King Saud University
College of Engineering
Dept. of Electrical Engineering

EE-212: *Electric Circuits*
Final Examination
12.01.2015
Time Allowed: *3 Hours*

Mobile Phones and Programmable Calculators Are Not Allowed

الرقم: **الاسم:**

Question 1 A:

For the circuit shown in **Fig.1**,

(a) Find the open-circuit voltage Vab
(b) The Thevenin resistance (R_{TH}) between terminals *a* and *b*

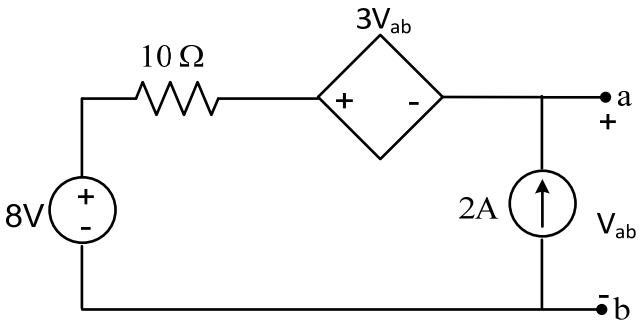

Fig.1

Question 1 B:

In the circuit shown in **Fig.2**, find V_1 and V_2.

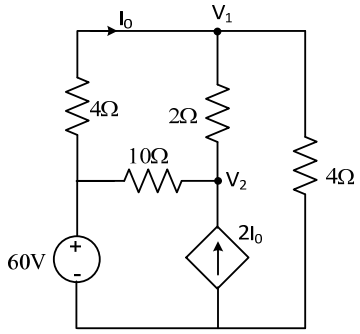

Fig.2

Question 2 A:

For the ideal op-amp circuit shown in **Fig.3**, find V_0 and i_0

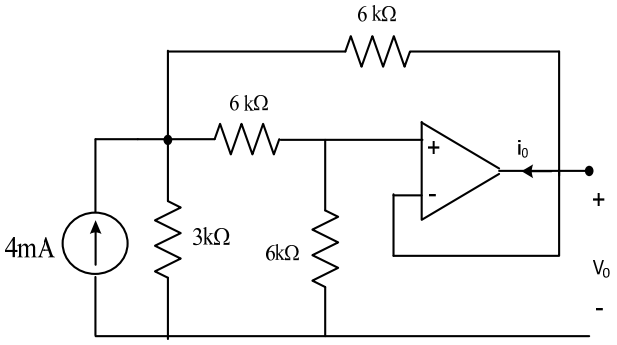

Fig.3

Question 2 B:

In the circuit shown in **Fig. 4**, the switch *S* has been closed for a long time. It is opened at time *t* = 0. Determine

a) $V_O(0^+)$
b) $V_O(\infty)$
c) Expression for V_0(t) for $t > 0$.
d) Sketch $V_O(t)$ for t > 0.

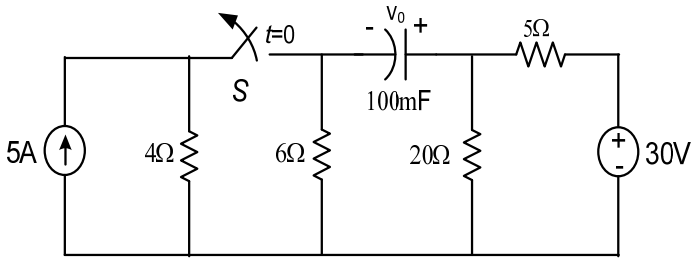

Fig 4

Question 3 A:

In the circuit shown in **Fig. 5**, the Switch has been in position "**a**" for a long time. It is moved to position "***b***" at time *t* = 0. Determine

a) $Vc(0^+)$
b) $I(0^+)$
c) $V_L(0^+)$
d) Expression for *i*(t) for *t* > 0.

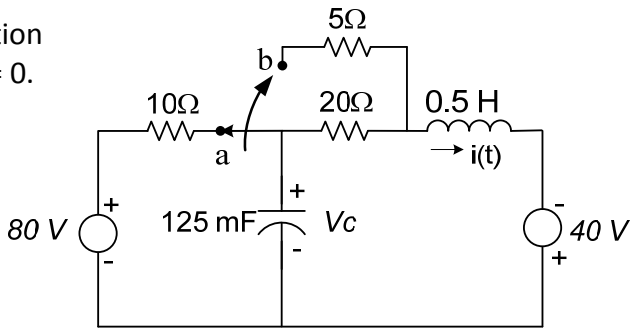

Fig. 5

Question 3 B:

For the circuit shown in **Fig. 6,** find the h-parameters such that $V_1=h_{11}I_1+h_{12}V_2$ & $I_2=h_{21}I_1+h_{22}V_2$.

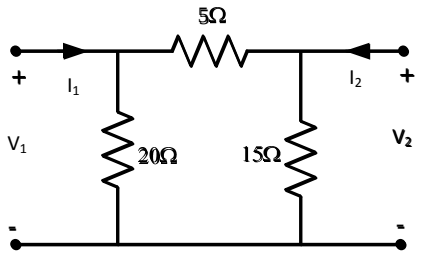

Fig. 6

Question 4 A:

The *Y*-parameters of a 2-port circuit are given in **Fig. 7**.

Find V_1 and V_2

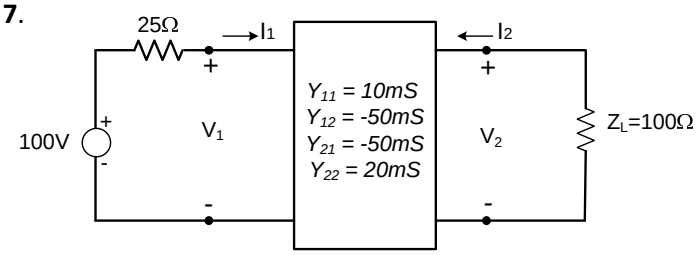

Fig. 7

Question 4B:

In the circuit shown in **Fig. 8**,

(a) Find the coefficient of coupling.

(b) Find I_1 and I_2

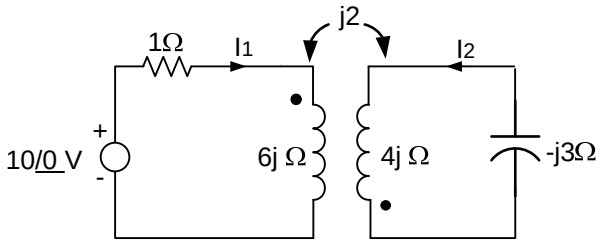

Fig. 8

Question 5A:

For the circuit shown in **Fig. 9** the input is current source I_0 and the output is the voltage across the 2-Ω resistor.

(a) Find the transfer function $H(s)= \frac{V_0(s)}{I_0(s)}$

(b) Find the poles and zeroes of $H(S)$

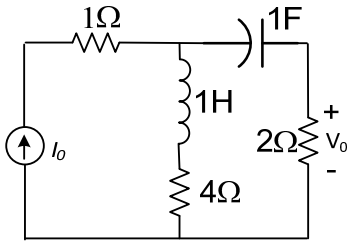

Fig. 9

Question 5 B:

For the circuit shown in **Fig. 10**, show that, for certain values of *R*, *L*, and *C*, the transfer function can be written as *H(s)* = $\frac{V_2(s)}{V_1(s)} = \frac{2s}{S^2+2s+1600}$

a) If *R* = 1 kΩ, find *L* and *C.*
b) What is the resonant frequency (ω_0) of the circuit?
c) What type of filter does this circuit represent?
d) What is the bandwidth of this filter?

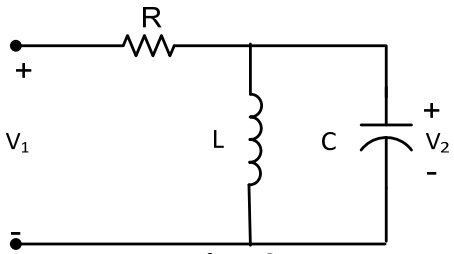

Fig. 10