ΕΞΕΤΑΖΟΜΕΝΟ ΜΑΘΗΜΑ: ΗΛΕΚΤΡΟΛΟΓΙΑ ΤΕΧΝΟΛΟΓΙΚΗΣ ΚΑΤΕΥΘΥΝΣΗΣ (ΚΥΚΛΟΥ ΤΕΧΝΟΛΟΓΙΑΣ & ΠΑΡΑΓΩΓΗΣ)

Προτεινόμενες Απαντήσεις Θεμάτων:

Α1.1. δ

Α1.2. α

Α1.3. β

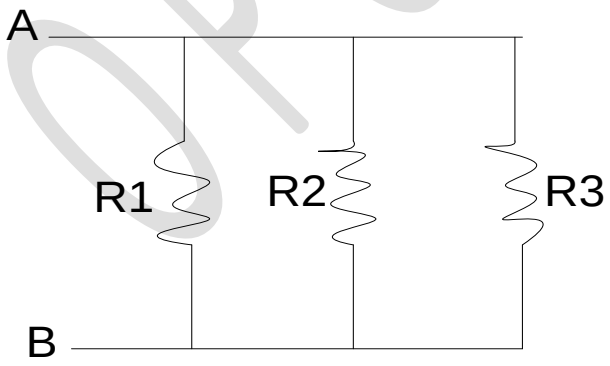
Α1.4. α

Α2. $(9A)_{16} = 10011010_{(2)} \Leftrightarrow (9A)_{16} = 9\times16^1 + A\times16^0 = 9\times16+10 = 154_{(10)}$

Α3.

x	y	xy	z	f = x + y + z
0	0	0	0	0
0	1	0	0	0
1	0	0	0	0
1	1	1	0	1
0	0	0	1	1
0	1	0	1	1
1	0	0	1	1
1	1	1	1	1

Α4. $R_1 = R_2 = R_3 = 12\Omega$



$$\frac{1}{R_{o\lambda}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \Leftrightarrow \frac{1}{R_{o\lambda}} = \frac{3}{R} \Leftrightarrow R_{o\lambda} = \frac{R}{3} = \frac{12\Omega}{3} = 4\Omega$$

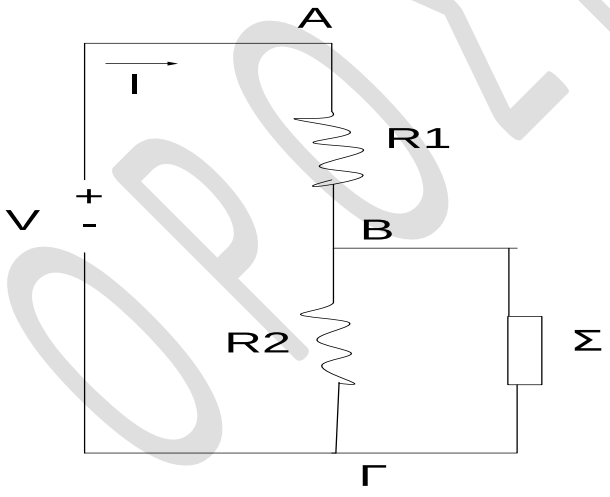
Α5.

α) Όταν αυξάνεται το ρεύμα $\mathbf{I_β}$, σημαίνει ότι ο εκπομπός στέλνει περισσότερους φορείς, επομένως αυξάνεται και το ρεύμα **Ic.** Ο λόγος των αντίστοιχων μεταβολών δύο εντάσεων αποτελεί χαρακτηριστική σταθερή του τρανζίστορ για ορισμένη θερμοκρασία και λέγεται **συντελεστής ενίσχυσης ρεύματος**
$\mathbf{\beta = \Delta I_c/\Delta I_B}$ όταν V_{CE} σταθερή.

β) $\mathbf{\beta = \Delta I_c/\Delta I_B}$

$\mathbf{\beta}$ = 1mA/20μA = 50

Β1.



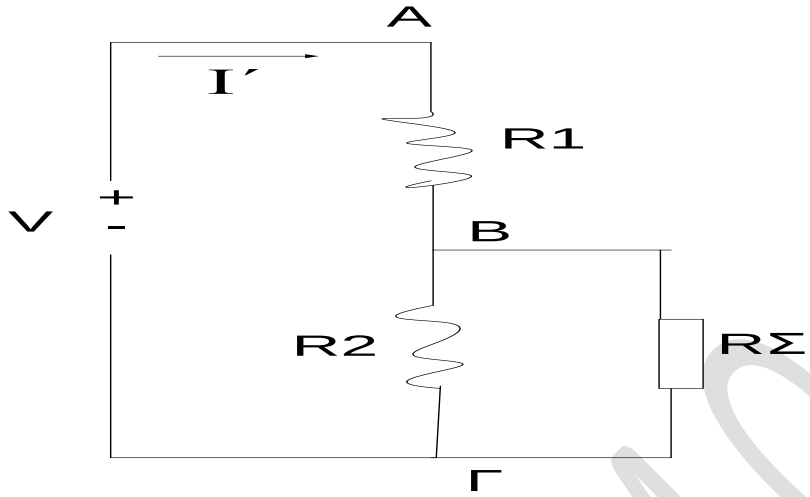
α)

$$I = \frac{V}{R_{ολ}} = \frac{72}{9} = 8\text{A}$$

$$V_{AB} = IR_1 = 8 \times 6 = 48V$$

$$V_{ΒΓ} = IR_2 = 8 \times 3 = 24V$$

β)



$$P_K = \frac{V_K^2}{R_\Sigma} \Rightarrow$$

$$R_\Sigma = \frac{V_K^2}{P_K} = \frac{24^2}{96} = \frac{576}{96} = 6\Omega$$

$$\frac{1}{R_{\Sigma,2}} = \frac{1}{R_2} + \frac{1}{R_\Sigma} \Rightarrow$$

$$\frac{1}{R_{\Sigma,2}} = \frac{1}{3} + \frac{1}{6} = \frac{3}{6} \Rightarrow$$

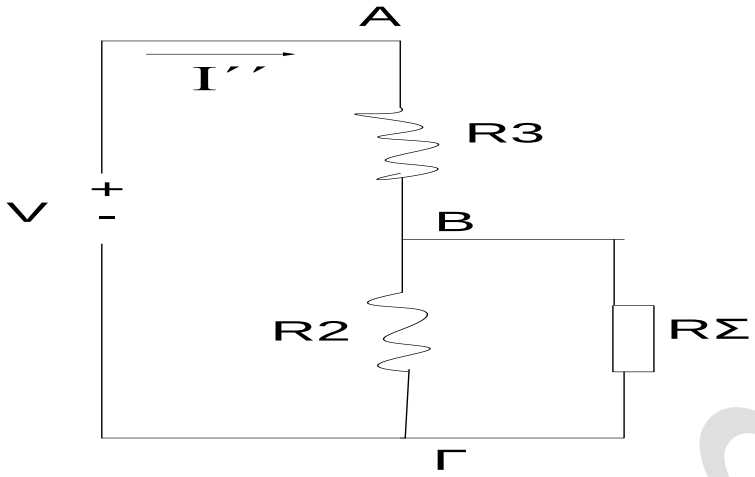
$$R_{\Sigma,2} = 2\Omega$$

$$R_{o\lambda} = R_1 + R_{2,\Sigma} = 6 + 2 = 8\Omega$$

$$V_{B\Gamma} = I' R_{2\Sigma} = 9 \times 2 = 18V$$

Άρα υπολειτουργεί

γ)



$V_{B\Gamma} = \mathrm{I}'' R_{\Sigma,2} \Rightarrow$

$\mathrm{I}'' = \dfrac{V_{B\Gamma}}{R_{\Sigma,2}} = \dfrac{24}{2} = 12\mathrm{A}$

$V = \mathrm{I}'' R'_{o\lambda} \Rightarrow$

$R'_{o\lambda} = \dfrac{V}{I''} = \dfrac{72}{12} = 6\Omega$

$R''_{O\lambda} = R_3 + R_{\Sigma,2} \Rightarrow$

$R_3 = R''_{o\lambda} - R_{\Sigma,2} = 6 - 2 = 4\Omega$

B2.

$a) A_I = \dfrac{I_{0\varepsilon\xi}}{I_{0\varepsilon\xi}} \Leftrightarrow \mathrm{I}_{0\varepsilon\xi} = \mathrm{A}_\mathrm{I} \times \mathrm{I}_{0\varepsilon\iota\sigma} \Leftrightarrow \mathrm{I}_{0\varepsilon\xi} = 0,5\mathrm{A}$

$dB_{\varepsilon\nu\tau\alpha\sigma\eta\varsigma} = 20\log\dfrac{\mathrm{I}_{0\varepsilon\xi}}{\mathrm{I}_{0\varepsilon\iota\sigma}} = 20\log A_I$

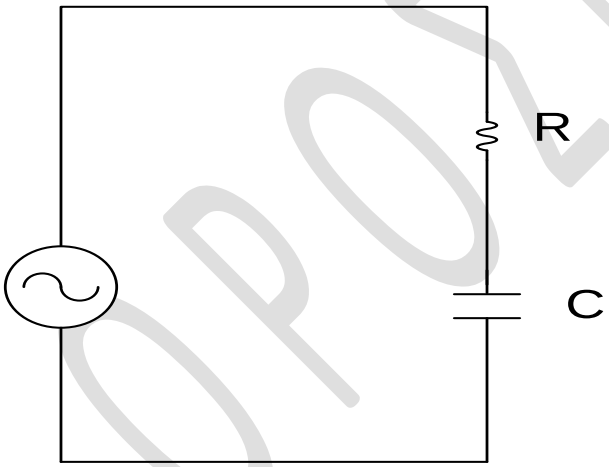
$dB_{\varepsilon\nu\tau\alpha\sigma\eta\varsigma} = 20\log 10^3 = 60$

β)

$A_p = A_I \times A_v = 10^3 \times 10^4 = 10^7$

$dB_{\iota\sigma\chi\acute{\upsilon}o\varsigma} = 10\log A_p = 10\log(10^7) = 70$

Β3.



$i = 4\eta\mu 500t(S.I)$

$I_0 = 4A$

$\omega = 500\dfrac{rad}{s}$

$a)\, x_c = \dfrac{1}{\omega c} = \dfrac{1}{500 \times 100 \times 10^{-6}}\Omega \Leftrightarrow x_c = 20\Omega$

$\beta) Z = \sqrt{R^2 + x_c^2} = \sqrt{20^2 + 20^2} = 20\sqrt{2}\Omega$

$\gamma) V_{c\max} = I_0 \times X_c = 4 \times 20\sqrt{2} = 80\sqrt{2} Volt$

$V_c = V_{c\max} \eta\mu(\omega t - \frac{\pi}{2})(S.I) \Leftrightarrow V_c = 80\sqrt{2}\eta\mu(500t - \frac{\pi}{2})(S.I)$

$V_0 = I_0 \times z = 4 \times 80\sqrt{2} = 160\sqrt{2} Volt$

$V = V_0 \eta\mu(\omega t) = 160\sqrt{2}\eta\mu(500t)(S.I)$

$\delta) \varphi = \tau o \xi \varepsilon \varphi \frac{-\frac{1}{\omega c}}{R} = \tau o \xi \varepsilon \varphi(-1) \Leftrightarrow \varphi = \frac{7\pi}{4} rad$

$V_{\varepsilon v} = \frac{V_0}{\sqrt{2}} = 80V$

$I_{\varepsilon v} = \frac{I_0}{\sqrt{2}} = 2\sqrt{2}A$

$P = V_{\varepsilon v} \times I_{\varepsilon v} \times \sigma \upsilon \nu \varphi = 80 \times 2\sqrt{2} \times \frac{\sqrt{2}}{2} = 160W$

$Q = V_{\varepsilon v} \times I_{\varepsilon v} \times \eta\mu\varphi = 80 \times 2\sqrt{2} \times (-\frac{\sqrt{2}}{2}) = -160Var$

$S = V_{\varepsilon v} \times I_{\varepsilon v} = 160\sqrt{2}VA$

$\varepsilon) \omega_0 = 500 \frac{rad}{s}$

$f_0 = \frac{\omega_0}{2\pi} = \frac{250}{\pi} Hz \Leftrightarrow f^2{}_0 \frac{1}{2\pi\sqrt{LC}}$

$L = \frac{1}{4\pi^2 \times f^2{}_0 \times c} = \frac{1}{4\pi^2 \times \frac{250^2}{\pi^2} \times 100} H \Leftrightarrow L = \frac{1}{25} \times 10^{-6} H$

$L = 4 \times 10^{-8} H$

ΟΡΟΣΗΜΟ

ΜΑΡΓΑΡΩΝΗΣ ΠΑΝΑΓΙΩΤΗΣ

ΜΠΟΥΛΙΕΡΗΣ ΚΩΝ/ΝΟΣ

ΚΩΝΣΤΑΝΤΕΛΟΣ ΧΡΗΣΤΟΣ

ΛΙΒΑΔΑ ΜΑΡΙΑ