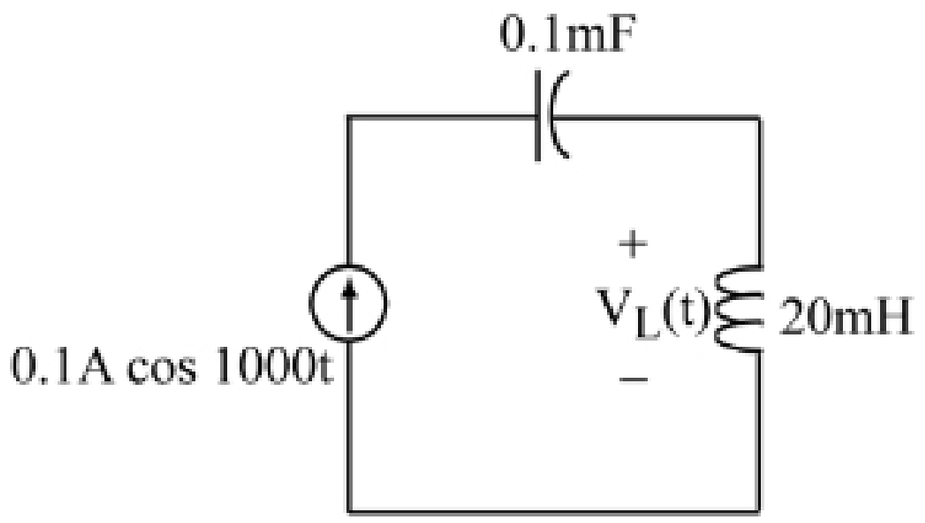


(1) 21.2 μF (2) 25.0 μF (3) 20.83 μF

(4) 4.0 μF (5) 1.13 μF (6) 4.81 μF

(7) 30.83 μF (8) 31.2 μF (9) 35.0 μF

3. The 0.1A cos 1000t current source drives the single loop network shown. The initial capacitor voltage is zero ($v_c(0) = 0$). Determine the voltage $V_L(t)$ across the inductor.

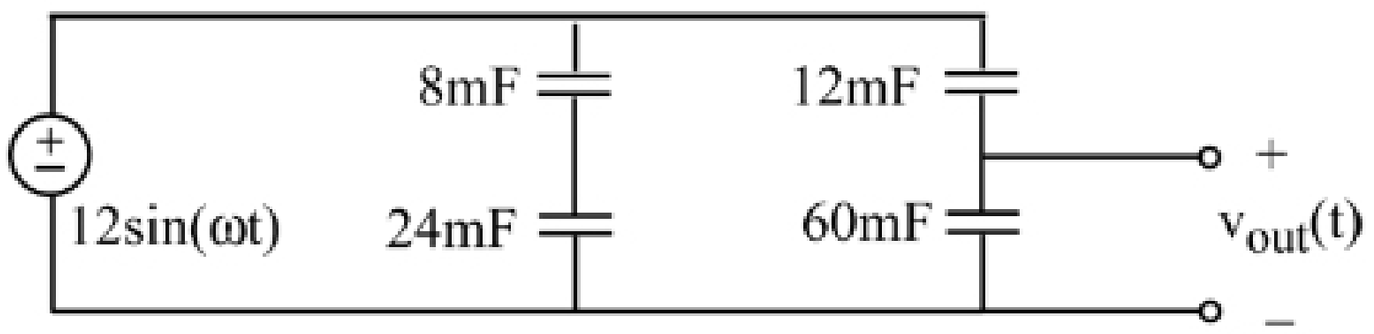


(1) -4V sin 1000t (2) -3V sin 1000t (3) -2V sin 1000t (4) -1V sin 1000t

(5) 0 (6) +1V sin 1000t (7) +2V sin 1000t (8) +3V sin 1000t

(9) +4V sin 1000t

4. Find v_{out} (in V): [V_{out} at t = 0 is zero.]



(1) sin (ωt) (2) 2 sin (ωt) (3) 3 sin (ωt) (4) 4 sin (ωt)

(5) 6 sin (ωt) (6) 36 sin (ωt) (7) 72 sin (ωt)