King Saud University
College of Engineering
Electrical Engineering Department

EE 212: Electric Circuits
Final Exam: 1st Semester 1436/437H
Time allowed: 3 hours

Student Name: ID #

Question 1A:

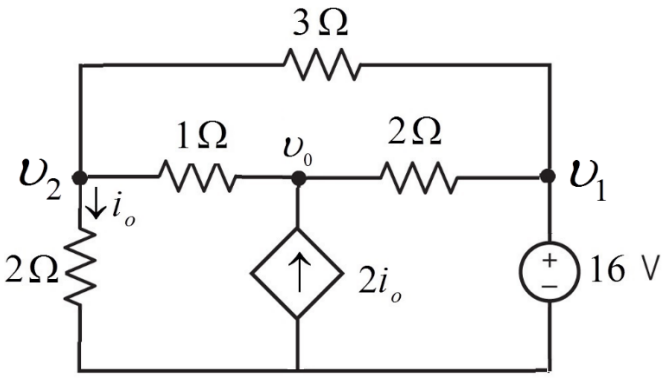

Fig. 1

Find v_0 and i_0 in the circuit of Fig. 1, using node method.

Question 1B:

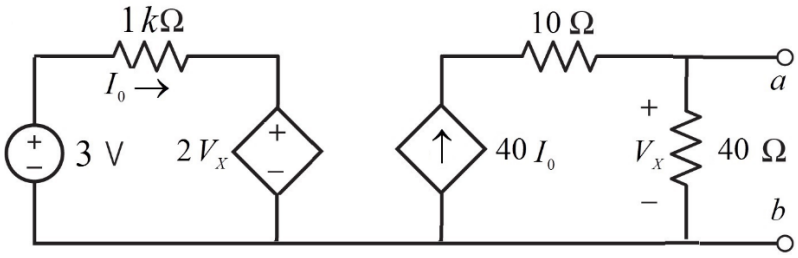

Fig. 2

Find the Thevenin equivalent circuit between terminals a-b of the circuit of Fig. 2.

Question 2A:

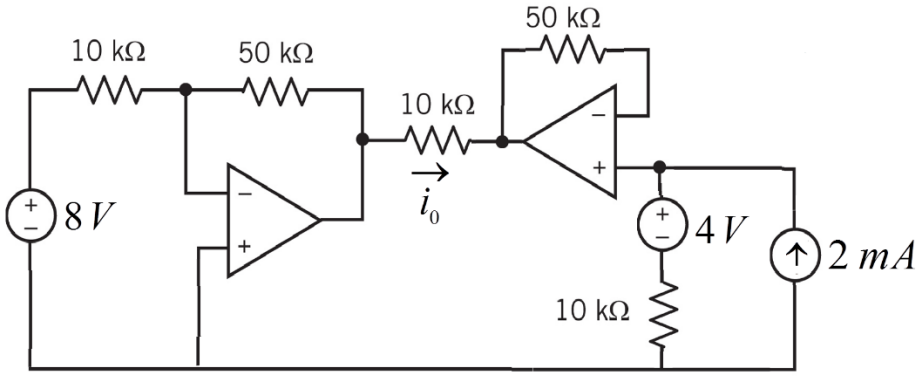

Fig.3

Find i_0 in the op amp circuit of Fig. 3.

Question 2B:

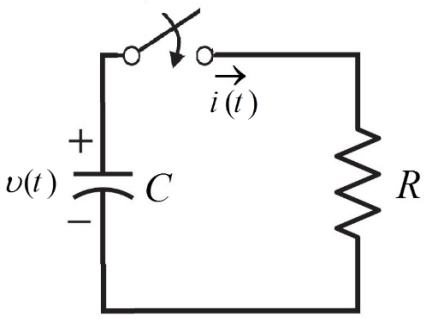

Fig.4

For the circuit of Fig. 4, if

$\upsilon(t) = 10\,e^{-4t}$ V and $i(t) = 0.2\,e^{-4t}$ A $t > 0$

i) Find R and C.

ii) Calculate the initial energy in the capacitor.

Question 3A:

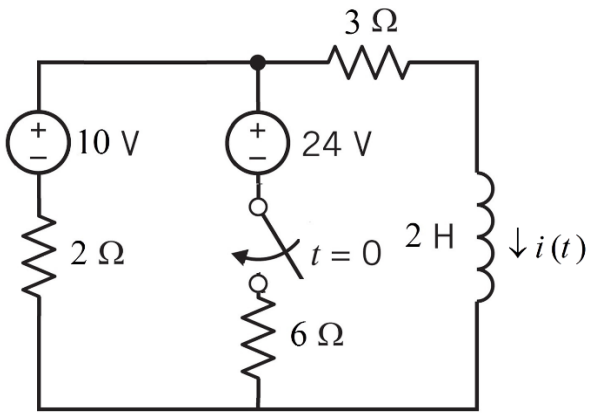

Fig. 5

In the circuit of Fig. 5

i) Find the inductor current $i(t)$ for $t > 0$.

ii) Sketch $i(t)$.

Question 3B:

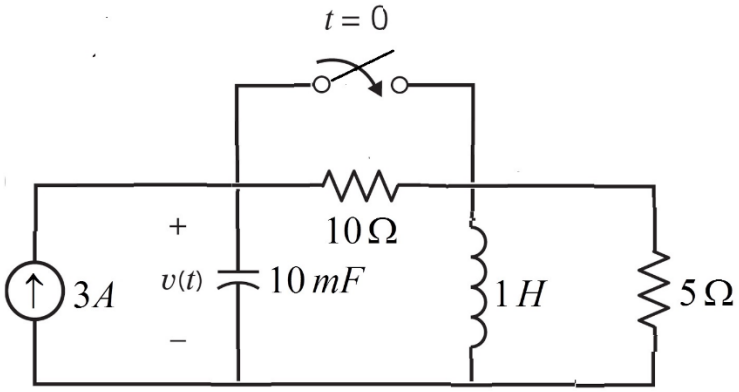

Fig. 6

Find the voltage across the capacitor $\upsilon(t)$ for $t > 0$ in the circuit of Fig. 6.

Question 4A:

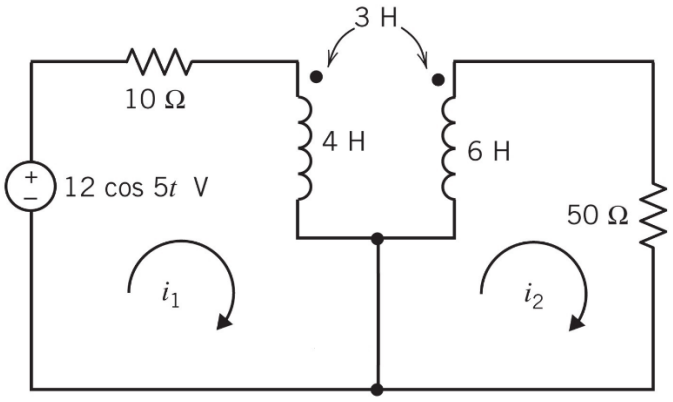

Fig.7

Find i_1 and i_2 in the circuit of Fig. 7.

Question 4B:

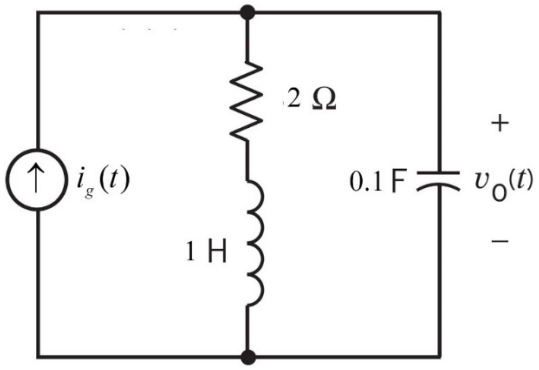

Fig. 8

For the circuit in Fig. 8,

i) Find the transfer function $H(s) = \dfrac{V_o(s)}{I_g(s)}$

ii) Determine poles and zeros of $H(s)$

Question 5A:

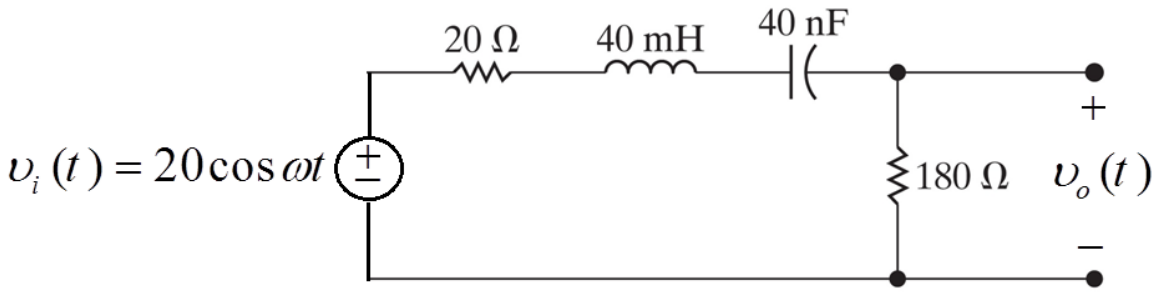

Fig. 9

For the resonant circuit in Fig. 9,

a) Calculate $\omega_0, Q, \omega_{c1}, \omega_{c2}$, and β.

b) If ω of the source is equal to ω_0 of the circuit, determine $\upsilon_o(t)$.

c) If ω of the source is equal to ω_{c1} of the circuit, determine $\upsilon_o(t)$.

d) If ω of the source is equal to ω_{c2} of the circuit, determine $\upsilon_o(t)$.

Question 5B:

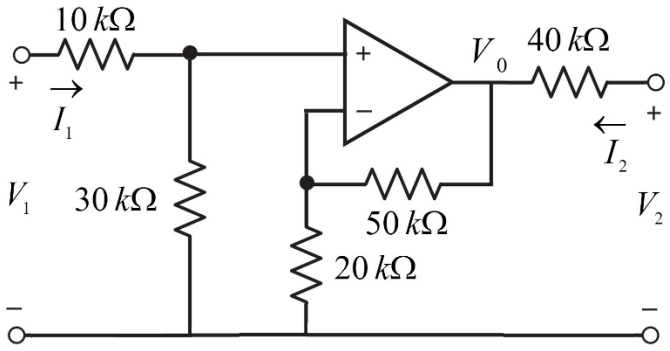

Fig. 10

For the op amp circuit in Fig.,

i) Find V_0 in terms of I_1

ii) If $V_1 = Z_{11}I_1 + Z_{12}I_2$ and $V_2 = Z_{21}I_1 + Z_{22}I_2$
Determine the Z parameters Z_{11}, Z_{12}, Z_{21}, and Z_{22}.