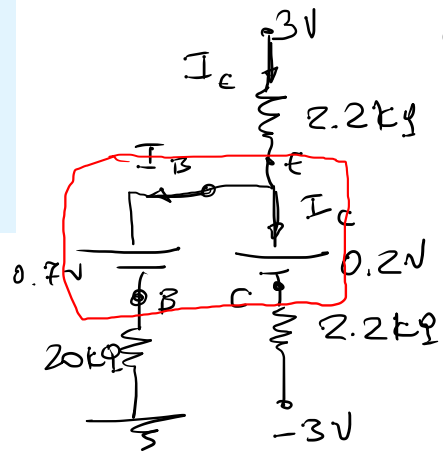
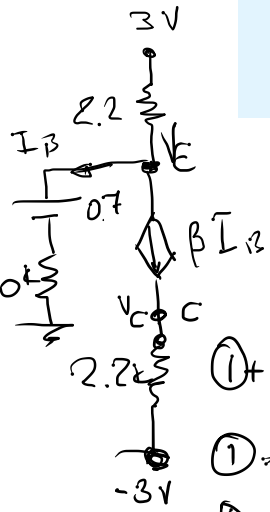


ΥΠΟΛΟΓΙΣΤΕ V_E, V_C ΓΙΑ $\beta = 50$

ΥΠΟΘΕΤΩ ΟΤΙ ΤΟ ΒJT PMP ΕΙΝΑΙ ΕΤΟΝ ΚΟΡΩ:
ΤΟ ΑΝΤΙΣΤΟΙΧΟ ΗΛΕΚΤΡΙΚΟ ΑΝΑΛΟΓΟ ΘΑ ΕΙΝΑΙ:



① $3 - V_E = (2.2k) I_E$

② $V_E - 0.2 - (-3) = (2.2k) I_C$

③ $V_E - 0.7 = (20k) \cdot I_B$

④ $I_E = I_B + I_C$

① + ② $\Rightarrow 3 - 0.2 + 3 = (2.2k)(I_C + I_C)$ ⑤

① + ③ $\Rightarrow 3 - 0.7 = (2.2k)I_C + (20k)I_B$ ⑥

④, ⑤, ⑥ ΣΤΗΣ ΕΞΙΣΩΣΕΙΣ ΓΡΑΜΜΙΚΕΣ ΜΕ ΑΓΝΩΣΤΩΦΕ I_C, I_C, I_B

5 ④ $\Rightarrow 5.8 = (2.2k)(2I_C + I_B) \Rightarrow 5.8 = (4.4k) \cdot I_C + (2.2k)I_B$

⑥ $\times 2 \Rightarrow 2 \times 2.3 = (4.4k)I_C + (40k)I_B$

① $\underline{\hspace{10em}}$
 $1.2 = 5.8 - 4.6 = -(37.8k)I_B \Rightarrow$

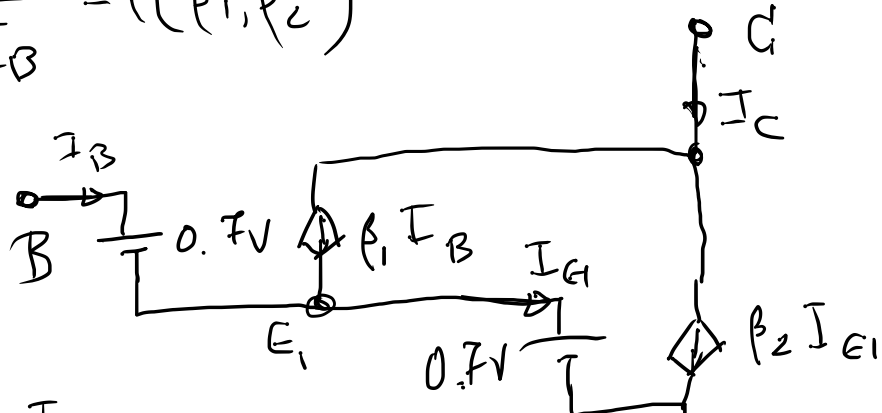
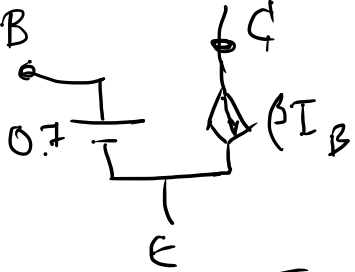
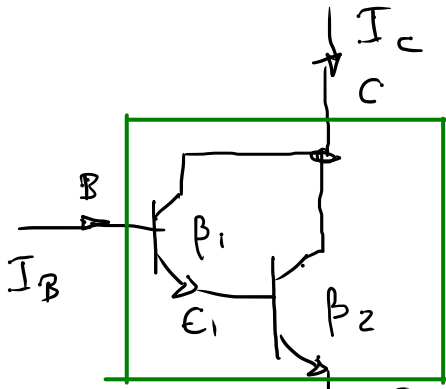
ΤΟ ΒJT ΕΙΝΑΙ ΕΤΟΝ ΚΟΡΩ
ΕΤΗΝ ΕΝΕΡΓΟ ΤΕΡΜΟΧΗ.

$$I_B = \frac{-1.2}{37.8} \mu A$$

ENERGIE ΠΕΡΙΟΧΗ

$$V_{BE} = V_B - V_E = 1.4V$$

$$\frac{I_c}{I_B} = \beta(\beta_1, \beta_2)$$



$$\frac{I_c}{I_B} = \frac{\beta_1 I_B + \beta_2 I_{E1}}{I_B} = \frac{\beta_1 I_B + \beta_2 (\beta_1 + 1) I_B}{I_B} = \frac{\beta_1 + \beta_2 (\beta_1 + 1)}{1}$$

$$\frac{I_c}{I_B} = \beta_1 + \beta_2 + \beta_1 \beta_2 \approx \beta_1 \beta_2$$

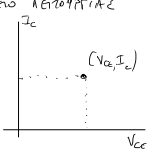
(V_{ce}, I_c) ΕΠΙΛΟΓΗ ΠΡΑΞΗΣ

DC ΑΝΑΛΥΣΗ:

$I_c = \beta I_B$
 $I_e = (\beta + 1) I_B$
 ① $V_c = 10 - I_c$
 ② $V_B = V_E + 0.7 = 0.7 + 10 I_e$
 ③ $10 - V_B = 10k \cdot I_1$
 ④ $V_B = 5k \cdot I_2$
 ⑤ $I_1 = I_2 + I_B$

$I_c = 100 I_B = \beta I_B$
 $V_c = 10 - I_c = 10 - (\beta + 1) I_B$
 $10 = 10k I_B + 0.7 + 10(\beta + 1) I_B$
 $\Rightarrow I_B = \frac{10 - 0.7}{10k + 10(\beta + 1)} = \frac{9.3}{10000 + 1010} = 8.3 \mu A$
 $I_c = 844 \mu A$

$V_{ce} = 10 - 100 \cdot I_c - V_E = 10 - 8.44 - 0.852 \approx 0.6V$



$5k I_2 - 10 I_e = 0.7$

$I_e = (\beta + 1) I_B$
 $I_c = 100 I_B = \beta I_B$
 $V_c = 10 - I_c = 10 - (\beta + 1) I_B$
 $10 = 10k I_B + 0.7 + 10(\beta + 1) I_B$
 $\Rightarrow I_B = \frac{10 - 0.7}{10k + 10(\beta + 1)} = \frac{9.3}{10000 + 1010} = 8.3 \mu A$
 $I_B = 844 \mu A$

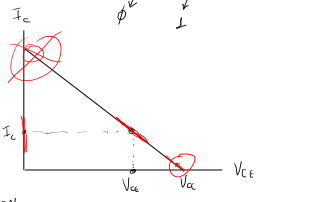
$V_c = 10 - (\beta + 1) I_B = 10 - 101 \times 8.44 \mu A = 10 - 8.44 \mu A = 9.524 mV$
 $I_c = \beta I_B = 100 \times 8.44 \mu A = 844 \mu A$
 $V_{ce} = 10 - 100 \cdot I_c - V_E = 10 - 8.44 - 0.852 \approx 0.6V$

AC ΑΝΑΛΥΣΗ (ΧΑΜΗΛΕΣ ΣΥΧΝΟΤΗΤΕΣ)

CLASS A

$i_c = (\beta + 1) i_b$
 $i_c = \beta i_b$
 $\frac{V_o}{V_i} = \frac{-100 \cdot i_c}{V_o L_b + 10 \cdot i_c} = \frac{-100 \cdot \beta \cdot i_b}{V_o L_b + 10(\beta + 1) i_b} \Rightarrow$
 $\Rightarrow \frac{V_o}{V_i} = \frac{-100 \cdot \beta}{V_o + (\beta + 1) \cdot 10} = \frac{-100}{\frac{V_o}{\beta} + (\beta + 1) \cdot 10} \approx -\frac{100}{10} = -10$

$\frac{V_o}{V_i} = -\frac{R_c}{R_e}$



CLASS B

$V_{B1} - V_{B2} = 1V$ ΔΙΟΤΙ ΒJT ΕΤΙΜΩΝΟΝΤΑ
 $R = 8\Omega$
 $I = \frac{V_{B1} - V_{B2}}{R} = \frac{1V}{8\Omega} = 125 \mu A$
 $P = V \cdot I = \frac{V^2}{R} = \frac{(100)^2}{8} = 1250W$
 $R_1 = \frac{100V \cdot 0.5}{125 \mu A} \approx 100 \times 10^3 \Omega = 100k\Omega$

ΕΡΩΤΗΜΑΤΑ: ① Δοιο αναλ το β τσν BJT
 ② Δοια η ισχυς τσν τρανζιςτορ.