10-5. ∵ $U_{O(AV)} = 0.9U_2 = 0.9\times20 = 18(V)$

∴ $I_{O(AV)} = \frac{U_{O(AV)}}{R_L} = \frac{18}{1} = 18(mA)$

∴ $I_{D(AV)} = \frac{1}{2}I_{O(AV)} = 9mA$

∴ $U_{RM} = \sqrt{2}U_2 = 20\sqrt{2}V \approx 28.2V$

10-10.(1) 不能。若去掉会使稳压管上的电流过大而容易烧坏。

(2). ∵ $U_{Zmax} = 1.2(1+10\%)U_2 = 1.2\times1.1\times15 = 19.8(V)$

∵ $\frac{U_{Zmax}-U_O}{R} < I_{Zmax}$

∴ $R > \frac{U_{Zmax}-U_O}{I_{Zmax}} = \frac{19.8-6}{38\times10^{-3}} = 363(\Omega)$

∵ $U_{Zmin} = 1.2(1-10\%)U_2 = 1.2\times0.9\times15 = 16.2(V)$

∵ $\frac{U_{Zmin}-U_O}{R} - I_{Omax} > I_Z$

∴ $R < \frac{U_{Zmin}-U_O}{I_Z+I_{Omax}} = \frac{16.2-6}{(5+10)\times10^{-3}} = 680(\Omega)$

∴ $363\Omega < R < 680\Omega$

∴ R取500Ω.

10-11.(1). $U_2 = \frac{U_1}{1.2} = \frac{24}{1.2} = 20(V)$

(2). ①当电位器调到最上端.

∵ $\frac{U_O R_4}{R_3+R_{RP}+R_4} = U_{BE}+U_Z$

∴ $U_O = \frac{R_3+R_{RP}+R_4}{R_4}(U_{BE}+U_Z) = \frac{300+300+300}{300}(0.7+5.3) = 18(V)$

② 当电位器调到最下端

∵ $\frac{U_O(R_4+R_{RP})}{R_3+R_4+R_{RP}} = U_{BE}+U_Z$

北京理工大学
BEIJING INSTITUTE OF TECHNOLOGY

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$\therefore U_o = \frac{R_3 + R_4 + R_{RP}}{R_4 + R_{RP}} (U_{BE} + U_Z) = \frac{300+300+300}{300+300} (0.7+5.3) = 9(V)$

∴可调范围为 9~18V

(3). 改成以后 $U_{omax} = \frac{R_3 + R_{RP} + R_4}{R_4} (U_{BE} + U_Z) = \frac{600+300+300}{300} (0.7+5.3) = 24 (V) = U_I$

$\therefore U_{omax}' = 24 - 2 = 22(V)$

10-7. (1) a. 输出恒定电流

b. 输出恒定电压且可调

(2). $I_o = \frac{U_{xx}}{R} + I_3 = \frac{5}{R} + I_3$

(3). $U_o = \frac{R_1 + R_2}{R_1} U_{xx} + I_3 R_2 = 5 \frac{R_1 + R_2}{R_1} + I_3 R_2$

10-19. ∵ $(U_o)_{max} = (U_{xx} + U_{EB}) \times \frac{R_1 + R_{RP} + R_3}{R_1} = (15+0.2) \frac{1+2+0.5}{1} = 53.2(V)$

$(U_o)_{min} = (U_{xx} + U_{EB}) \frac{R_1 + R_{RP} + R_3}{R_1 + R_{RP}} = (15+0.2) \frac{1+2+0.5}{1+2} = 17.7(V)$

∴调节范围是 17.7~53.2V

联系方式：

北京理工大学良乡校区管理处监制 电话：81382088