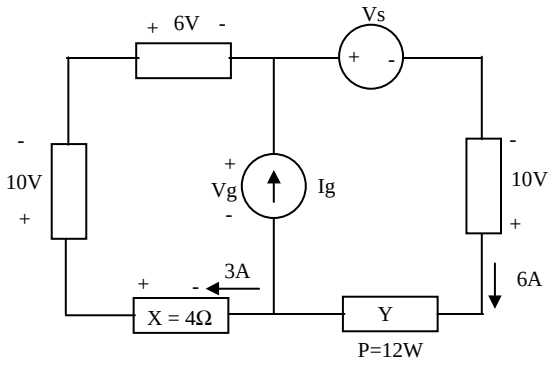
Initials_____ INEL 3105 Section 060
Last 4 digits ID_____ Electrical Systems Analysis I
December 13, 2005 Prof. Nayda G. Santiago

FINAL EXAM

Part I: Select the BEST answer. (4 points each). Circle only one answer. There is no partial credit.

Questions **1 to 6** refer to the following circuit:



(a) The number of nodes in the circuit is:
   (a) 4 nodes
   (b) 5 nodes
   (c) 7 nodes
   (d) 6 nodes
   (e) 8 nodes
   (f) None of the above

2. The voltage in passive element X is:
   (a) 0.75 V
   (b) –12 V
   (c) 7.5 V
   (d) 12 V
   (e) None of the above

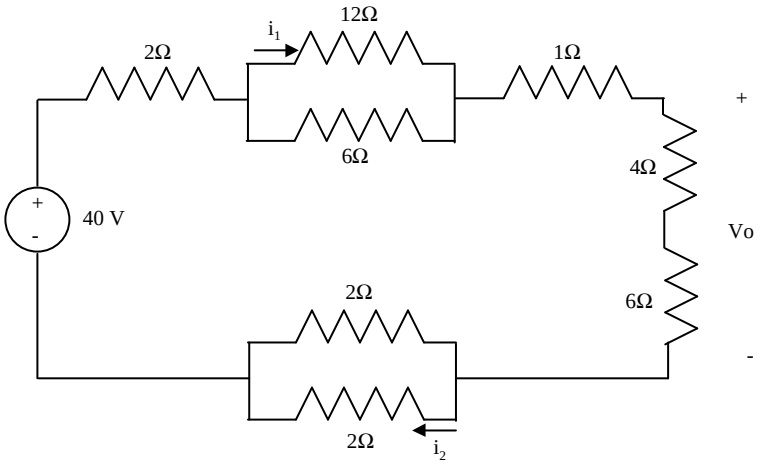
3. The voltage Vg is:
   (a) 28 V
   (b) 16 V
   (c) 4 V
   (d) –4 V
   (e) –28 V
   (f) None of the above

4. The power in element X is:
   (a) 576 W
   (b) –36 W
   (c) 36 W
   (d) –576 W
   (e) None of the above

5. The value of Vs is:
   (a) –16 V
   (b) –20 V
   (c) 20 V
   (d) 4 V
   (e) 40 V
   (f) None of the above

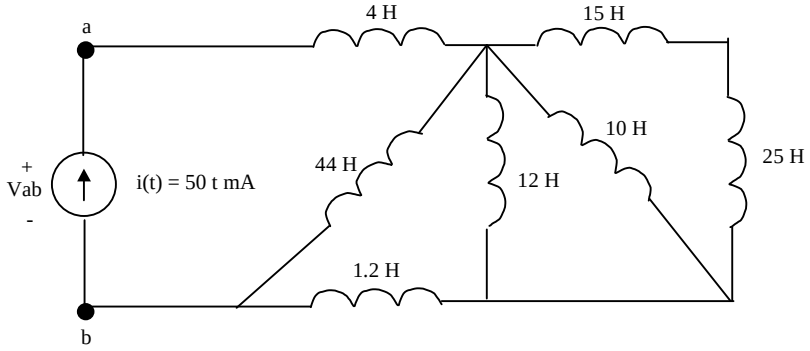
6. The power in element Vs is:
   (a) 24 W
   (b) 120 W
   (c) -120 W
   (d) -96 W
   (e) 240 W
   (f) None of the above

Questions **7 to 9** refer to the following circuit:



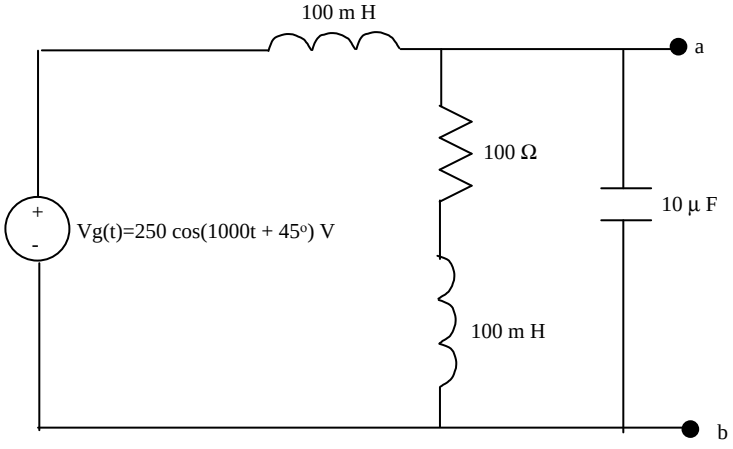
7. The voltage Vo is:
   (a) 88.8 V
   (b) 13.33 V
   (c) 11.43 V
   (d) 22.2 V
   (e) 15.35 V
   (f) None of the above
8. The current i_1 is:
   (a) 2.22 A
   (b) 3.33 A
   (c) 0.74 A
   (d) 1.48 A
   (e) 6.67 A
   (f) None of the above
9. The current i_2 is:
   (a) 1.11 A
   (b) 2.22 A
   (c) 0.74 A
   (d) 0.56 A
   (e) 4.44 A
   (f) None of the above

Questions **10 to 12** refer to the following circuit:



10. The equivalent inductance seen from terminals a and b is:
    (a) 9.28 H
    (b) 3.67 H
    (c) 9.28 Ω
    (d) 3.67 Ω
    (e) None of the above
11. The power supplied or dissipated by the current source at t = 2 seconds is:
    (a) 3.75 mW
    (b) -3.75 mW
    (c) -1.97 mW
    (d) 46.4 mW
    (e) -46.4 mW
    (f) None of the above

Questions **13 to 17** refer to the following circuit:

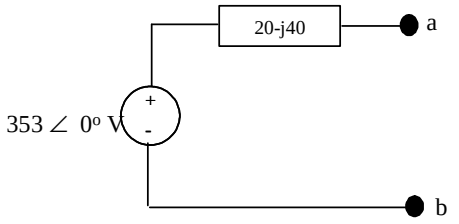


12. The voltage source phasor representation is:
    (a) 250 ∠-45°
    (b) 250 ∠135°
    (c) 250 ∠45°
    (d) 250 ∠1000°
    (e) None of the above
13. The impedance of the capacitor is:
    (a) j100 Ω
    (b) -j100 Ω
    (c) j 0.01 Ω
    (d) -j 0.01 Ω
    (e) None of the above

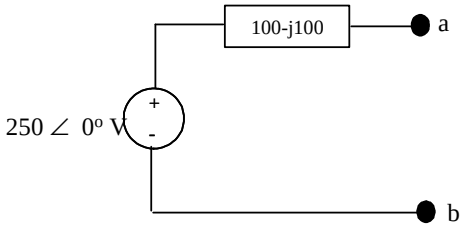
14. The impedances of the inductors are:
    (a) j100 Ω
    (b) -j100 Ω
    (c) j 0.01 Ω
    (d) -j 0.01 Ω
    (e) None of the above

15. The Thevenin equivalent circuit is:

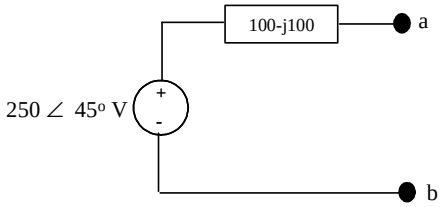
(a)



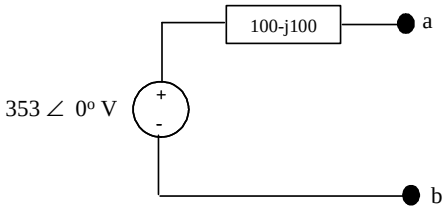
(b)



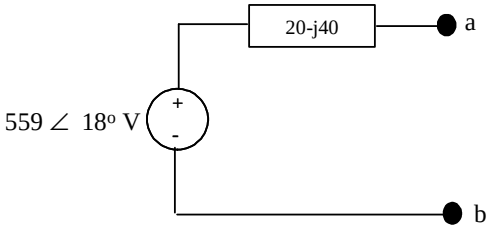
(c)



(d)



(e)

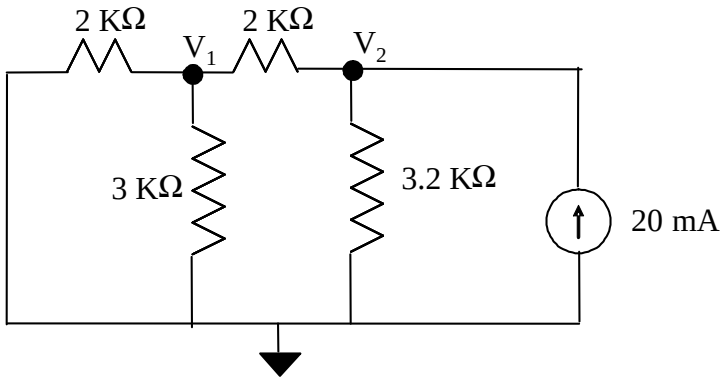


(f) None of the above

Part II

Problem 1 (20 points)

Use the **node-voltage method** to find V_1, and V_2 in the following circuit:



Problem 2 (20 points)

Use the concept of source transformation to find the phasor voltage V_0 for the following circuit.