

《电路分析》答案

1. ① $V_{GS} = -3V$ 截止 $-V_{PO} = -2V$ $\therefore$ 截止

② $V_{GS} = 3V$, $V_{DS} = 1V$, 而 $V_{GS} - V_T = 3 - 2 = 1V$ $\therefore$ 临界饱和

③ 发射结、集电结均正偏， $\therefore$ 饱和

④ $I_E = \frac{15V - 0.7}{\frac{100k}{\beta} + 1k} = 7.15mA$, 而 $I_E(2k + 1k) = 21.45V > 15V$ $\therefore$ 饱和

2. ① D 导通，流过 $0.6k$ 的电流 $I = \frac{9}{0.6k + 0.3k // 10.4k} = 11.67mA$

$\therefore I_1 = I \frac{0.4}{0.3 + 0.4} = 6.67mA$

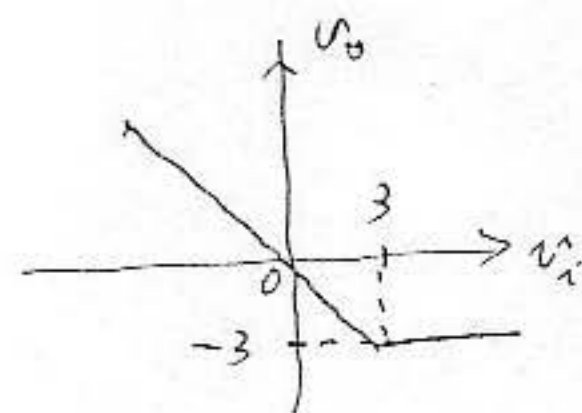
$I_2 = 5mA$

$V_o = 2V$

② $V_A = V_i \frac{R_2}{R_1 + R_2} = V_i \frac{1}{3}$ 当 $V_A = 1V$ 时 D 导通，此时 $V_i = 3V$

$\therefore V_i < 3V$ D 截止， $V_o = -\frac{R_3}{R_1 + R_2} V_i = -V_i$

$V_i \geq 3V$ D 导通 $V_o = -\frac{R_3}{R_2} (1V) = -3V$



3. 单级时 $A_{vi} \cdot f_{hi} = f_T$ 若取 $A_{vi} = 100$ 则 $f_{hi} = \frac{f_T}{100} = \frac{1M}{100} = 10kHz$ 不符要求

(或 $100 \times 50kHz = 5000kHz > f_T$, 一级不可)

$n=2$ 时, $f_{hi} = 0.64 f_{hi}$ 若 $f_{hi} = 50kHz$, $f_{hi} = 78kHz \Rightarrow A_{vi} = \frac{1000}{78} = 12.82$

而 $A_v = A_{vi}^2 = 12.82^2 > 100$