Jordan University
Faculty of Engineering and Technology
Electrical Engineering Department
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EE211 Lina Al.ghanem لينا الغانم **Second Exam** **Time:90 mints**

Q1) For the circuit shown in Fig. 1

1) **The value of Ix in A is**
a. 2 b. 1.33 c. -2 d. -1,33 d. none

2) **R_{Th} in mΩ between a and b is**
a. 250 b. 444.4 c. 500 d. none

3) **The maximum power transfer in Joules to the load is**
a. 1.7776 b. 14.2 c. 28.4 d. none

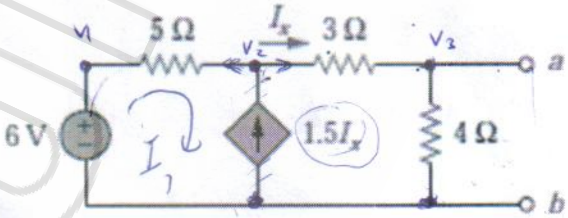


Fig. 1

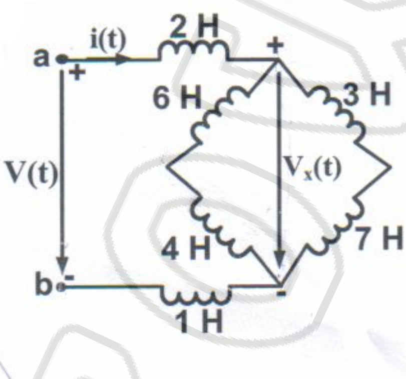
The current i(t) through the network in Fig. 2.1 is shown in Fig. 2.2

4) **the equivalent inductor seen by a and b is**
a. 0.588 b. 0.645 c. 8 d. none

5) **the voltage V(t) in Volts for the period of [0,3ms]**
a. -10.66 b. -3.33 c. 3.33 d. 10.66 e. none

6) **the voltage Vx(t) in Volts for the period of [3ms, 6ms]**
a. -2.22 b. 6.66 c. 2.22 d. - 6.66 e. none

7) **the energy stored in μJ in the equivalent inductor at t =3 ms**
a. -32 b. 32 c. -64 d. 64 e. none



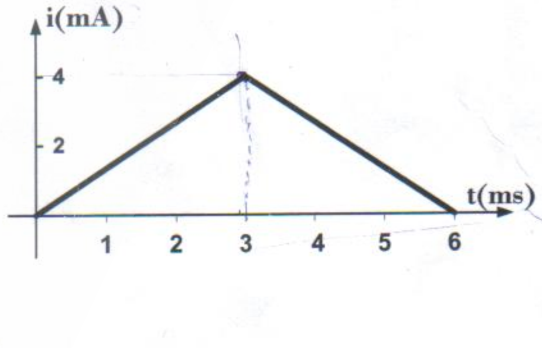


Fig. 2.1

For the circuit shown in Fig. 3 under dc conditions
(All resistors are in Ω ,$C_1=C_2=$ 2μF and $L_1=L_2=$2mH)

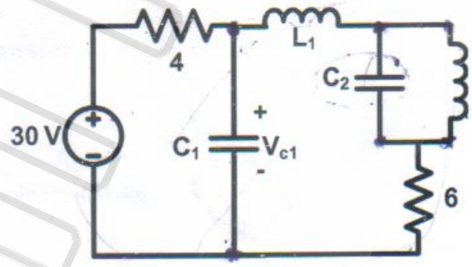


Fig. 3

8) The voltage V_{C1} across the capacitor C_1 is
a. 10 V b. 12 V c. 18 V d. 30 V d) none

9) The energy stored in the capacitor C_2 is
a. none b. 0 J c. 0.144 mJ d. 0.324 mJ

10) The energy stored in the inductor L_2 is
a. 56 mJ b. 0 J c. 25 mJ d. 9 mJ e) none

For the circuit shown in Fig. 4 under dc conditions

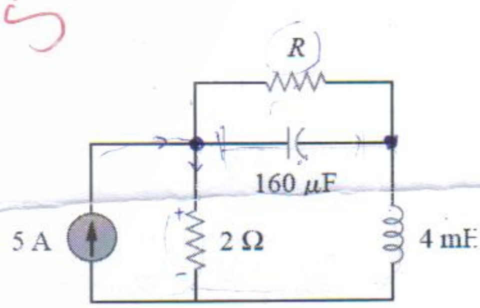


Fig.4

11) the value of R in Ω that will make the energy stored in the capacitor the same as that stored in the inductor
a. -5 b. 5 c. both a and b d. 3 e. -3 f. None

12) The voltage through the capacitor is
a. 3.235 b. 7.142 c. 17.857 d. None

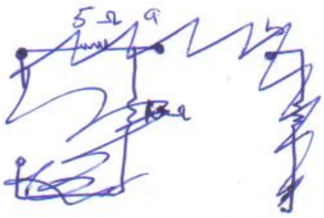
13) The energy stored in the inductor is

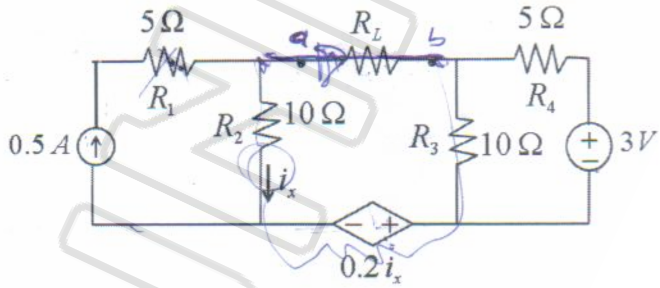
a. 56 mJ b. 0 J c. 25 mJ d. 4 mJ e) none

Q2) Consider the circuit shown below (9 marks)

a. Draw the equivalent Thevenin's circuit

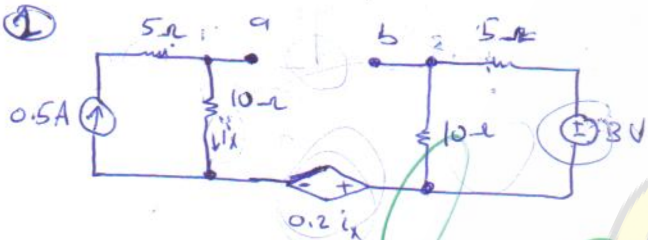
b. Find the value of the load resistance R_L such that power transfer to R_L is P=20mW.





a)

①



$R_{th} = \frac{V_{ab}}{I_{s.c}} = \frac{V_{th}}{I_{th}} =$

$V_a = IR = (0.5)(10) = 5V$

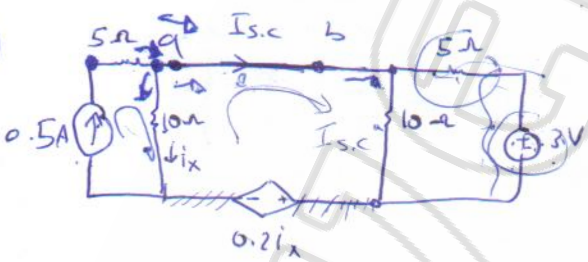
$V_{ab} = V_a - V_b$

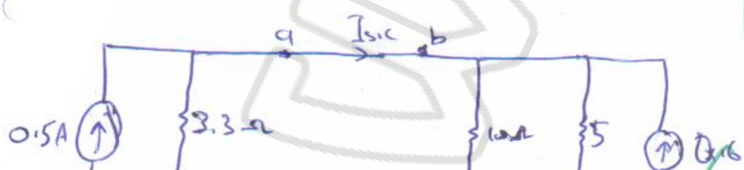
$V_{ab} = 5 - 2 = 3V$

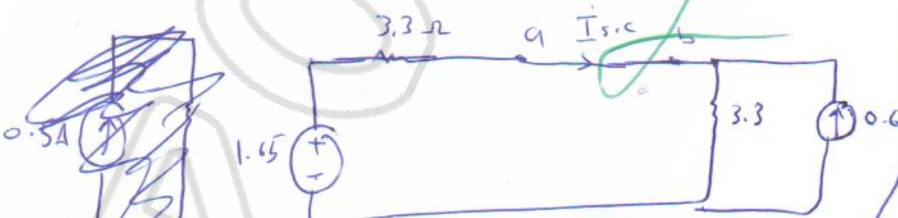
$V_b = \frac{(3)(10)}{15} = 2V$

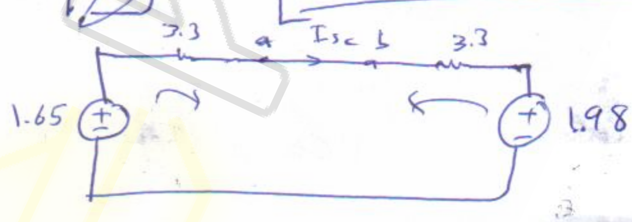
$V_{ab} = 3V = V_{th}$

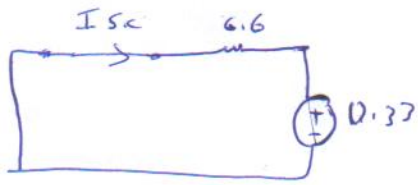
②





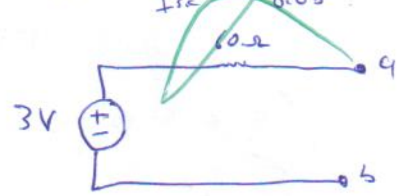




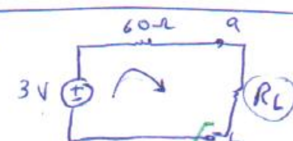


$I_{s.c} = \frac{0.33}{6.6} = 0.05$ A

So $R_{th} = \frac{V_{th}}{I_{sc}} = \frac{3}{0.05} = 60Ω$



b)



$P = I^2 R_L$

$I = \frac{3}{}$

$20 = (\frac{9}{R_L^2} \cdot R_L)$

$20 = \frac{9}{R_L}$

$20 R_L = 9$

$R_L = \frac{9}{20} = 0.45Ω$

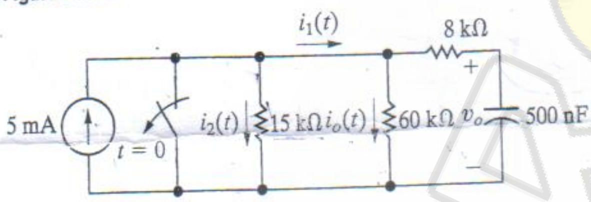
Q3-

The switch in the circuit shown in Fig. P7.51 has been closed a long time before opening at $t = 0$. For $t \geq 0^+$, find

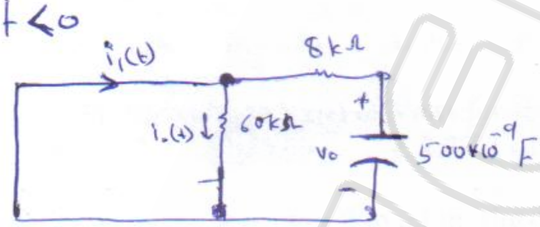
a) $v_o(t)$.
b) $i_o(t)$.
c) $i_1(t)$.
d) $i_2(t)$.
e) $i_1(0^+)$.

(9 Marks).

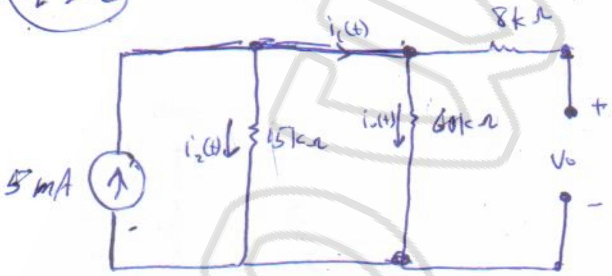
Figure P7.51



$t < 0$



$t > 0$



b) $i_o(t) = \frac{(5)(15)}{75} = 1mA$ $\boxed{V_o(t) = V_{60k\Omega}}$

So $V_o(t) = i_o(t) \times 60$

$= 1 \times 60$

a) $V_o(t) = 60V$

c) $i_1(t) = i_o(t) = 1mA$

d) $i_2(t) = \frac{(5)(60)}{75} = 4mA$

e) $i_1(0^+) = 1$

3

$i_L(t) = i_o + e^{-t/\tau}$

$\tau = R_{eq} C_{eq}$

$\tau = (7.05)(500 \times 10^{-9})$

$\tau = 3529.4 \times 10^{-9}$

$i_L(t) = 1 \cdot e^{-t/3529.4 \times 10^{-9}}$

$i_1(0^+) = 1$