The Hong Kong University of Science and Technology
Department of Electronic and Computer Engineering

ELEC2400 **ELECTRONIC CIRCUITS** FALL 2021-22

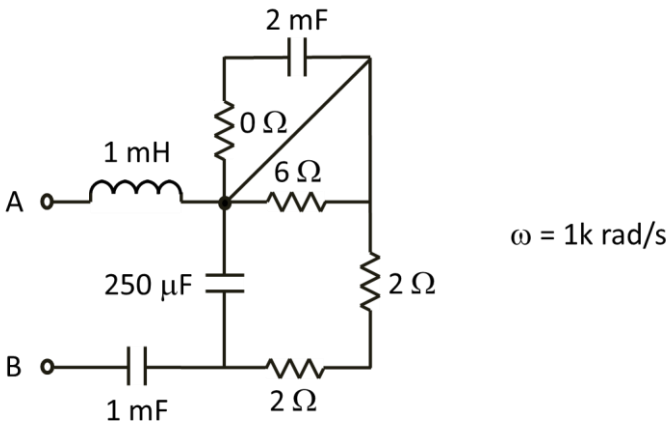
HOMEWORK 2

Issued on Oct. 5, 2021 (Tuesday)
Due on Oct. 19, 2021 (Tuesday, 11:59pm)
Submit your homework online https://canvas.ust.hk
Do not do your work on the question papers. Use separate blank papers

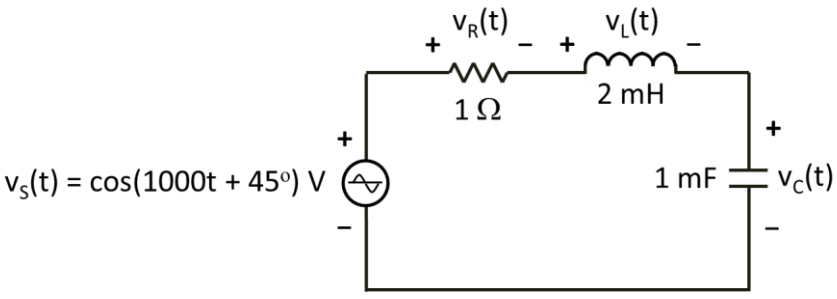
Q1. Compute and write the answers in polar form, i.e., $r\angle\theta°$.

a. $\frac{2j}{10\angle 30°}$ b. $\frac{15e^{j\frac{\pi}{2}}}{-3}$ c. $\frac{5\angle 60°}{j+2}$ d. j^j

Q2. Find the impedance Z_{AB} and write the answer in rectangular form.

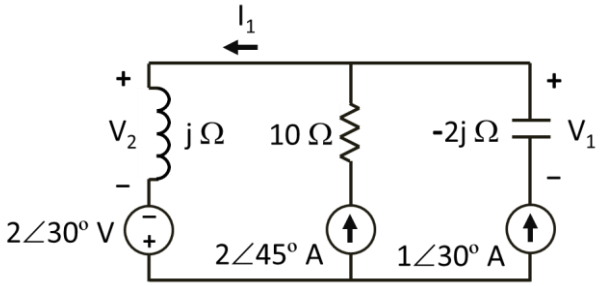


Q3. Consider the following circuit.

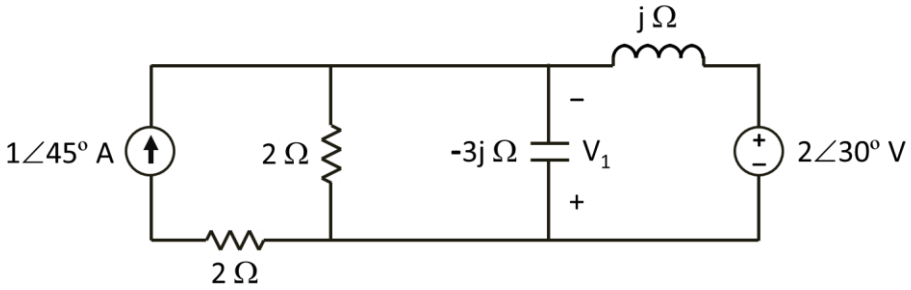


(a) Draw all the impedances (Z_R, Z_L and Z_C) in one impedance diagram.
(b) Draw all the phasor voltages (V_S, V_R, V_L and V_C) in one phasor diagram.
(c) Evaluate $v_S(t)$, $v_R(t)$, $v_L(t)$ and $v_C(t)$ at t = 1 ms.

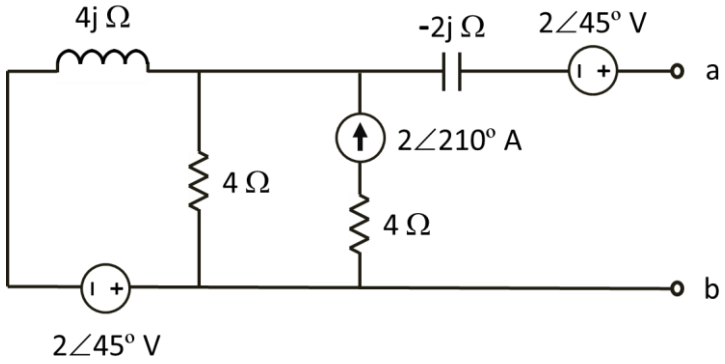
Q4. Find I_1, V_1 and V_2, and write the answers in polar form.



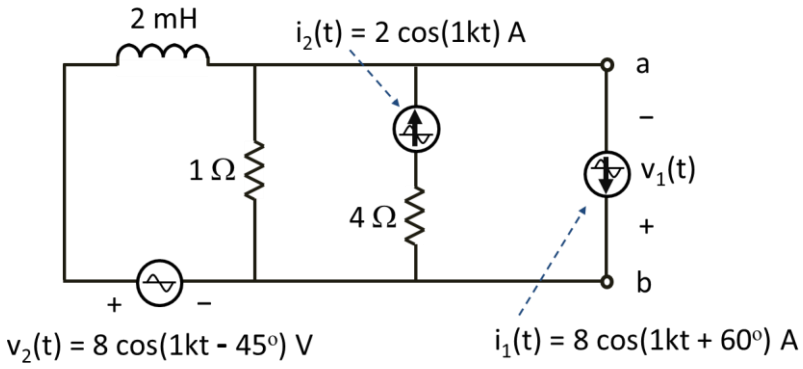
Q5. Find V_1 and write the answer in polar form.



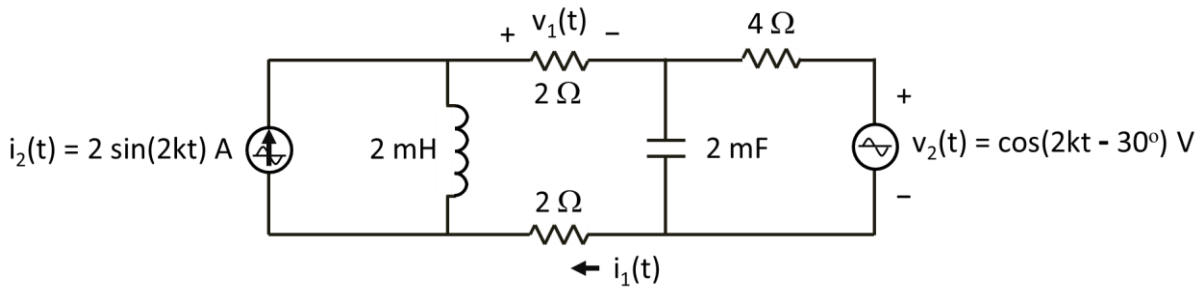
Q6. Find and draw the Thevenin's equivalent circuit with respect to the terminals a and b, and write the answers in polar form.



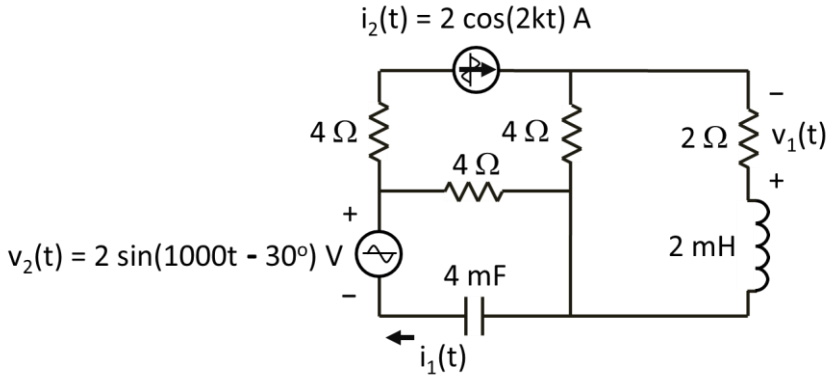
Q7. Use Norton's theorem to find $v_1(t)$ in the network.



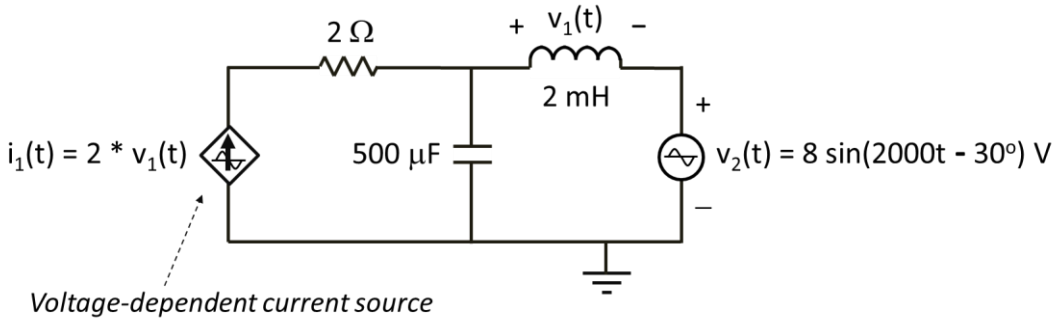
Q8. Use source transformation(s) to find $i_1(t)$ and $v_1(t)$ in the network.



Q9. Find $i_1(t)$ and $v_1(t)$.



Q10. Consider the following circuit.



(a) Compute the average AC power for each circuit element.
(b) Specify whether each circuit element is supplying AC power, absorbing AC power (dissipating power), or neither.
(c) Verify that the AC power balance is satisfied.