Mansoura University
Faculty of Engineering
Dept. of Electrical Engineering
First Year

Final Exam (23/6/ 2011)
Electric Circuits-2
Full Mark (90)
Time: 3 Hours

Please Answer The Followings:

1- For the circuit shown in Fig.1, find **(15 Mark)**
   a- Vc(0⁻), I(0⁻).
   b- Vc(t), I (t).
   c- Energy stored in a capacitor and power dissipated in 5Ω resistance at t=2τ.

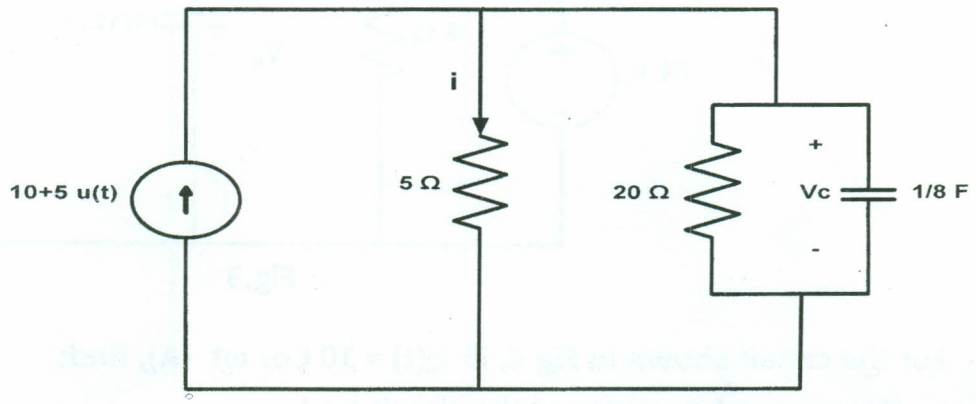

Fig. (1)

2- The linear transformer in the circuit shown in Fig.2 represents a two-port network. The voltage source Vs = 100 V (r.m.s). **(30 Mark)**
   a- Find the Z-parameters of the linear transformer.
   b- Under loading conditions of linear transformer, find I_1 , total circuit impedance and power delivered by the source.
   c- Use the Z-parameters to derive the Thevenin's equivalent circuit with respect to R_L and find the maximum power absorbed by this resistance.

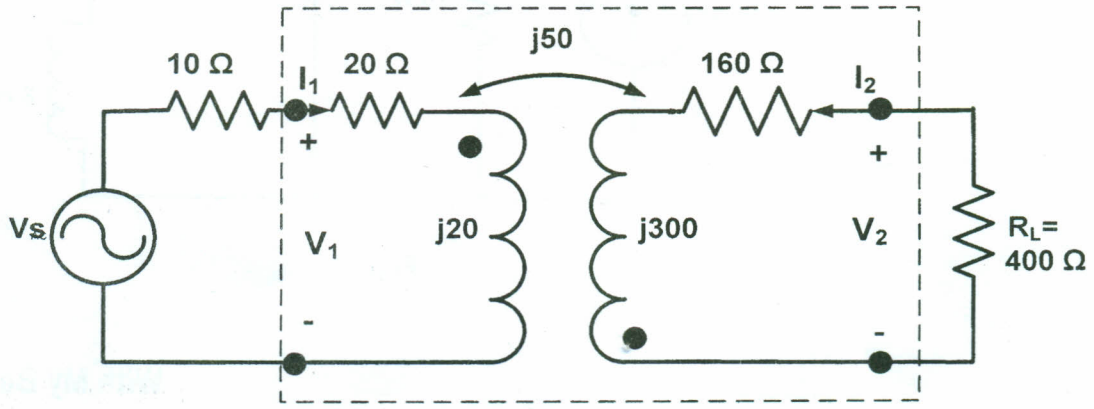

Fig.2

3- The switch in the circuit shown in Fig.3 has been open a long time before closing at t=0, find: (25 Mark)

a- $i(0^+)$ and $V_o(0^+)$.

b- $i(t)$ for $t \geq 0$.

c- Energy stored in inductor at steady-state.

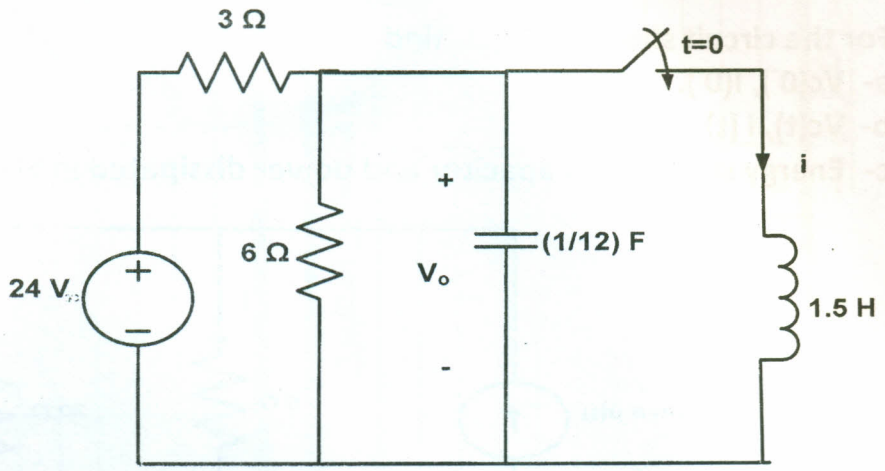

Fig.3

4- For the circuit shown in Fig.4, if $Is(t) = 10 \cos \omega t$ (A), find: (20Mark)

a- Resonance frequency of the circuit (ω_0).

b- The magnitude of $Y(\omega)$ at $\omega=0$, ω_0, and ∞.

c- Circuit quality factor (Q), bandwidth (B) and half power frequency points (ω_1, ω_2).

d- Power delivered by the current source at resonance and at ω_1, ω_2.

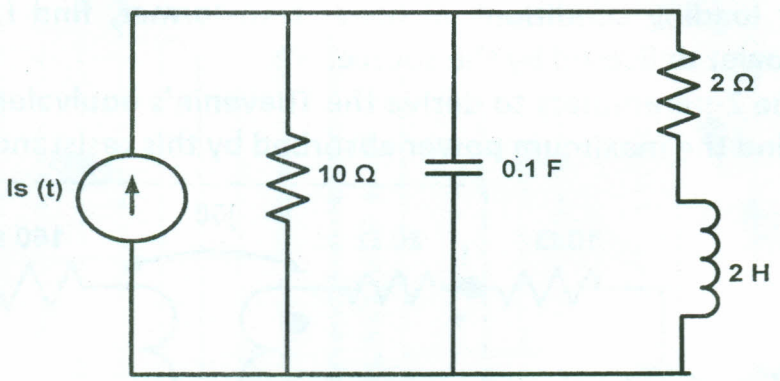

Fig.4

With My Best W ishes

Prof. Dr. Mohammed El-Saied