样卷3

一、1、R被加入反电压 $P<0$ N功率为发出(产生) $\Rightarrow B$.

2、电压降: $u_a=\frac{R_1}{R_1+R_2}u_s=6V$

$u_b=\frac{R_{eq2}}{R_3+R_4}u_s=3V$.

$\therefore u=u_a-u_b=2V \Rightarrow D$.

3、$3R_Y \Rightarrow B$ (背的)

4、理想电压源内阻为0. $\Rightarrow A$.

5、基波阻抗中虚部与频率有关: $Z_2=(1+j8)\Omega \Rightarrow D$.

6、~~$(R_1+R_2)u_{a1}=$~~ 电流源串联电阻支路不被计算在方程中

故 $\frac{1}{R_1}u_{a1}=i_s-i$. $\Rightarrow B$.

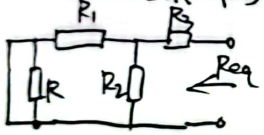
7、网孔电流法: $\begin{cases}300I_1-200I_2=3\\-200I_1+(200+R)I_2=rI_1\end{cases}$.

$\therefore r=100\Omega \Rightarrow A$

8、$i_1=-4\cos(100t+60°)A=4\sin(100t-30°)A$

$\therefore \Delta\varphi=-30°-60°=-90° \Rightarrow D$

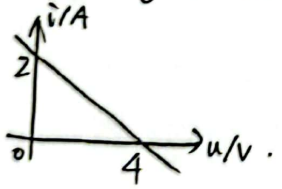
9、除R_L,其余进行戴维宁变换短路电压源:



$R_{eq}=R_3+R_1/\!/R_2$

$=3\Omega$.

$\therefore R_L=R_{eq}=3\Omega$时, $P=P_{max} \Rightarrow B$.

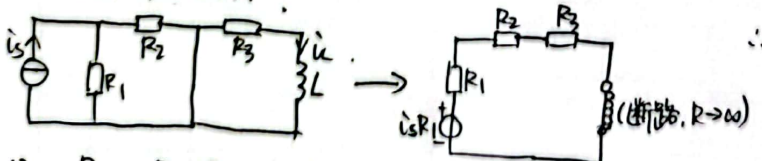
10、 

有: $i=2-\frac{1}{2}u$

即: $u=4-2i$.

$\therefore \begin{cases}u_{oc}=4V\\R_{eq}=2\Omega\ (方向求)\end{cases}$

11、$i_L(0_-)=0A$.



$\therefore u(0_+)=i_sR_1=40V \Rightarrow D$

12、$R_{eq}=R_1/\!/R_2=5\Omega$.

$u_{oc}=\frac{u_s}{2}=10\varepsilon(t)\ V$

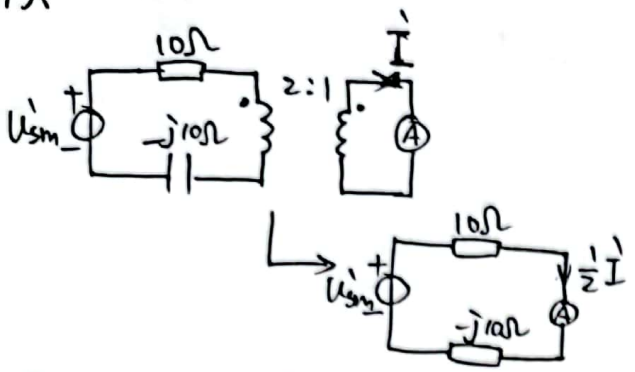
$\tau=\frac{L}{R_{eq}}=0.2s$

$i(0_-)=0A$.

$i(\infty)=\frac{u_s}{R_1}=2A$.

$\therefore i(t)=2(1-e^{-5t})\varepsilon(t) \Rightarrow B$.

13、



$\therefore \frac{1}{2}\dot{I} = \frac{\dot{U}_{sm}/\sqrt{2}}{10-j10}$

$\therefore \dot{I} = 2\angle 45° A.$

$\therefore I_A = 2A \Rightarrow A.$

14、 $i(t) = \frac{1}{L}\int u(t)dt.$

$= 5\int 5\sin 50t + 10\sin 100t \, dt$

$= [0.5\sin(50t-90°) + 0.5\sin(100t-90°)]A \Rightarrow A.$

15、 $\dot{U}_2 = j\omega L_2 \dot{I}_2 + j\omega M \dot{I}_1$

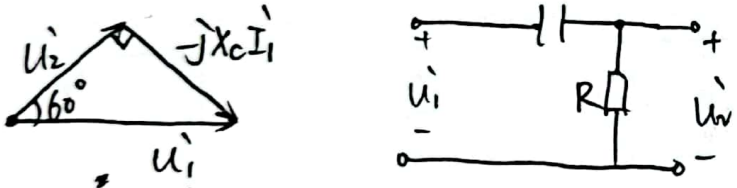
由于 $\dot{I}_1 = I_m\angle 0°$ $\dot{I}_2 = 0$

$\therefore \dot{U}_2 = -j\omega M I_m \angle 0° = \omega M I_m \angle 90°.$

$\therefore u_2 = -\omega M I_m \cos\omega t \Rightarrow B$

16、线性电阻二端口网络: $\frac{u}{i_s} = \frac{u'}{i_s'} \Rightarrow i_s' = 4i_s \Rightarrow D$

17、



$\therefore \frac{U_2}{U_1} = \frac{1}{2} \Rightarrow D.$

18、 $I = \sqrt{4^2 + \frac{2.5^2}{2} + \frac{1.5^2}{2} + \frac{0.8^2}{2}}\ A \Rightarrow C.$

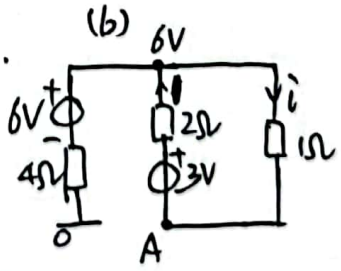
直流不需除$\sqrt{2}$

二、 KVL有: $-24 + 6i + i + 6 + i + 6 + 2i = 0.$

$\therefore i = 1.2A.$

$\therefore u_A = 6 + 7i - 24 = -9.6V.$

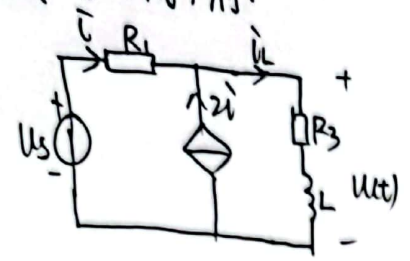
(b)



$i = \frac{3}{1+2} = 1A.$

$u_A = 6 - i = 5V$

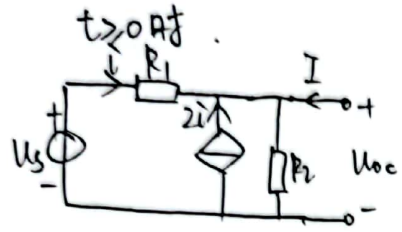
三、$t<0$时，有：



$$\begin{cases} i_L = 3i \\ u_s = iR_1 + i_L R_3 \end{cases}$$

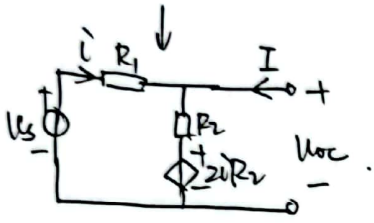
$$\therefore \begin{cases} i_L(0_-) = 6A \\ u(0_-) = 24V \end{cases}$$

$t \geq 0$时：



即：$\begin{cases} 3i - iR_1 = u_{oc} \\ 2iR_2 + R_2(i+I) = u_{oc} \end{cases}$

$\therefore u_{oc} = 24 + I$



即：$\begin{cases} R_{eq} = 1 + R_3 = 5\Omega \\ u_{oc} = 24V \end{cases}$

$\therefore \tau = \frac{L}{R_{eq}} = 0.1s$

$i_L(\infty) = 4.8A$.

$\therefore i_L(t) = (4.8 + 1.2e^{-10t})A$

$u(t) = i_L R_3 + L\frac{di_L}{dt} = (19.6 - 1.2e^{-10t})V$

四. 直接列写方程：

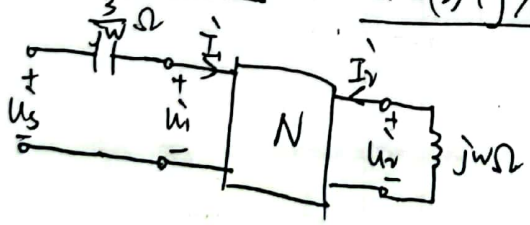
$$\begin{cases} \dot{U}_s = \dot{I}'R_1 + \dot{I}'j\omega L_1 + \dot{I}j\omega M + (\dot{I}+\dot{I}')R_2 \\ \dot{U} = \dot{I}j\omega L_2 + \dot{I}'j\omega M + (\dot{I}+\dot{I}')R_2 \end{cases}$$

$$\therefore \dot{I}' = \frac{60 - (j5+6)\dot{I}}{12+j10}$$

$\therefore \dot{U} = 30 + (3+j7.5)\dot{I}$

即：$\dot{U} = 30\angle 0°V$，$Z = (3+j7.5)\Omega$

五.



由Z矩阵有：$\begin{cases} \dot{U}_1 = 7\dot{I}_1 + 3\dot{I}_2 \\ \dot{U}_2 = 3\dot{I}_1 + 3\dot{I}_2 \end{cases}$

由KVL有：$\begin{cases} \dot{U}_s = \dot{I}_1\frac{3}{j\omega} + \dot{U}_1 \\ \dot{U}_2 = -j\omega\dot{I}_2 \end{cases}$

$$\therefore Z_{eq} = \frac{\dot{U}_s}{\dot{I}_1} = \frac{3}{j\omega} + 7 + \frac{9}{-3-j\omega}$$

$$= 7 + \frac{27}{9+\omega^2} + \left(\frac{j9\omega}{9+\omega^2} - \frac{j3}{\omega}\right)$$

令$Im[Z_{eq}] = 0$，有：$\frac{9\omega}{9+\omega^2} = \frac{3}{\omega}$. 即：$\omega = \frac{3}{\sqrt{2}}$ rad/s.

谐振频率为 $\omega = \frac{3}{\sqrt{2}}$ rad/s