台灣科技大學一百零九學年度上學期平時考（二）

科目名稱：電路學(二)　開課系所：電子系 ET2103301　地點：視聽館 AU101

考試時間：110 年 6 月 10 日　下午 13:20 至 15:20 (不可使用工程計算機)

1. (15%) Please find the output voltage $V_o(t)$ in Fig. 1(a) for t >0 when the input source $v(t)$ is given in Fig. 1(b).The initial current in the 4H inductor is one and the others are zero.

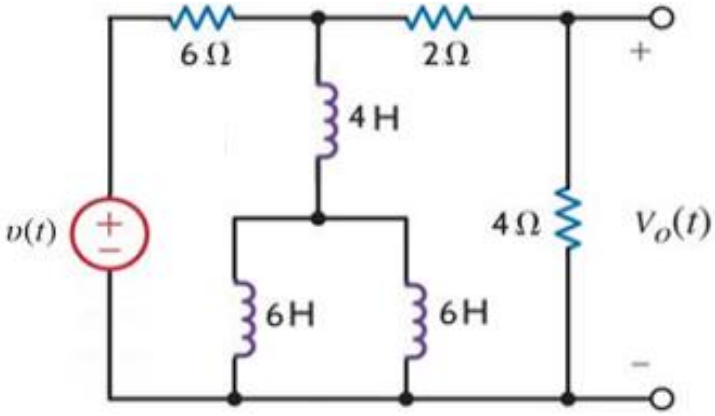

Fig. 1(a).

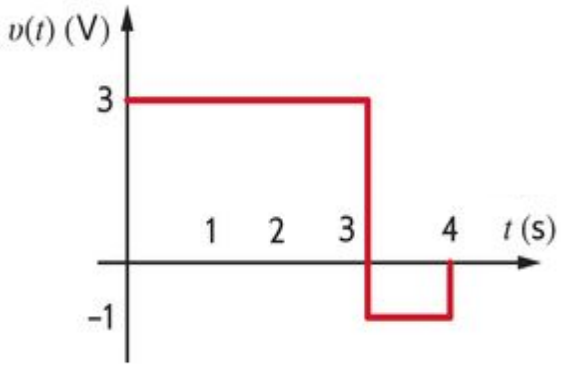

Fig. 1(b).

2. (15%) Assume the circuit is operated at the steady state initially, please find $i(0^+)$ in Fig. 2.

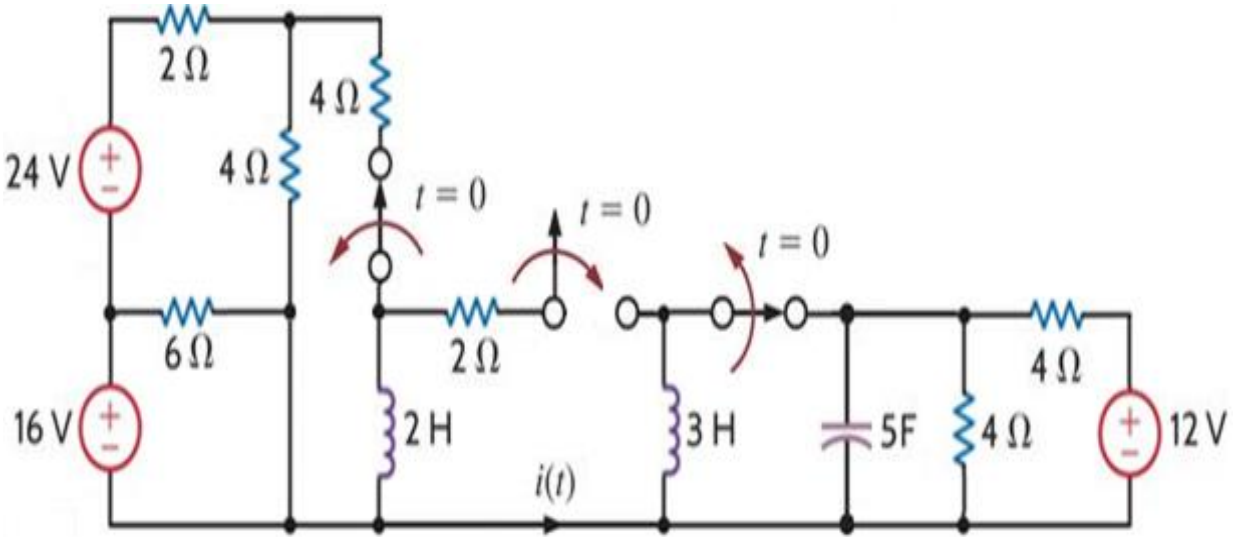

Fig. 2.

3. (15%) Please find the output voltage v_o (t) in Fig. 3 if the initial voltage in the capacitor is zero.

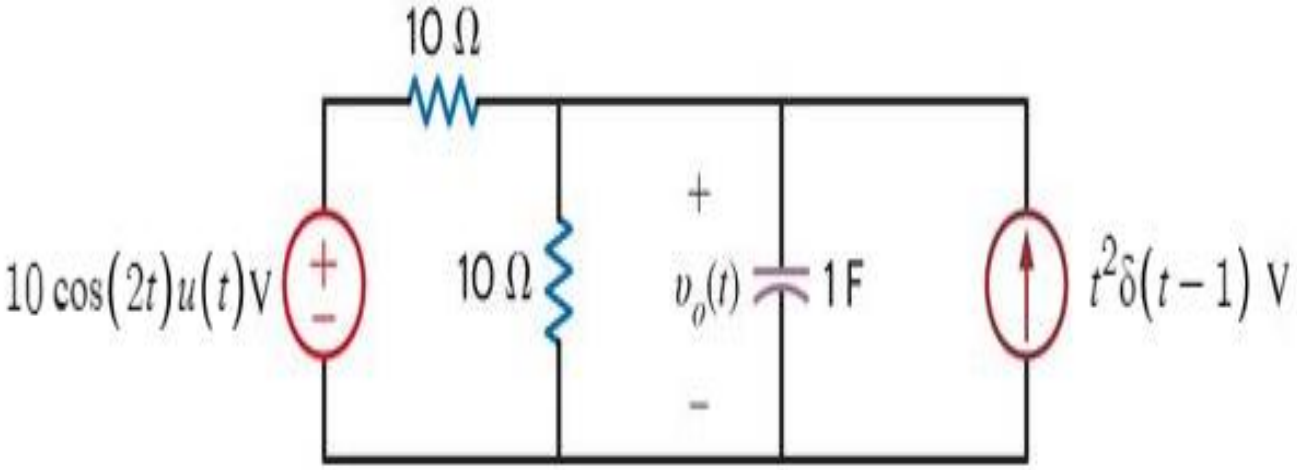

Fig. 3.

4. (10%) The magnitude characteristic of the Bode plot is depicted in Fig. 4. Please determine the transfer function of G(jω).

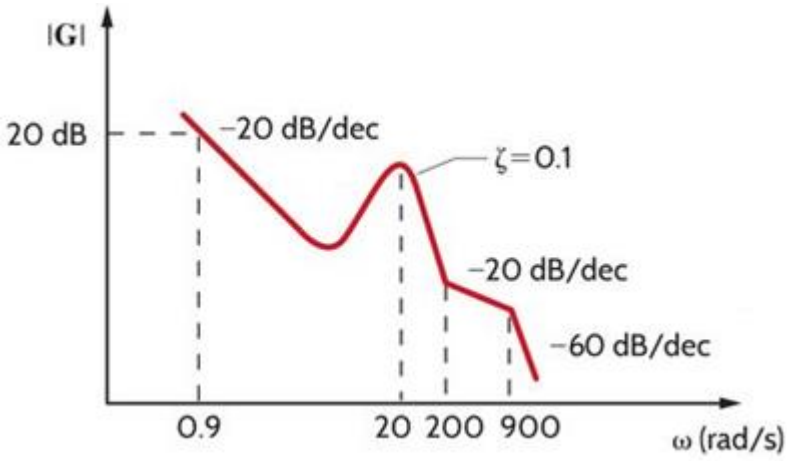

Fig. 4.

5. (15%) There is a critical-damping RLC parallel resonant circuit with C=0.25μF and L=4H, please answer the following questions:

   (5%) (a) Please determine the value of R for this critically-damped system.

   (10%) (b) What is the resonant angular frequency ω_0, quality factor Q, bandwidth B_w, and half-power angular frequency ω_H and ω_L of this system?

6. (15%) The circuit is operated at the steady state initially, please find $v_o(t)$ for $t>0$ in Fig. 5.

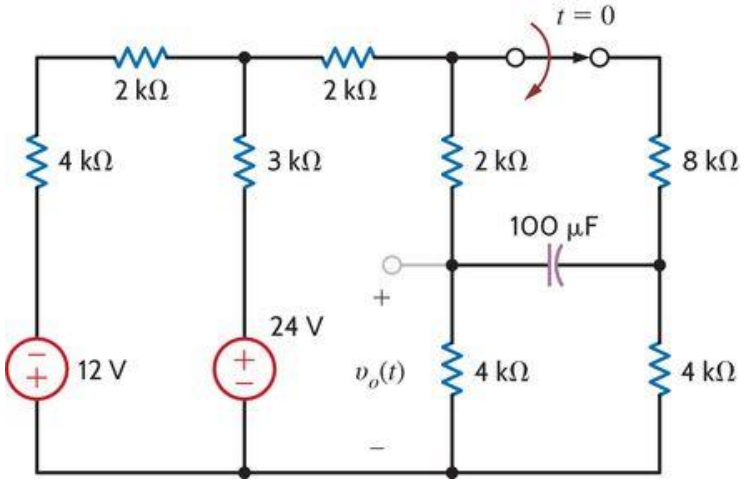

Fig. 5.

7. (15%) Please sketch the magnitude characteristic of the Bode plot for the following transfer function.

$$\mathbf{H}_{(j\omega)} = \frac{5(j\omega + 10)}{j\omega(j\omega + 100)}$$