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18/427508/PA/18468

2.1) $f = \frac{c}{\lambda} \Rightarrow \lambda = \frac{c}{f}$

$f = 230\ MHz = 2,3 \times 10^8$

$= \frac{3 \times 10^8}{23 \times 10^7}$

$= \frac{3}{2,3} \approx 1,3$ meter

2.2) $R = 68\ \Omega$

$E = 110$ V (peak to peak) → $V_p = 55$ V

$rms = \frac{V_p}{\sqrt{2}} = \frac{55}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{55\sqrt{2}}{2} = \frac{55\sqrt{2}}{2}$ V

$P = ?$

$P = E^2/R$

$= \left(\frac{55\sqrt{2}}{2}\right)^2 / 68$

$= \frac{6050/4}{68} = \frac{1512,5}{68} \approx 22,24$ watt

2.3) $R = 950\ \Omega$

$\rho = 53\ \Omega/in$

$r = 0,16$ in

$L = ?$

$R = \rho \frac{L}{A} \Leftrightarrow L = \frac{R \cdot A}{\rho}$

$A = \pi r^2$

$= \pi \cdot (0,16)^2$

$= 3,14 \cdot 0,0256$

$= 0,08\ in^2$

$= \frac{950 \cdot 0,08}{53}$

$\approx 1,43$ in

2.4) $\alpha = 0,0045/°C$ $T_1 = 20°C$

$R_1 = 130\ \Omega$

$R_2 = 183\ \Omega$

$T_2 = ?$

$R_2 = R_1 (1 + \alpha T)$

$183 = 130 (1 + [0,0045T])$

$0,408 = 1 + 0,0045T$

$T = \frac{0,408}{0,0045T} = 90,67°C$

$T_{tot} = T_0 + T$

$= 20 + 90,67 = 110,6°C$

2.5) $V = 17$ V

$R = 133\ \Omega$

$I = ?$

$V = IR$

$\Leftrightarrow I = \frac{V}{R} = \frac{17}{133} \approx 0,128$ A

2.6) $R_1 = 7.5\ K\Omega$

$R_2 = 12,5\ K\Omega$

$R_3 = 14,8\ K\Omega$

$I = 2,7$ mA

$V = I \cdot R_p$

$V = 2,7 \times 3,560\ \Omega$

$= 9,61$ V

$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$= \frac{1}{7,5K} + \frac{1}{12,5K} + \frac{1}{14,8K}$

$= \frac{740 + 444 + 375}{5550}$

$= \frac{1559}{5550}$

$R_p = \frac{5550}{1559} = 3,560\ K\Omega$

27) $R_1 = 7.5\ K\Omega$

$R_2 = 12,5\ K\Omega$

$R_3 = 14,8\ K\Omega$

$I = 2,7$ mA

$V = ?$

$R_{seri} = 7,5 + 12,5 + 14,8$

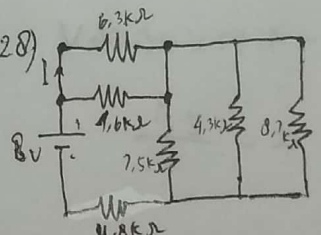
$= 34,8\ K\Omega$

$V = I\ R_{seri}$

$= 2,7$ mA $\times$ 34,8 KΩ

$= 93,96$ V

28)



$I = ?$

$\frac{1}{R_{p_1}} = \frac{1}{7,5K} + \frac{1}{4,3K} + \frac{1}{8,7K}$

$\frac{1}{R_{p_1}} = \frac{2998}{6235}$

$R_p = \frac{6235}{2,08} = 2,08\ K\Omega$

$\frac{1}{R_{p_2}} = \frac{1}{6,3} + \frac{1}{4,6}$

$\frac{1}{R_{p_2}} = \frac{545}{1449}$

$R_{p_2} = \frac{1449}{545} = 2,66\ K\Omega$

$V = I \cdot R_{tot}$

$I = \frac{V}{R_{tot}} = \frac{8}{(2,08 + 2,66 + 11,8)K\Omega} = \frac{8}{16,54\ K\Omega}$

$\approx 0,484$ mA

$I_{masuk} = I_{keluar}$

$I_{seri} = I_1 = I_2 = I_3$

2.9) $V_{R_1} = 7,5\ k\Omega \times 2,7\ mA = 20,25\ V$

$V_{R_2} = 12,5\ k\Omega \times 2,7\ mA = 33,75\ V$

$V_{R_3} = 14,8\ k\Omega \times 2,7\ mA = 39,96\ V$

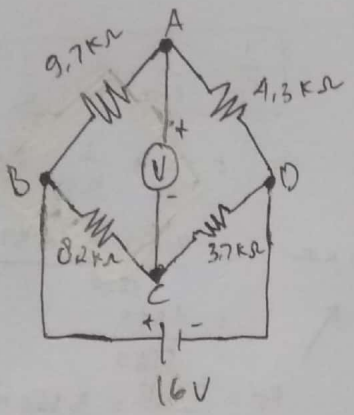
2.10) $V_1 = V_2 = V_3 = V_{total} = V_{baterai}$

$I_{R_1} = 9,61\ V / 7,5\ k\Omega \approx 1,28\ mA$

$I_{R_2} = 9,61\ V / 12,5\ k\Omega \approx 0,769\ mA$

$I_{R_3} = 9,61\ V / 14,8\ k\Omega \approx 0,649\ mA$

2.11)



$V_A = \frac{4,3\ k\Omega}{9,7\ k\Omega + 4,3\ k\Omega} \cdot 16$

$= \frac{4,3\ k\Omega}{14\ k\Omega} \cdot 16 \approx 4,91\ V$

$V_C = \frac{3,7\ k\Omega}{8,2\ k\Omega + 3,7\ k\Omega} \cdot 16 \approx$

$= \frac{3,7\ k\Omega}{11,9\ k\Omega} \cdot 16 \approx 4,97\ V$

$V_{tot} = V_A - V_C = 4,91\ V - 4,97\ V = -0,06\ V$

2.12) $C = \varepsilon A / d \Leftrightarrow d = \frac{\varepsilon A}{C}$

$C = 4,3\ \mu F$

$A = 2,2\ m \times 3,7\ m = 8,14\ m^2$

$\varepsilon = 4,8 \times 10^{-9}\ F/m$

$d = ?$

$d = \frac{4,8 \times 10^{-9}\ F/m \times 8,14\ m^2}{4,3 \times 10^{-6}\ F}$

$= \frac{39,07 \times 10^{-9}\ Fm}{4,3 \times 10^{-6}\ F}$

$\approx 9,09 \times 10^{-3}\ m$

2.13) $C = 3,2\ nF = 3,2 \times 10^{-9}\ F$

$X_c = 0,02\ M\Omega = 0,02 \times 10^6\ \Omega$

$X_c = \frac{1}{2\pi f C}$

$0,02 \times 10^6 = \frac{1}{2 \times 3,14 \times f \times 3,2 \times 10^{-9}}$

$f = \frac{1}{20,1 \times 10^{-9} \times 0,02 \times 10^6}$

$= \frac{1}{0,402 \times 10^{-3}} = 2487,6\ Hz$

2.14) $I_{(pd\ capacitor\ 2.13)} = ?$

$V_{rms} = \frac{V_p}{\sqrt{2}} = \frac{9}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{9\sqrt{2}}{2}\ V$

$I = \frac{V_{rms}}{X_c} = \frac{9\sqrt{2}/2}{0,02 \times 10^6} \approx 318,2 \times 10^{-6}\ A$

$= 0,318,2\ mA$

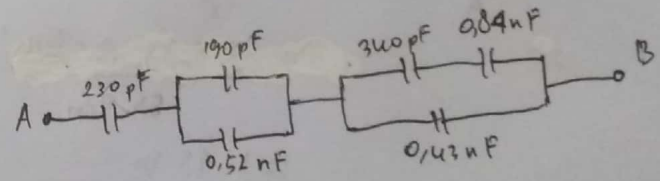
2.15) $\frac{1}{C_{seri}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

$\frac{1}{C_{ser}} = \frac{1}{110} + \frac{1}{93} + \frac{1}{213}$

$\frac{1}{C_{seri}} = \frac{5941}{242110}$

$C_{seri} = \frac{242110}{5941} \approx 40,75\ pF$

2.16)



$\frac{1}{C_{s_1}} = \frac{1}{840p} + \frac{1}{340p} = \frac{59}{14280} \approx C_{s_1} = 242,03\ pF$

$C_{p_1} = 150\ pF + 520\ pF = 710\ pF$

$C_{p_2} = 242,03\ pF + 430\ pF = 672,03\ pF$

$\frac{1}{C_{total}} = \frac{1}{230p} + \frac{1}{710p} + \frac{1}{672,03p}$

$\frac{1}{C_{tot}} = \frac{39\,75041}{548712995}$

$C_{tot} = C_{pengganti} \approx 138,09\ pF$

2.17) $L = 2,8\ mH$

diameter kawat $1,4\ cm$

$r = 8,7\ cm$

$d = 5,6\ cm$

$\mu = 4,7 \cdot 10^{-7}\ H/m$

$A = \pi r^2$

$= 3,14(8,7)^2$

$\approx 1,539\ cm^2$

$N = ?$

$$N^2 = \frac{Ld}{\mu A} = \frac{2,8 \cdot 10^{-3} \cdot 5,6 \cdot 10^{-2}}{4,7 \cdot 10^{-7} \cdot 1,539 \cdot 10^{-4}}$$

$$= 2,168 \cdot 10^6$$

$$N = \sqrt{2,168 \cdot 10^6}$$

$$= 10^3 \sqrt{2,168}$$

$$= 1,472 \cdot 10^3 \text{ kali lilitan}$$

$$\approx 1472 \text{ kali lilitan}$$

2.18) $X_C = 11,4\ k\Omega$

$f = 2,3\ MHz$

$C = ?$

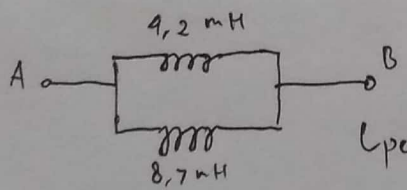
$X_L = 2\pi f L$

$$L = \frac{11,4 \cdot 10^3}{2 \cdot 3,14 \cdot 2,3 \cdot 10^6} =$$

$L = 0,000789\ H$

$= 0,789\ H$

2.19)

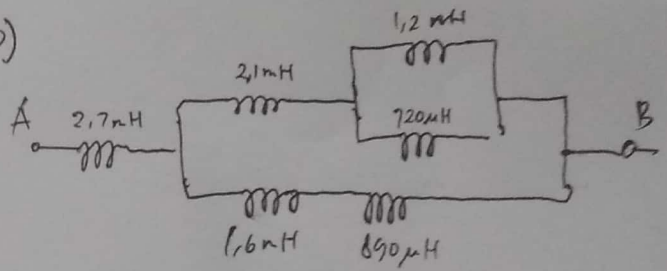


$L_{pengganti} = ?$

$$\frac{1}{L} = \frac{1}{4,2} + \frac{1}{8,7} = \frac{2,5}{6,09}$$

$L \approx 2,832\ mH$

2.20)



$$L_{P_1} = \frac{720 \times 1200}{720 + 1200} = 450\ \mu H$$

$L_{S_1} = 2100 + 450 = 2550\ \mu H$

$L_{S_2} = 1600 + 890 = 2490\ \mu H$

$$L_{P_2} = \frac{2550 \times 2490}{2550 + 2490} = 1259,82\ \mu H$$

$L_{Pengganti} = 2700 + 1259,82$

$= 3959,82\ \mu H$