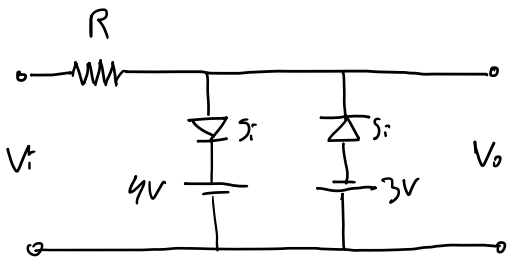
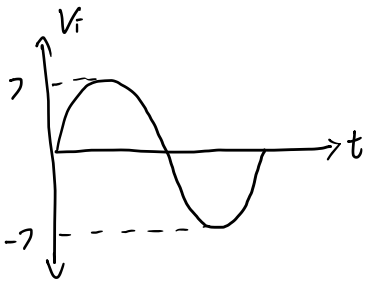
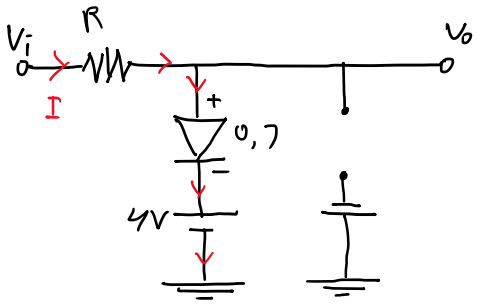
M. Hasyim Abdillah P. 1101191095 TT-43-11

1.





* Arus maju



$\sum V = 0$

$V_i - IR - 0{,}7 - 4 = 0$

$7 - IR - 0{,}7 - 4 = 0$

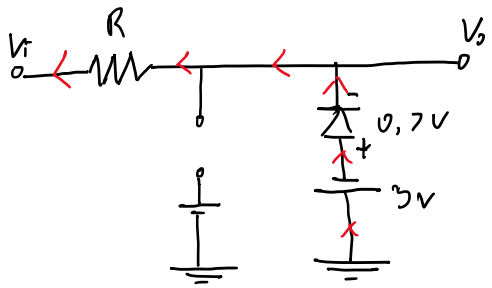
$IR = 2{,}3\ V$

$V_o = V_i - IR$

$= 7 - 2{,}3$

$= 4{,}7\ V$

* Arus mundur



$\sum V = 0$

$V_i - IR - (-0{,}7) - (-3) = 0$

$-7 - IR + 0{,}7 + 3 = 0$

$IR = -3{,}3$

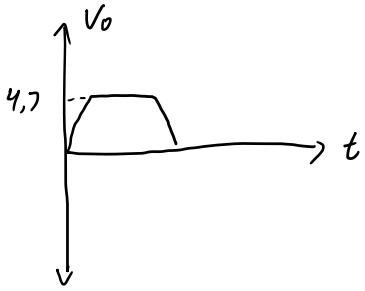
$V_o = V_i - IR$

$= -7 - (-3{,}3)$

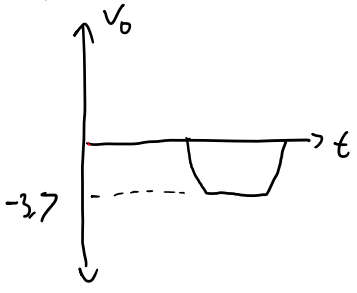
$= -3{,}7\ V$

Gelombang output

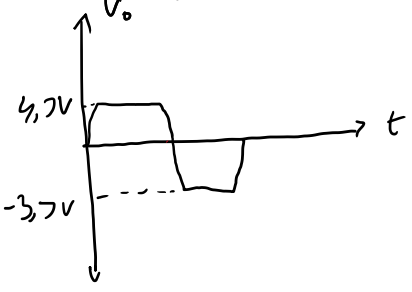
Arus maju



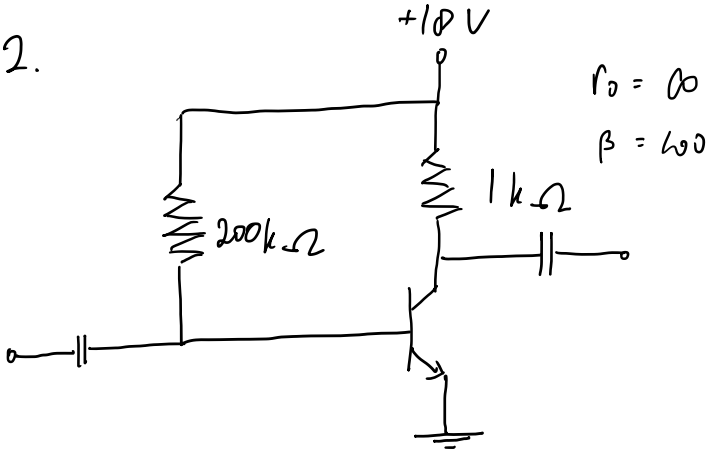
Arus mundur



Gelombang output keseluruhan



2.



$r_o = \infty$

$\beta = 400$

Dit : $A_v = \ldots$

$Z_i = \ldots$

$Z_o = \ldots$

$$I_B = \frac{V_{cc} - V_{BE}}{R_B} = \frac{10 - 0,7}{200k} = 56,5\,\mu A$$

$$I_E = (\beta + 1) I_B$$

$$= 101 \cdot 56,5\,\mu A = 5,7\,mA$$

$$r_e = \frac{26mV}{I_E} = \frac{26mV}{5,7mA} = 4,56\,\Omega$$

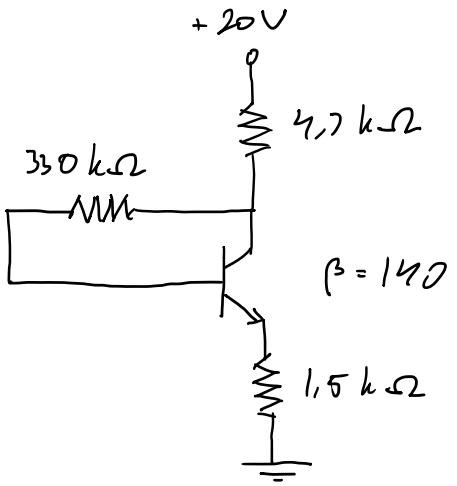
Karena $r_o \geq 10 R_c$

$$A_v = -\frac{R_c}{r_e} = -\frac{1k}{4,56} = 219,3$$

$$Z_i = \beta r_e = 400 \cdot 4,56 = 456\,\Omega$$

$$Z_o = R_c = 1k\,\Omega$$

3.



Dit: I_B = ...

I_C = ...

V_E = ...

$\Sigma V = 0$

$V_{cc} - I_C' R_L - I_B R_B - V_{BE} - I_E R_E = 0$

$20 - \beta I_B \cdot 4{,}7k - I_B \cdot 330k - 0{,}7 - \beta I_B \cdot 1{,}5k = 0$

$19{,}3 = I_B (140 \cdot 4{,}7k + 330k + 140 \cdot 1{,}5k)$

$I_B = \frac{19{,}3}{1190k} = 16{,}11 \mu A$

$I_C' = \beta I_B = 16{,}11 \mu A \cdot 140 = 2{,}26 mA$

$I_C = I_C' - I_B = 2{,}26 mA - 16{,}11 \mu A = 2{,}24 mA$

$V_{CE} = V_{cc} - I_E R_E - I_C' R_L = V_{cc} - I_C' (R_E + R_L)$

$= 20 - 2{,}26 mA (1{,}5k + 4{,}7k)$

$= 20 - 14{,}012$

$= 5{,}988 V$

$V_C = V_{cc} - I_C' R_L$

$= 20 - 2{,}26 mA \cdot 4{,}7k$

$= 9{,}378 V$

$V_{CE} = V_C - V_E$

$V_E = V_C - V_{CE} = 9{,}378 - 5{,}988 = 3{,}39 V$