תשובות סופיות לבחינת מה״ט בתורת החשמל – קיץ 2024 מועד ב׳

שאלה 1

א. $U_{I_S} = 0.571(\text{V})$

ב. $P_{I_S} = 1.714(\text{mW})$

$P_{E_1} = 61.714(\text{mW})$

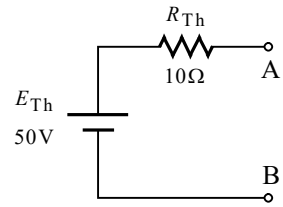
$P_{E_2} = 3.047(\text{mW})$

ג. $\sum P$ **נצרך** $= \sum P$ **מושקע**

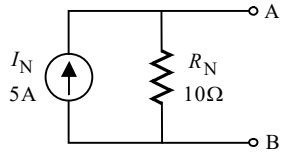
$64.761\text{mW} = 64.761\text{mW}$

שאלה 2

א.



ב.



ג. $R_L = R_{\text{Th}} = 10(\Omega)$

$P_{R_L} = 62.5(\text{W})$

ד. $R_{\text{A}} = 2.5(\Omega)$

ה. $I = 3.333(\text{A})$ **טעינה (צרכן)**

שאלה 3

א. $\bar{U}_{Z_3} = 30.388\angle 41.15°(\text{V})$

ב. $\bar{U}_{I_S} = 73.864\angle 10.93°(\text{V})$

ג. $P_{I_S} = 698.148(\text{W})$

$Q_{I_S} = 241.219(\text{VAR})$

$S_{I_S} = 738.645(\text{VA})$

שאלה 4

א. $\bar{I}_R = 23\angle 0°(\text{A})$

$\bar{I}_S = 23\angle -120°(\text{A})$

$\bar{I}_T = 23\angle -240°(\text{A})$

$\bar{U}_{RS} = 398.371\angle 30°(\text{V})$

$\bar{U}_{ST} = 398.371\angle -90°(\text{V})$

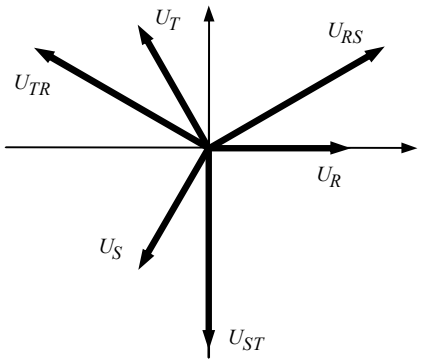
$\bar{U}_{TR} = 398.371\angle 150°(\text{V})$

ב. $P_{\text{T}} = 15870(\text{W})$

$Q_{\text{T}} = 0(\text{VAR})$

$S_{\text{T}} = 15870(\text{VA})$

ג.



שאלה 5

א. $\bar{I}_{Z_2} = 2\angle 0°(\text{A})$

$\bar{U}_{Z_2} = 200\angle 53.13°(\text{V})$

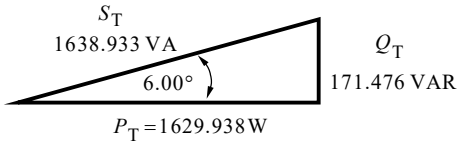
ב. $\bar{E} = 313.190\angle 94.32°(\text{V})$

ג. $P_{\text{T}} = 1629.938(\text{W})$

$Q_{\text{T}} = 171.476(\text{VAR})$

$S_{\text{T}} = 1638.933(\text{VA})$

ד. $PF = 0.994$



שאלה 6

א. $W_{L_1} = 0.036(\text{J}) = 36(\text{mJ})$

ב. $W_C = 0.303(\text{J}) = 303.75(\text{mJ})$

ג. $W_{\text{T}} = 1.8(\text{kWh})$

ד. $W_{L_1} = W_{L_2} = 0.144(\text{J}) = 144(\text{mJ})$

$W_C = 0.135(\text{J}) = 135(\text{mJ})$

ה. $U_{C_x} = E = 60(\text{V})$

שאלה 7

א. $\mu_{r_{\text{A}}} = 3183.098$

$\mu_{r_{\text{B}}} = 1492.077$

$\mu_{r_{\text{C}}} = 716.197$

ב. $R_{m_{\text{A}}} = 131.25\times10^3\left(\frac{1}{\text{H}}\right)$

$R_{m_{\text{B}}} = 280\times10^3\left(\frac{1}{\text{H}}\right)$

$R_{m_{\text{C}}} = 611.111\times10^3\left(\frac{1}{\text{H}}\right)$

$R_{m_{\text{T}}} = 1.022\times10^6\left(\frac{1}{\text{H}}\right)$

ג. $I = 0.321(\text{A}) = 321.25(\text{mA})$

שאלה 8

א. $W_L = 0.12(\text{J})$

$U_{\text{AB}} = 8(\text{V})$

ב. $U_{I_S} = 80(\text{V})$

$P_{I_S} = 400(\text{W})$

ג. $U_{C_1} = 4(\text{V})$

$U_{C_2} = 2.666\,(\text{V})$

$U_{C_3} = 2.666\,(\text{V})$

$U_{C_4} = 2.666\,(\text{V})$

$U_{C_5} = 1.333(\text{V})$

$Q_{C_1} = 16(\mu\text{C})$

$Q_{C_2} = 5.333\,(\mu\text{C})$

$Q_{C_3} = 5.333\,(\mu\text{C})$

$Q_{C_4} = 5.333\,(\mu\text{C})$

$Q_{C_5} = 16(\mu\text{C})$

שאלה 9

א. מדובר בגל משולש סימטרי.

$f = 200000(\text{Hz}) = 200(\text{kHz})$

ב. $U_{\text{av}} = 0(\text{V})$

$I_{\text{av}} = 0(\text{A})$

ג. $U_{\text{rms}} = 115.47\,(\text{V})$

$I_{\text{rms}} = 0.23(\text{A})$

ד. $P_{\text{av}} = 26.666(\text{W})$

ה. $P_{\text{av}} = 31.666(\text{W})$

שאלה 10

א. $U_{C_1} = 7.5(\text{V})$

$U_{C_2} = 37.5(\text{V})$

ב. $W_{C_1} = 0.562(\text{mJ})$

$W_{C_2} = 21.093(\text{mJ})$

$W_L = 16(\text{nJ})$

ג. $P_{I_S} = 0.15(\text{W})$

ד. $U_{C_1} = 60(\text{V})$

$W_{C_1} = 36(\text{mJ})$

$U_{C_2} = 0(\text{V})$

$W_{C_2} = 0(\text{J})$