电路分析（Ⅰ）参考答案

一．单项选择题

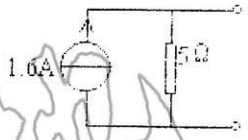
1. C	2. B	3. A	4. D	5. B
6. D	7. A	8. C	9. D	10. D
11. A	12. C	13. A	14. D	15. A
16. D				

二．填空

1. 能量	2. 0	3. n-1	4. 短路	5. VCR
6. $5e^{-10t}$ V	7. 0.02 S	8. 15°	9. $40\cos(10t+120°)$ V	
10. 0.8	11. 5H			

三．解：ab 短路，求短路电流 $I_{ab} = I_{sc}$ （用叠加定理）

$$I_{sc} = \frac{12}{6+\frac{6\times7}{6+7}}\times\frac{6}{6+7}+2\times\frac{5}{5+2+6//6}=1.6A$$



独立电流源不作用，求等效电阻 Ro

$Ro = (6//6+2+5)//10 = 5\Omega$

四．解：列结点方程

$$\begin{cases}\frac{1}{3}U_1 = 4 - I\\ \frac{1}{6}U_2 = 2 + I\\ U_1 - U_2 = 6\end{cases}$$

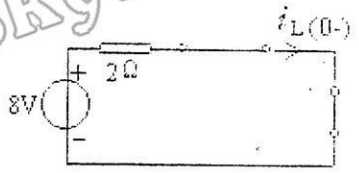
解得：$U_1 = 14V$　$U_2 = 8V$

$$I = \frac{U_2}{6} - 2 = \frac{8}{6} - 2 = -\frac{2}{3}A$$

五．解：$t < 0$，$i_L(0-) = \frac{8}{2} = 4A$

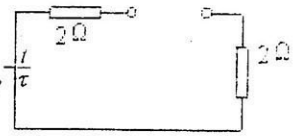
$t > 0$，$i_L(0+) = i_L(0-) = 4A$

$$i_L(\infty) = \frac{8}{2+2} - 2\times\frac{2}{2+2} = 1A$$



(0-)等效电路

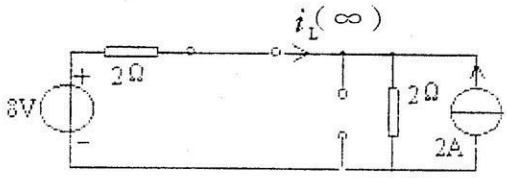
$$\tau = \frac{L}{R_o} = \frac{1}{2+2} = \frac{1}{4}S$$



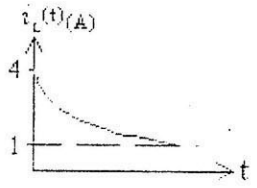
求 Ro 等效电路

$$\therefore\ i_L(t) = i_L(\infty) + [i_L(0+) - i_L(\infty)]e^{-\frac{t}{\tau}}$$

$$= 1 + 3e^{-4t}A \qquad t \geqslant 0$$



（∞）等效电路



六、解：将变压器次级负载断开，求次级端口左侧戴维南等效电路，

$\dot{U}_{OC}=100\angle 0^\circ \times\frac{2}{2+2}\times 10=500\angle 0^\circ$ V　　（极性为上"+"下"－"）

$R_0=2//2\times 10^2=100\Omega$

由等效电路得：$\dot{U}_3=\dot{U}_{OC}\frac{100}{100+100+j200}=125\sqrt{2}\angle -45^\circ$ V

七、解：画出相量模型，可得：

$$\dot{I}_1=\frac{\dot{U}_S}{1+j3+\frac{(5\times 0.4)^2}{2+j2}}=\frac{10\angle 15^\circ}{2+j2}=\frac{5}{\sqrt{2}}\angle -30^\circ A$$

$$\dot{I}_2=\frac{-j2\dot{I}_1}{2+j2}=\frac{-j2\times\frac{5}{\sqrt{2}}\angle -30^\circ}{2\sqrt{2}\angle 45^\circ}=2.5\angle -165^\circ A$$

$\therefore i_1(t)=5\cos(5t-30^\circ)$ A

$i_2(t)=2.5\sqrt{2}\cos(5t-165^\circ)$ A