

电工电子部分习题参考答案

练习一 计算题

1. $I=2.27\text{A}$, $W=5.4\times 10^6\text{J}=1.5$ 度
2. $P=463\text{W}$, $W=740741\text{J}=0.206$ 度
3. $W=20.8$ 度, $t=13.9\text{h}$
4. a) $I=2.5\text{A}$ b) $U=43\text{V}$
5. a) $I_2=-5\text{A}$, $I_3=3\text{A}$, $I_5=1\text{A}$, $U_5=17\text{V}$,
 $P_1=50\text{W}$, $P_2=-125\text{W}$, $P_3=24\text{W}$, $P_4=34\text{W}$, $P_5=17\text{W}$,
b) $I_A=6\text{A}$, $I_B=5\text{A}$, $I_F=-3\text{A}$, $U_B=60\text{V}$, $U_C=30\text{V}$, $U_D=50\text{V}$,
 $P_A=-480\text{W}$, $P_B=300\text{W}$, $P_C=30\text{W}$, $P_D=200\text{W}$, $P_E=-100\text{W}$, $P_F=-30\text{W}$, $P_G=80\text{W}$
6. $I=2\text{A}$, $P_2=36\text{W}$
7. $I=11\text{A}$, $P_2=10\text{W}$
8. $I=13.04\text{A}$, $I_3=4.35\text{A}$
9. $I_{\text{HEDC}}=(5E)/(12R)$, $I_{\text{DC}}=E/(12R)$
10. a) 8Ω b) 50Ω c) 5Ω d) 2Ω
11. $R_1=197\text{K}\Omega$, $R_2=800\text{K}\Omega$, $R_3=1000\text{K}\Omega$
12. $R_1=12.06\Omega$, $R_2=1.5075\Omega$, $R_3=1.5075\Omega$
13. $I_1=5.625\text{A}$, $I_2=5.8125\text{A}$, $I_3=11.4375\text{A}$, $P_3=1308\text{W}$
14. $I_3=-0.5\text{A}$
15. $E_0=-2\text{V}$, $R_0=12\Omega$, $I_3=0.09\text{A}$, $P_3=0.08\text{W}$
16. $E_0=25\text{V}$, $R_0=15\Omega$, $I_2=-0.5\text{A}$
17. $I_1=1/3=0.33\text{A}$, $I_{\text{II}}=4/3=1.33\text{A}$, $I_{\text{III}}=1\text{A}$, $P_{E1}=93.3\text{W}$, $P_{E2}=-8.3\text{W}$
18. $E_0=40\text{V}$, $R_0=30\Omega$, $I_5=0.57\text{A}$
19. $U_1=50.39\text{V}$, $U_2=22.86\text{V}$, $U_3=6.75\text{V}$, $I_6=0.169\text{A}$, $P_E=31.8\text{W}$, $P_S=100.8\text{W}$
20. 按由上到下, 由左到右的顺序选择网孔, 均取顺时针方向。
 - a) $(R_3+R_4+R_5)I_{\text{I}} - R_4I_{\text{II}} - R_5I_{\text{III}} = 0$
 $-R_4I_{\text{I}} + (R_1+R_4+R_6)I_{\text{II}} - R_6I_{\text{III}} = E_1$
 $-R_5I_{\text{I}} - R_6I_{\text{II}} + (R_2+R_5+R_6)I_{\text{III}} = -E_2$
 - b) $I_{\text{II}} = I_{S2}$
 $(R_2+R_4)I_{\text{I}} - R_2I_{\text{III}} - R_4I_{\text{IV}} = -E_1$
 $-R_2I_{\text{I}} - R_1I_{\text{II}} + (R_1+R_2+R_3)I_{\text{III}} - R_3I_{\text{IV}} = 0$
 $-R_4I_{\text{I}} - R_3I_{\text{III}} + (R_3+R_4+R_5)I_{\text{IV}} = 0$
21. a) 取节点 4 为参考点, 其中 $G_i = 1/R_i$
 $(G_1+G_3+G_4)U_1 - G_4U_2 - G_3U_3 = G_1E_1$
 $-G_4U_1 + (G_4+G_5+G_6)U_2 - G_5U_3 = 0$
 $-G_3U_1 - G_5U_2 + (G_2+G_3+G_5)U_3 = G_2E_2$

b) 取节点 D 为参考点, 其中 $G_i = 1/R_i$
 $U_B = E_1$
 $(G_1+G_3+G_5)U_A - G_1U_B - G_3U_C = -I_{S2}$
 $-G_3U_A - G_2U_B + (G_2+G_3+G_4)U_C = 0$

22. a) $32.94\ \Omega$ b) $35.83\ \Omega$

23. $I=4\text{A}$

24. $I=0.22\text{A}$

25. $P=15\text{W}$