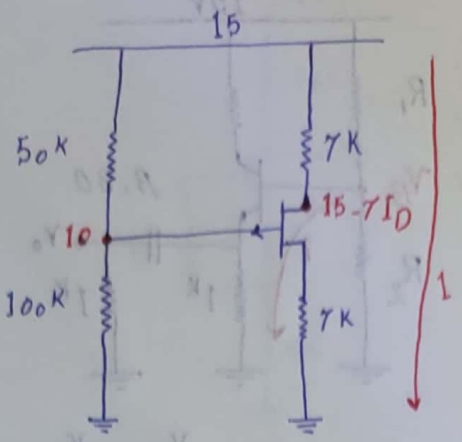


$V_p = 3V$

$I_{DSS} = 9mA$

$V_{GS} = 10 - 15 + 7I_D = -5 + 7I_D$

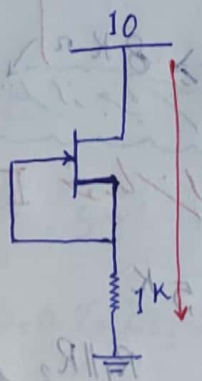
$I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_p}\right)^2 \longrightarrow \begin{cases} V_{GS} = 4.1 \\ V_{GS} = 2 \checkmark \end{cases}$

$I_D = 0.42mA$

KVL@1: $-15 + 7(0.42) + V_{SD} + 7(0.42) = 0$

$V_{SD} = 9.12 > V_p - V_{GS}$ ✓

Bias point (0.42, 9.12)



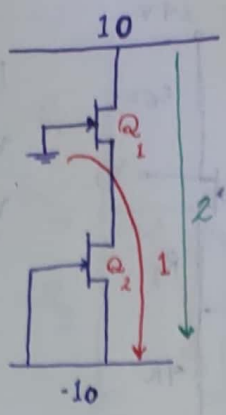
$I_{DSS} = 4mA$

$V_p = -2V$

$V_G = V_S \longrightarrow V_{GS} = 0$

$I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_p}\right)^2 \longrightarrow I_D = 4mA$

KVL@1: $-10 + V_{DS} + 4 = 0 \longrightarrow V_{DS} = 6V > 0-(-2)$ ✓



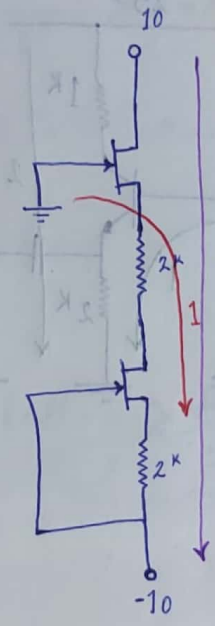
$I_{DSS} = 4\,mA$

$V_p = -2\,V$

$V_{GS_2} = 0 \qquad I_D = 4\,mA$

KVL@1: $V_{GS} + V_{DS_2} - 10 = 0 \longrightarrow V_{DS_2} = 10 > 2$ ✓

KVL@2: $-10 + V_{DS_1} + V_{DS_2} - 10 = 0 \longrightarrow V_{DS_1} = 10 > 2$ ✓



$I_{DSS} = 4\,mA$

$V_p = -2$

$V_G = -10$

$V_S = -10 + 2I_D$ $\Big\} \Rightarrow V_{GS} = -2I_D \Longrightarrow I_D = I_{DSS}\left(1 - \frac{-2I_D}{-2}\right)^2$

$I_D = 1.64$

$I_D = 0.6$ ✓ $\longrightarrow V_{GS} = -1.2$

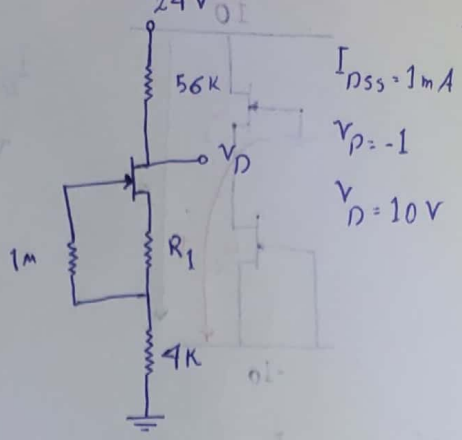
KVL@1: $V_{GS} + 2(0.6) + V_{DS_2} + 2(0.6) - 10 = 0$

$V_{DS_2} = 8.8 > 0.8$

KVL@2: $-10 + V_{DS_1} + 2(0.6) + 8.8 + 2(0.6) - 10 = 0$

$V_{DS_1} = 8.8 > 0.8$

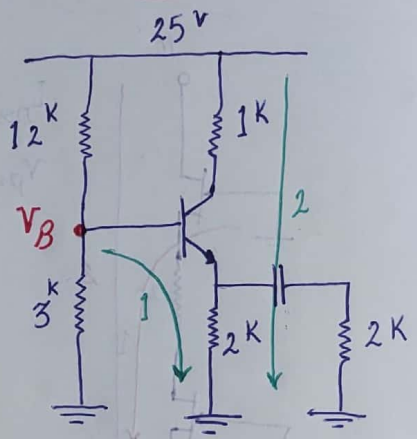
.2



$24 - 56 I_D = 10 \longrightarrow I_D = 0.25 \longrightarrow V_{GS} = 0.5$

$R_1 I_D = V_{GS} \longrightarrow R_1 = 2K$

.3



DC analysis:

$V_B = \frac{3 \times 25}{15} = 5V$

KVL@1: $-5 + 0.7 + 2 I_E \longrightarrow I_E = 2.15mA$

KVL@2: $-25 + 2.15 + V_{CE} + 4.3 = 0 \longrightarrow V_{CE_Q} = 18.5V$

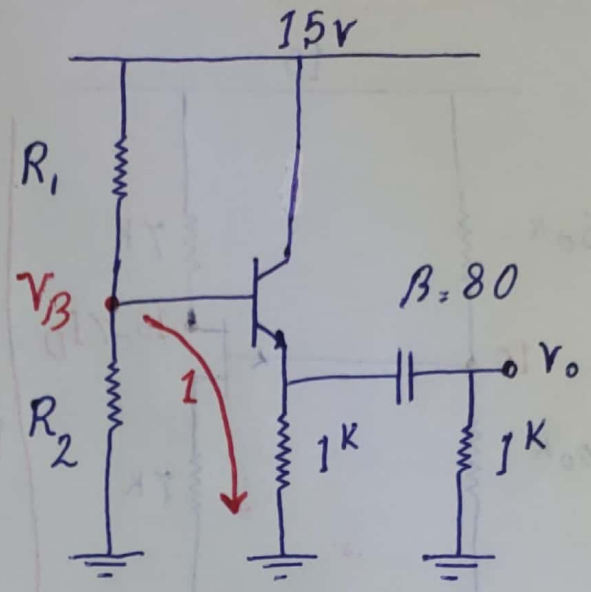
$Swing_\mu = \min\{R_{AC} \cdot I_{CQ}, V_{CE_Q} - V_{CE,sat}\}$

$R_{AC} = 2K \qquad I_{CQ} = 2.15$

$V_{CE_Q} = 18.5 \qquad V_{CE,sat} = 0.2$

$Swing_\mu = 4.3V$

output voltage $swing_\mu = \left(\frac{R_C}{R_C + R_E}\right) V_{CE_{(swing_\mu)}} = 1.43V$



for max swing $\longrightarrow I_{CQ} = \dfrac{V_{CC} - V_{CE,sat}}{R_{DC} + R_{AC}}$

$R_{DC} = 1^K$ $\quad V_{CC} = 15$

$R_{AC} = 0.5^K$ $\quad V_{CE,sat} = 0.2$

$$I_{CQ} = \frac{15 - 0.2}{1^K + 0.5^K} = 9.8mA$$

KVL@1: $-V_B + 0.7 + 9.8 = 0 \longrightarrow V_B = 10.5v$

$$\begin{cases} \dfrac{R_2 \cdot V_{CC}}{R_1 + R_2} = 10.5\ I \\ R_1 \| R_2 \geq 0.1 \times \beta \times R_E \geq 8\ K\Omega \end{cases} \longrightarrow \begin{cases} R_2 = 0.43^K \\ R_1 = 0.175^K \end{cases}$$

برای حد نظر از جواب بیش