Đáp án môn: Mạch điện_ELCI140144 – thi ngày 24/12/2014.

Câu 1 (2đ)

$$\begin{cases} I_a(4+4)+20-100-4I_b-I_c4=0 \\ I_b(4+4+3)-20-4I_a-4I_c=0 \\ I_c(4+4+4)-U_1-4I_a-4I_b=0 \\ U_1=4(I_a-I_b) \end{cases}$$ (0,5đ)

$I_a = 30A$, $I_b = 20A$, $I_c = 20A$ (0,5đ)

$P_1 = 4.20^2 + 3.20^2 + 4(30-20)^2 + 4(30-20)^2 + 4(20-20)^2 = 3600W$ (0,5đ)

$P_{ng} = 100.30 + 20.4(30-20) - 20(30-20) = 3600W$ (0,5đ)

$P_t = P_{ng}$: cbcs.

Câu 2 (2đ)

Hỗ mạch $\dot{U}_0\left(1+\frac{1}{j}+\frac{1}{-j}\right) = \frac{\dot{U}_a}{-j} - \frac{12}{1}$

$\dot{U}_a\left(\frac{1}{-j}\right) - \frac{\dot{U}_0}{-j} = 2\dot{U}_0$ (0,5đ)

$\dot{U}_a = \dot{U}_{ab} = 6+18j = 18,97\angle 72°$

* Ngắn: $\dot{U}_0\left(1+\frac{1}{j}+\frac{1}{-j}\right) = 12$

$\dot{U}_0 = 12V$ (0,5đ)

$I_{ng} = \dot{I}_1 + 2\dot{U}_0 = 24+12j = 26,83\angle 27°$

* $Z_{td} = \frac{\dot{U}_{ab}}{I_{ng}} = 0,5+0,5j = 0,707\angle 45°$ (0,5đ)

Để P_{max} thì $R = 0,707\Omega$.

$\dot{I} = 14,52\angle 49°5$ (0,25đ)

$P_{max} = 0,707.14,52^2/2 = 74,53W$ (0,25đ)

Câu 3 (2đ)

$U_p = 100/\sqrt{3}$ (0,25đ)

$I_p = I_d = \frac{100}{\sqrt{3}\sqrt{10^2+9^2}} = 4,29A$ (0,5đ)

$\Delta P_{td} = 3.2.4,29^2 = 110,42W$ (0,5đ)

$P_{tm} = 3.12.4,29^2 = 662,55W$

$Q_{tm} = -3.6.4,29^2 = -331,27Var$

$S_{tm} = \sqrt{P_{tm}^2+Q_{tm}^2} = 740,75VA$ (0,5đ)

$U_{dn} = \frac{740,75}{\sqrt{3}.4,29} = 99,66V$

Câu 4 (2đ)

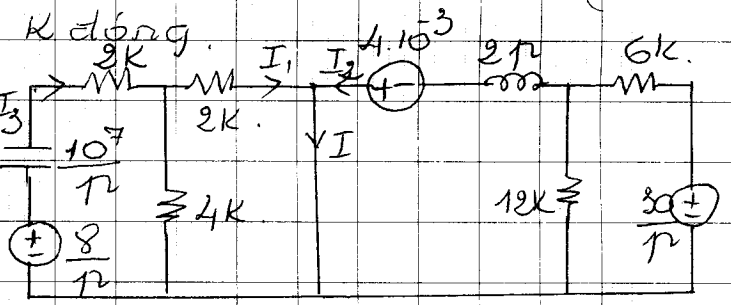
ĐKBĐ K mở

$R_{td} = \frac{(4+2).12}{4+2+12} + 6 = 10K$.

$i_L(-0) = \frac{30}{10}.\frac{12}{12+6} = 2mA$ 0,25đ

$U_C(-0) = 2.4 = 8V$ (0,25đ)

K đóng.



Áp dụng BĐTĐ.

$I_1 = \frac{4}{4+2}\cdot\frac{8/p}{\frac{10^7}{p}+2000+\frac{4000}{3}}$

$\Rightarrow i_1 = 1,6e^{-3000t}$ mA 0,5đ

$I_2 = \frac{20/p + 4.10^3}{2p+4000}$ (0,5đ)

$\Rightarrow i_2 = 5-3e^{-2000t}$ mA.

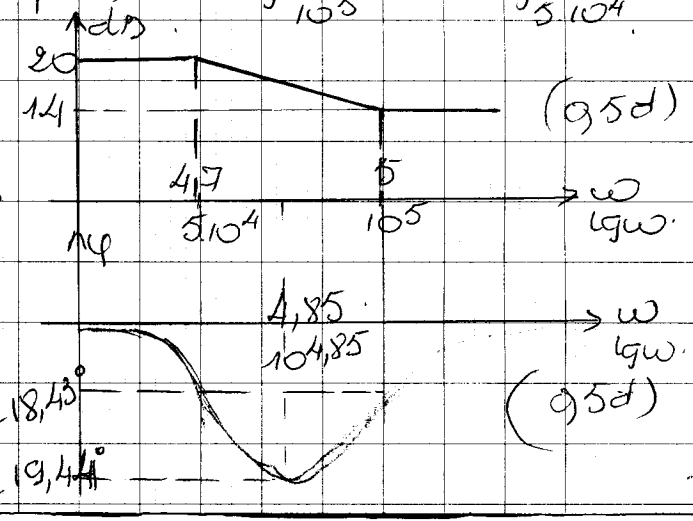
$i = i_1 + i_2 = 5-3e^{-2000t}+1,6e^{-3000t}$ mA. (0,25đ)

Câu 5 (2đ)

$W(p) = \frac{5(p+10^5)}{p+5.10^4}$ (1đ)

TSG: 5.10^4, 10^5; $20\lg|W(j\omega)| = 20db$ khi $\omega = 0$

$\varphi(\omega) = \operatorname{arctg}\frac{\omega}{10^5} - \operatorname{arctg}\frac{\omega}{5.10^4}$



(0,5đ) (0,5đ)