ECE 201 – Fall 2009
Exam #1

February 16, 2009

Division 0101: Elliott (9:30am)
Division 0201: Capano (10:30 pm)
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.

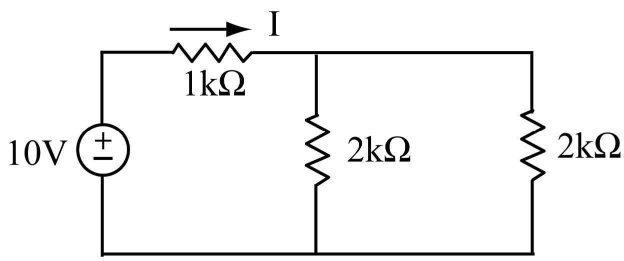
8. If you cannot solve a question, be sure to look at the other ones and come back to it if time permits.

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, ii, and iii. (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.

Course Outcome	Exam Questions	Total Points Possible	Minimum Points required to satisfy course outcome
i	1-4, 13, 14	42	21
ii	5-8	28	14
iii	9-12	28	14

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

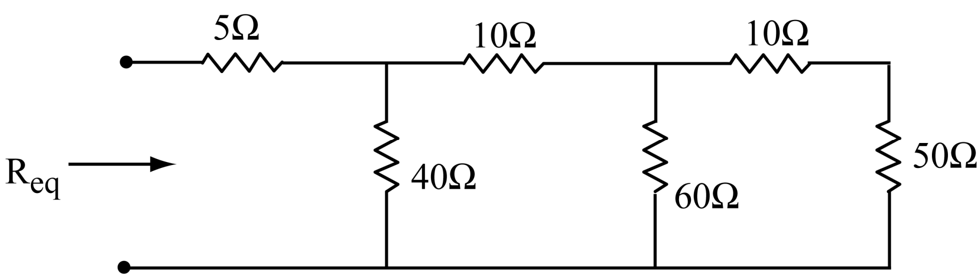
1. Find the value of I (in A).



(1) 1 (2) 2 (3) 3 (4) 4

(5) 5 (6) 6 (7) 7

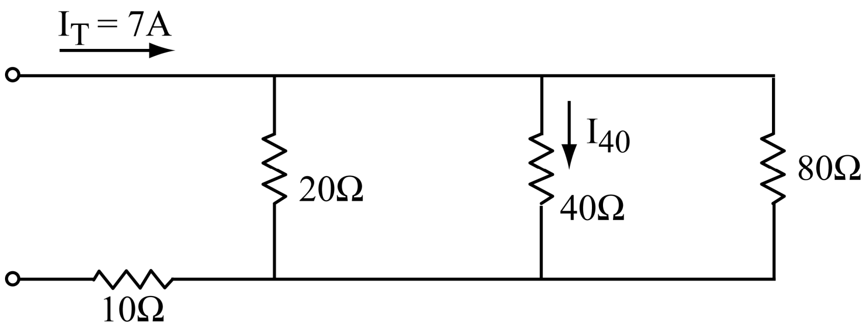
2. Find the equivalent resistance, R_{eq} (in Ω).



(1) 10 (2) 15 (3) 20 (4) 25

(5) 30 (6) 35 (7) 40

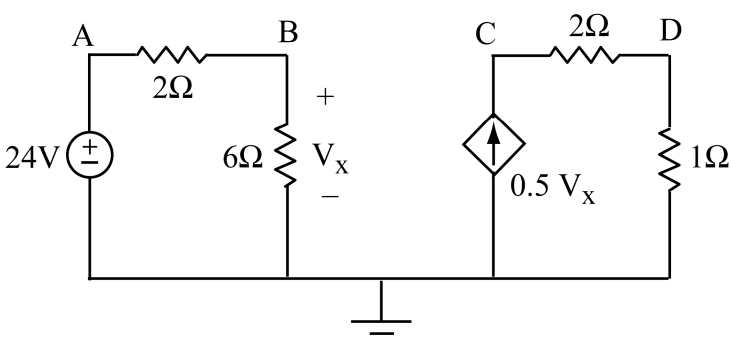
3. For the following network, determine I_{40}.



(1) 1A (2) 2A (3) 3A (4) 4A

(5) 5A (6) 6A (7) 7A

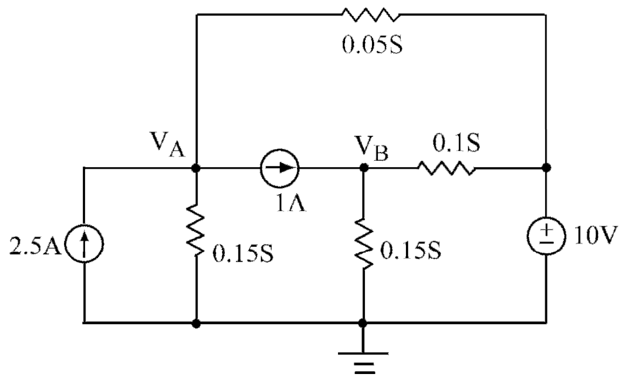
4. In the circuit below, find the potential, V_{BC} ($V_{BC} = V_B - V_C$) (in V).



(1) -1 (2) 4 (3) -9 (4) 16

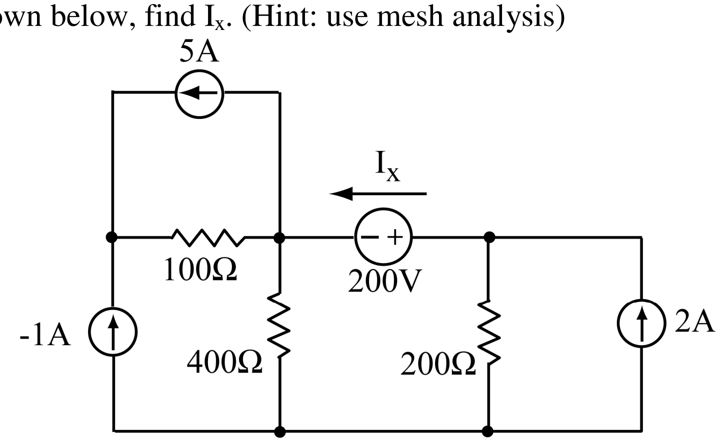
(5) -25 (6) 36 (7) -49

5. For the circuit shown below, find V_{AB}. ($V_{AB}=V_A-V_B$).



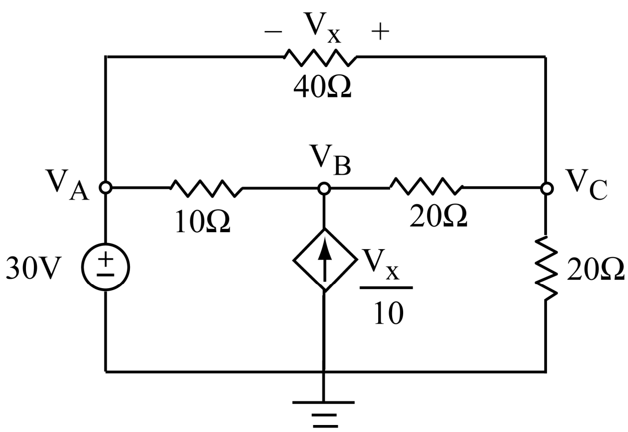
(1) 0 V (2) 1 V (3) -1 V (4) 2 V
(5) -2 V (6) 3 V (7) -3 V

6. For the circuit shown below, find I_x. (Hint: use mesh analysis)



(1) 0 A (2) 1 A (3) -1 A (4) 2 A
(5) -2 A (6) 3 A (7) -3 A

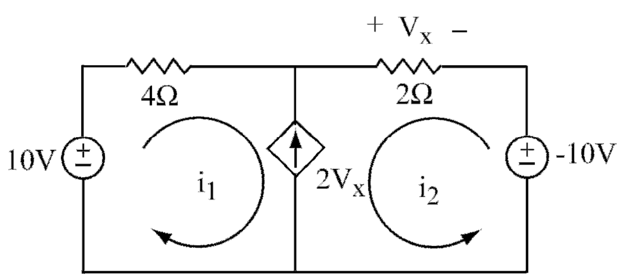
7. Using Nodal analysis, determine V_c in the following network.



(1) -10V (2) -5V (3) 0 (4) 5V

(5) 10V (6) 15V (7) 20V

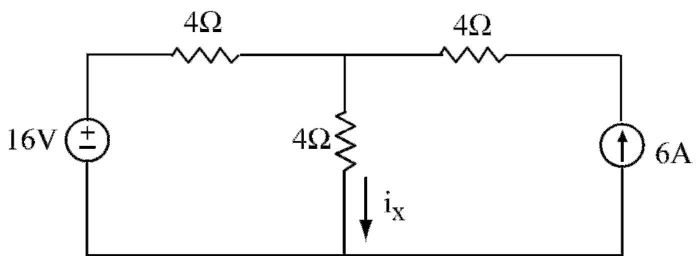
8. Find the mesh current, i_2, for the circuit below (in A).



(1) 1 (2) 2 (3) 3 (4) 4

(5) -2 (6) -3 (7) -4

9. Using superposition principles, find the contributions to the current i_x from each source (VS – voltage source active; CS – current source active)



(1) i_x(VS) = 0.5A ; i_x(CS) = 2A

(2) i_x(VS) = 1A ; i_x(CS) = 2A

(3) i_x(VS) = 1.5A ; i_x(CS) = 4A

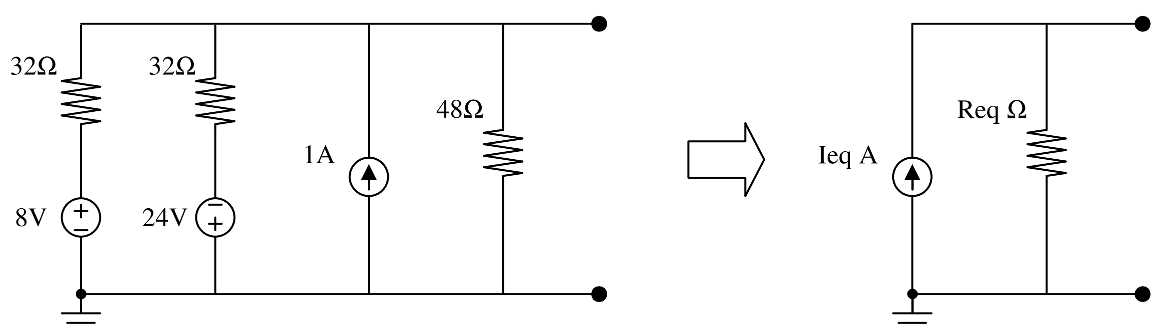
(4) i_x(VS) = 16A ; i_x(CS) = 1.5A

(5) i_x(VS) = 0.3A ; i_x(CS) = 0.75A

(6) i_x(VS) = 4A; i_x(CS) = 1A

(7) i_x(VS) = 2A ; i_x(CS) = 3A

10. Use a series of source transformation to simplify the circuit shown below (left) into one consisting of a single current source in parallel with a single resistance (right). Determine Ieq and Req.



(1) Ieq = 0.5 A, Req = 12 Ω

(2) Ieq = 0.5 A, Req = 24 Ω

(3) Ieq = 1.0 A, Req = 12 Ω

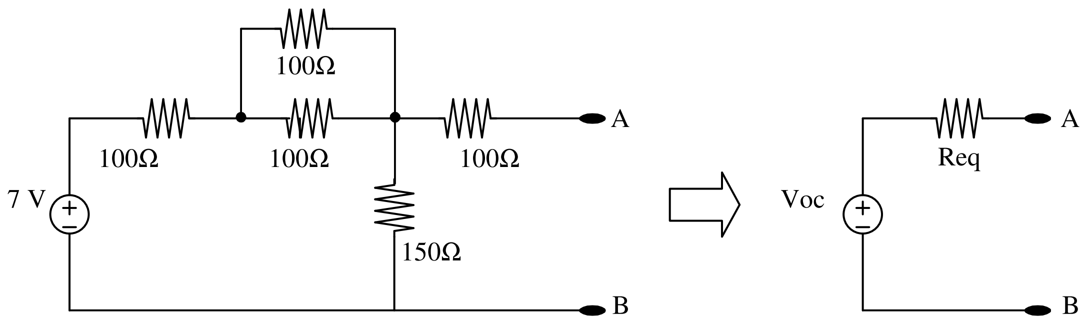
(4) Ieq = 1.0 A, Req = 24 Ω

(5) Ieq = 1.5 A, Req = 12 Ω

(6) Ieq = 1.5 A, Req = 24 Ω

(7) Ieq = 2.0 A, Req = 12 Ω

11. Find the Thévenin equivalent seen at terminals A-B for the circuit shown below.



(1) Voc = 3.0 V, Req = 150 Ω

(2) Voc = 3.0 V, Req = 175 Ω

(3) Voc = 3.5 V, Req = 150 Ω

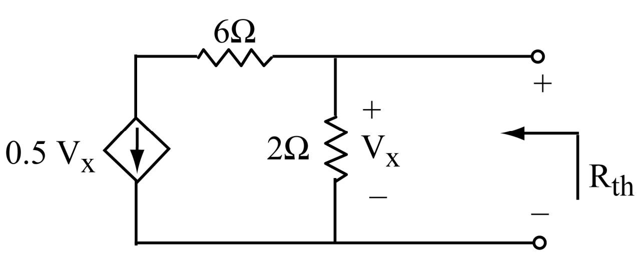
(4) Voc = 3.5 V, Req = 175 Ω

(5) Voc = 4.0 V, Req = 150 Ω

(6) Voc = 4.0 V, Req = 175 Ω

(7) Voc = 4.5 V, Req = 150 Ω

12. Find the Thévenin equivalent resistance, R_{th} for the circuit below (in Ω).



(1) 1

(2) 2

(3) 3

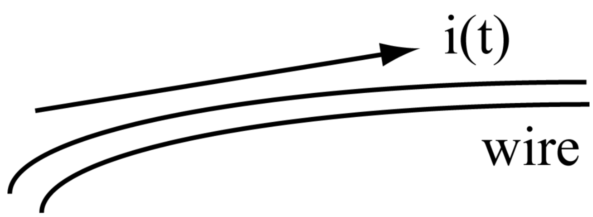
(4) 4

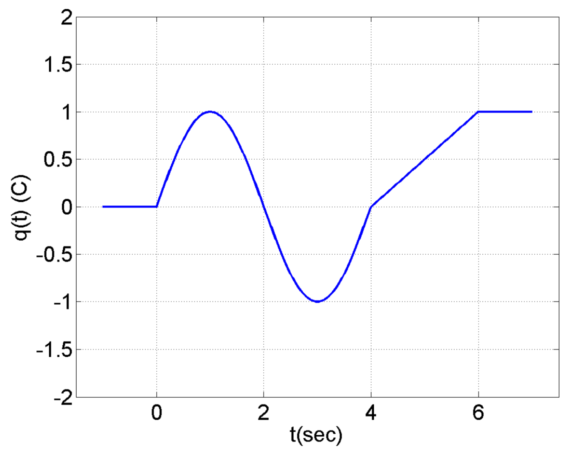
(5) 5

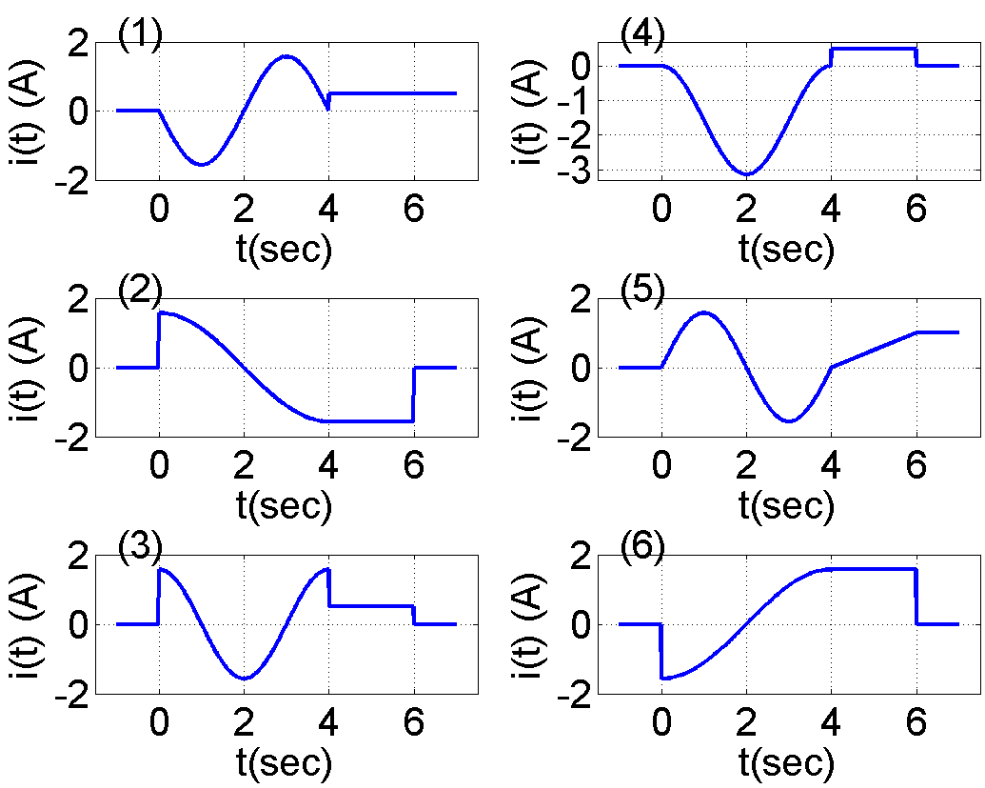
(6) 6

(7) 7

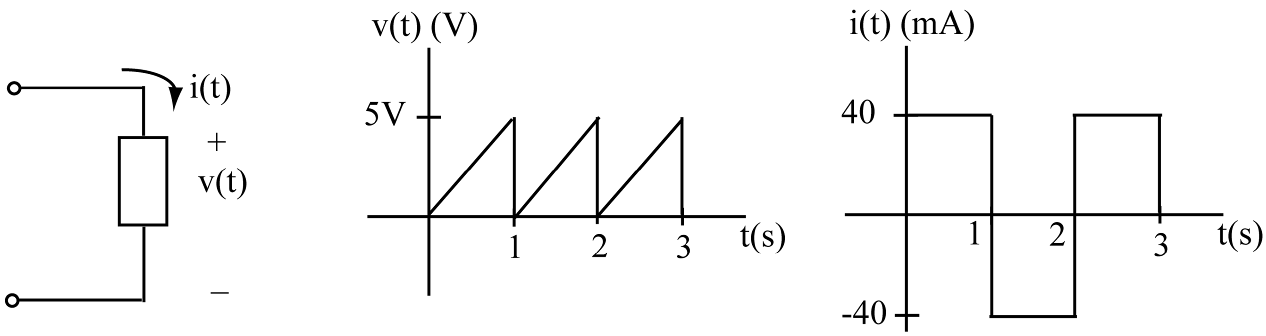
13. The total charge q(t) conducted past a cross section of the wire shown is given in the plot. Which plot below best represents the current i(t) in the wire.





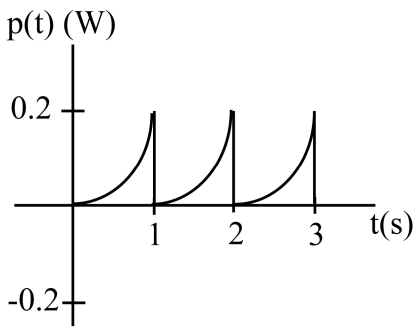


14. The voltage v(t) across an element and the current i(t) through the element are shown in the figure.

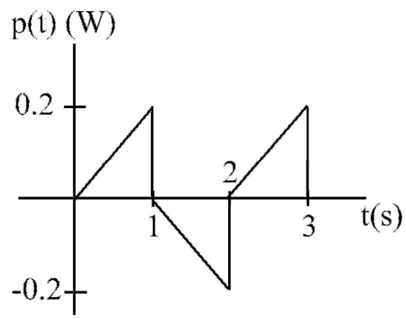


Which of the following plots best represents the power absorbed by this element?

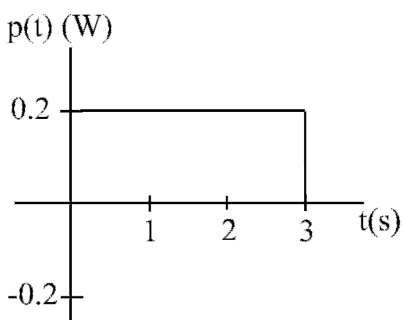
(1)



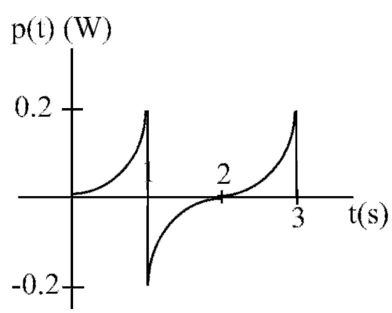
(4)



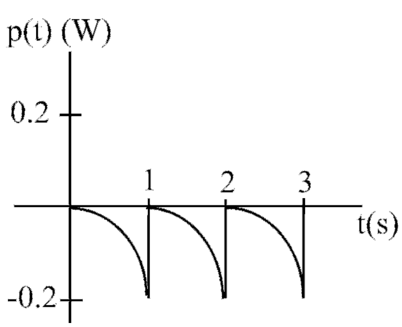
(2)



(5)



(3)



(6)