Prof. R. Chedid FACULTY OF ENGINEERING & ARCHITECTURE SPRING TERM 2005-06

Name:.....

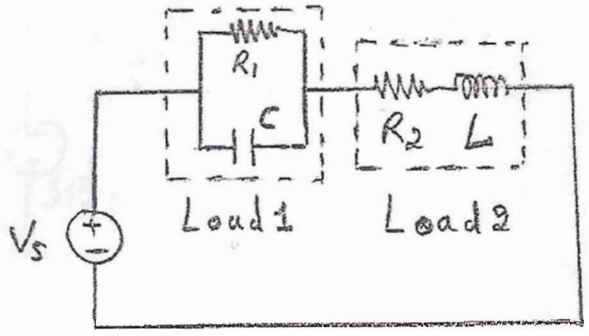
May 10, 2006

(EECE210) ELECTRIC CIRCUITS & ELECTRONICS

CLOSED BOOK (1 ½ HRS)

Programmable Calculators are not allowed
Provide your answers on the computer's card only
Return the computer's card attached to the question sheet
Mark with a pencil your last name, first name initial (FI) and father's name initial (MI).
Mark your AUB ID NO. in the box titled "Social Security No."
The test ID No. is your exam version. Mark it in the box titled ' Test ID".
Use pencil for marking your answers
When using eraser, be sure that you have erased well

1. The values of R_1, R_2, C and L are unknown. Load 1 absorbs a complex power of $50\angle -45^0$ VA and load 2 absorbs a complex power of $100\angle 45^0$ VA. Determine R_2 if $V_s = 250\angle 0^0$ V.

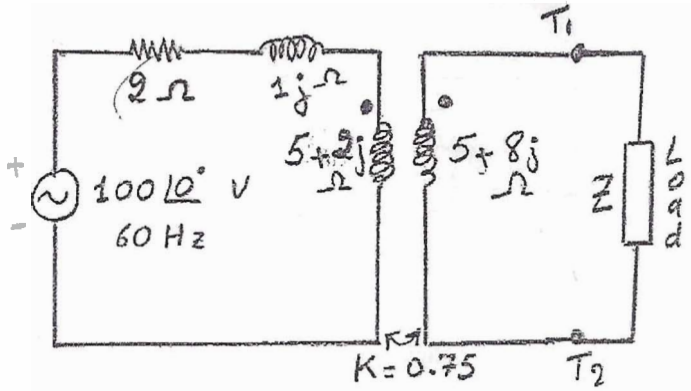


a. $250\sqrt{2}\ \Omega$.
b. $125\sqrt{2}\ \Omega$.
c. $125\ \Omega$.
d. $125/\sqrt{2}\ \Omega$.
e. None of the above.

2. A balanced delta-connected load draws 10 A of line current (rms) and 3 kW at 220 V (rms). Determine the reactance X of each phase.

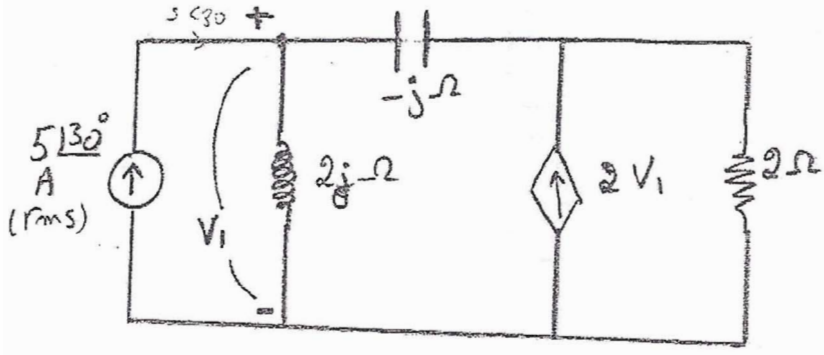
a. 38.1 Ω.
b. 23.486 Ω.
c. 30 Ω.
d. 35 Ω.
e. None of the above.

3. Determine the Thevenin impedance to the left of the terminals T1-T2 of the circuit shown in figure.



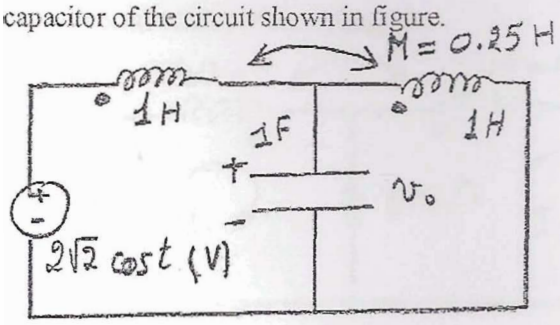
a. $15\angle 50^0\ \Omega$
b. $5+5j\ \Omega$
c. $1.086+2.535j\ \Omega$
d. $9.69\angle 51.07^0\ \Omega$
e. None of the above.

4. How much complex power is delivered by the $5\angle 30^0$ A (rms) current source to the circuit shown in figure.



a. $7.5\angle 137.48^0$ VA.
b. 0 VA.
c. 100 VA.
d. $15.35\angle 137.48^0$ VA.
e. None of the above.

5. Find the voltage $v_0(t)$ across the capacitor of the circuit shown in figure.

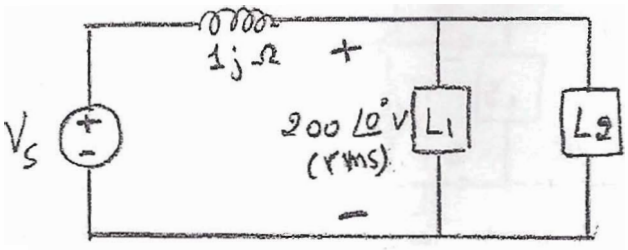


a. $1.60\cos(2t)$ V.
b. $1.60\sin(t)$ V.
c. $3.2\cos(t)$ V.
d. $2.26\cos(t)$ V.
e. None of the above.

6. Two impedances $Z_1 = 9.8\angle -78^0\ \Omega$ and $Z_2 = 18.5\angle 21.8^0\ \Omega$ are connected in parallel and the combination in series with an impedance $Z_3 = 5\angle 53^0\ \Omega$. If this circuit is connected across a 100-V source (rms), how much average power will be supplied by the source.

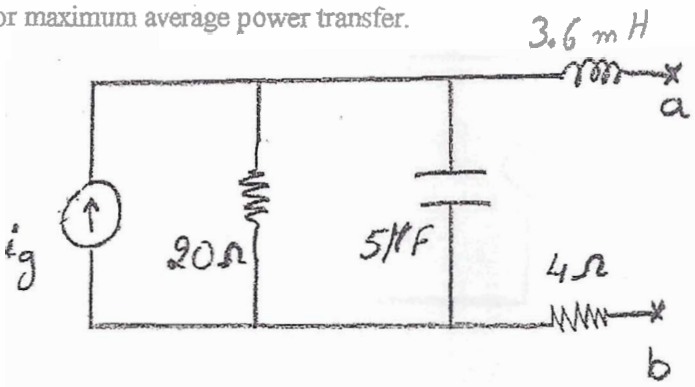
a. 980.8 W.
b. 490 W.
c. 1960 W.
d. 1391.6 W.
e. None of the above.

7. Find the phasor voltage $\mathbf{V}_s$ (rms) in the circuit shown if loads $\mathbf{L}_1$ and $\mathbf{L}_2$ are absorbing 15 kVA at 0.6 pf lagging and 6 kVA at 0.8 pf leading, respectively.



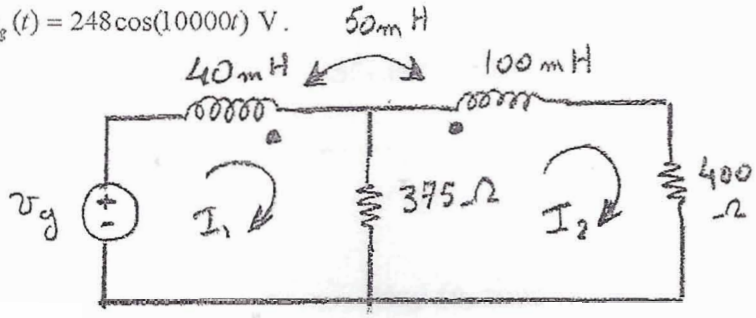
a. $240\angle -18^0$ V.
b. $176\angle 14.71^0$ V.
c. $230\angle 7.8^0$ V.
d. $251\angle 15.91^0$ V.
e. None of the above.

8. The source current in the circuit shown is $3\cos(5000t)$ A. What impedance should be connected across the terminals a,b for maximum average power transfer.



a. $10-20j\ \Omega$
b. $20-10j\ \Omega$
c. $10+20j\ \Omega$
d. $10-20j\ \Omega$
e. None of the above.

9. Find I_1 in the figure shown if $v_g(t) = 248\cos(10000t)$ V.

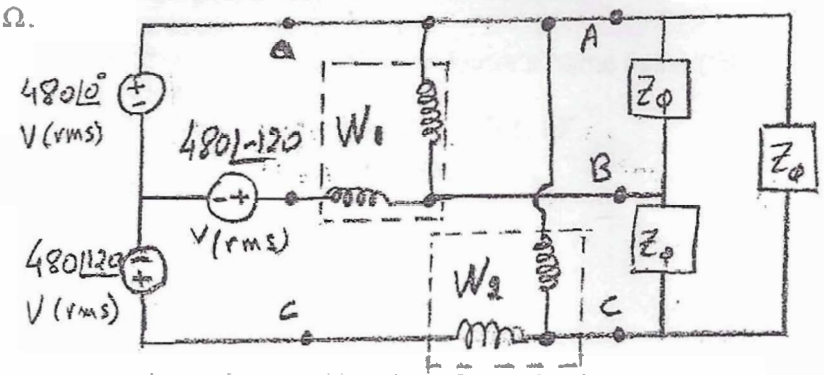


a. $0.8 - 0.62j$ A.
b. $0.4 - 0.3j$ A.
c. $0.6 - 0.6j$ A.
d. $0.9 - 0.31j$ A.
e. None of the above.

10. In problem 9, find the average power delivered to the 375 Ω resistor.

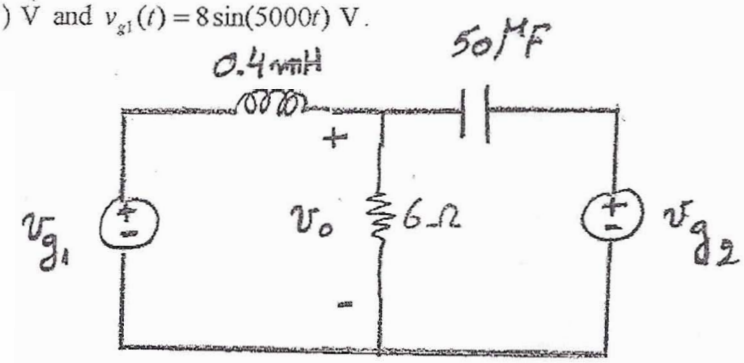
a. 99.2 W.
b. 50.3 W.
c. 49.2 W.
d. 62.7 W.
e. None of the above.

11. Calculate the reading of the two wattmeters ($W_1 + W_2$) in the circuit shown in figure. The value of $Z_\phi = 60\angle 30^\circ\ \Omega$.



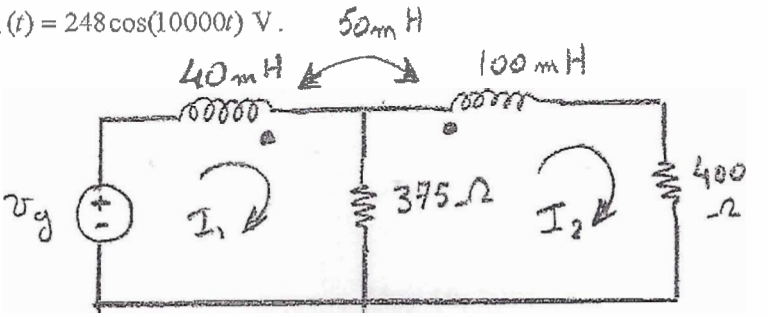
a. ~10 kW.
b. ~29.9 kW.
c. ~33.2 kW.
d. ~15.4 kW.
e. None of the above.

12. Find the steady-state expression for $v_0(t)$ in the circuit shown if $v_{g1}(t) = 10\cos(5000t + 53.13^0)$ V and $v_{g1}(t) = 8\sin(5000t)$ V.



a. $4\cos(5000t)$ V.
b. $8\cos(5000t)$ V.
c. $16\cos(5000t)$ V.
d. $12\cos(5000t)$ V.
e. None of the above.

9. Find I_1 in the figure shown if $v_g(t) = 248\cos(10000t)$ V.



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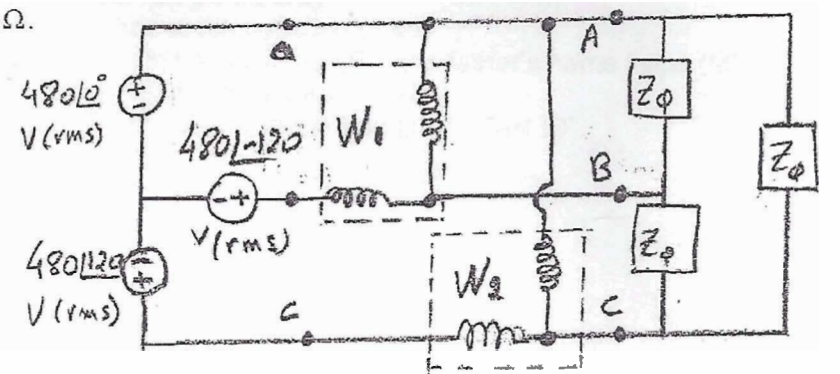

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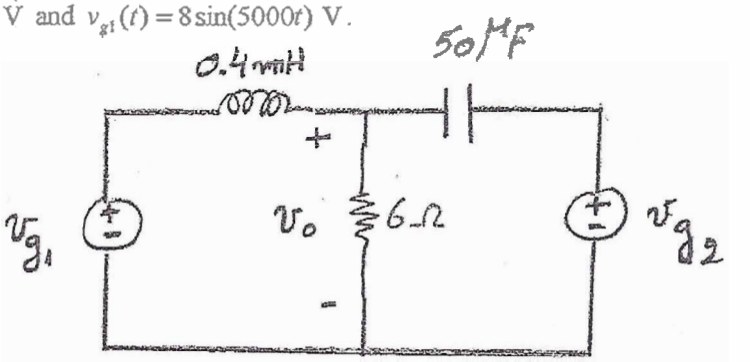

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