Final Written Examination.

24/12/2013

Time all: 3 Hrs

Answer the following questions

Question (1): [10 Marks]

Find the equivalent resistance R_{ab} for the circuit shown in fig.1.

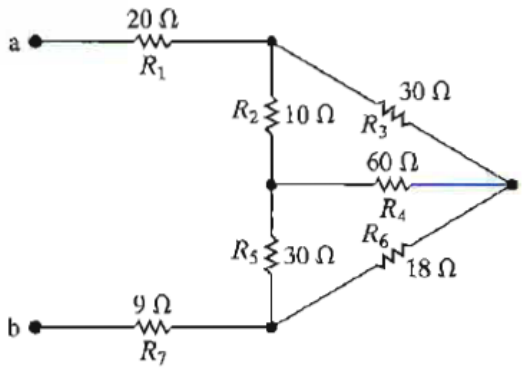

Fig.1

Question (2): [10 Marks]

a) Use Kirchhoff's laws and Ohm's law to find the voltage υ_o as shown in Fig. 2.
b) Show that your solution is consistent with the constraint that the total power developed in the circuit equals the total power dissipated.

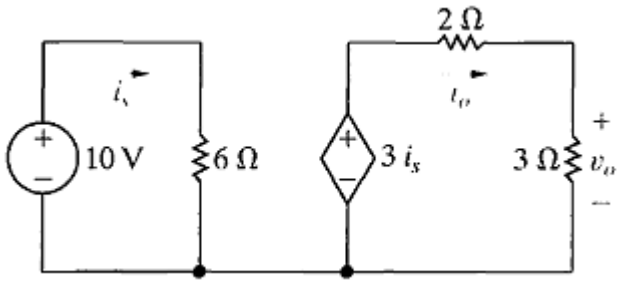

Fig.2

Question (3): [10 Marks]

Use the mesh currcnt method to find the total power dissipated in the circuit in Fig. 3

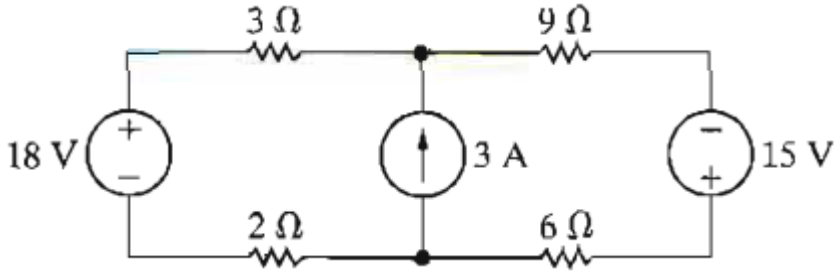

Fig.3

Question (4): **[10 Marks]**

Determine the Thevenin equivalent with respect to the terminals a,b for the circuit shown in Fig. 4.

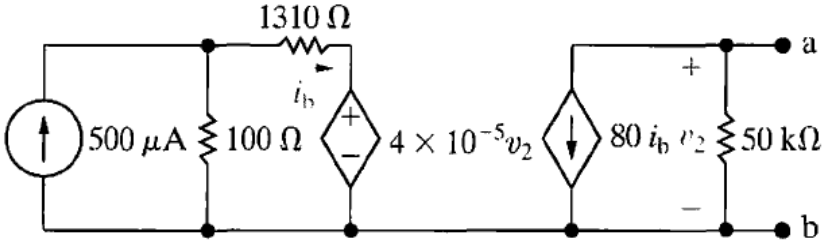

Fig.4

Question (5): **[10 Marks]**

The switch in the circuit shown in Fig. 5 has been in position x for a long time.

At $t = 0$, the switch moves instantaneously to position y. Find

a) $\upsilon_c(t)$ for $t \geq 0$,

b) $\upsilon_o(t)$ for $t \geq 0+$

c) $i_o(t)$ for $t \geq 0+$, and

d) The total energy dissipated in the 60 kΩ resistor.

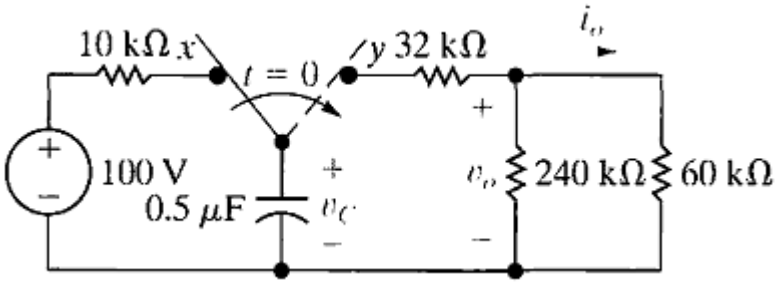

Fig.5

Question (6): **[10 Marks]**

Use the concept of source transformation to find the phasor voltage V_0 in the circuit shown in Fig. 6.

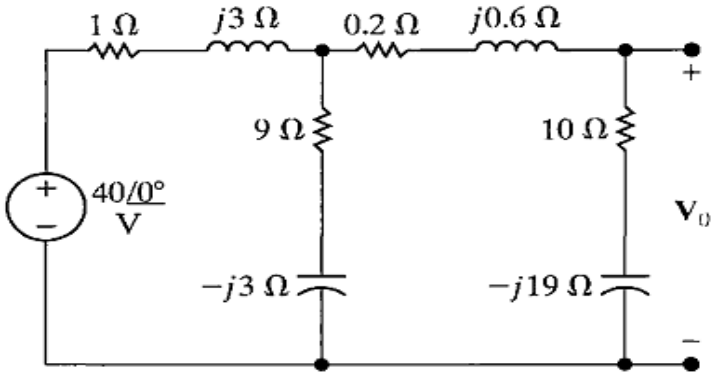

Fig.6

Fig. 6