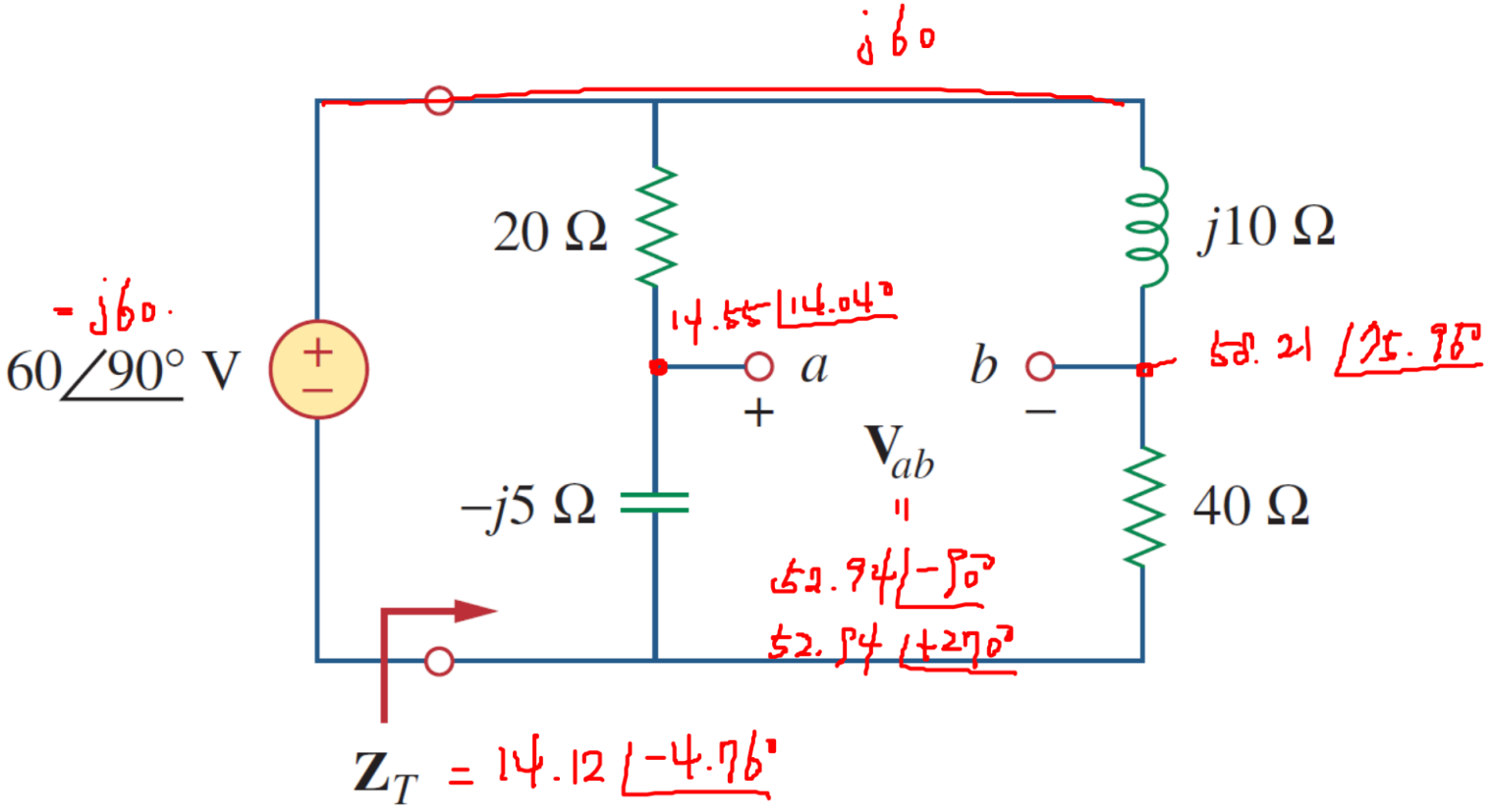
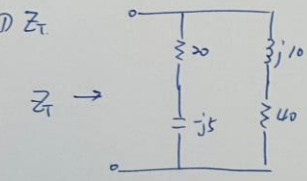
For the circuit below, calculate Z_T and V_{ab}.



Quiz 2

① Z_T



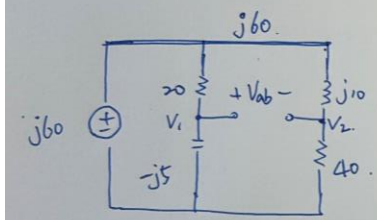
$Z_T \rightarrow$

$Z_T = (20-j5) \parallel (j10+40)$

$Z_T = \frac{(20-j5)(40+j10)}{60+j5} = \frac{850}{60+j5}$

$60.21\angle 4.76°$

$= \boxed{14.12\angle -4.76°}$



at V_1

$\frac{V_1 - j60}{20} + \frac{jV_1}{-j5} = 0.$

$V_1 - j60 + j4V_1 = 0.$

$V_1 = \frac{j60}{1+j4} = 14.55\angle 14.04°$

at V_2

$\frac{-j4(V_2 - j60)}{j10} + \frac{V_2}{40} = 0.$

$-j4V_2 + -240 + V_2 = 0.$

$V_2 = \frac{240}{1-j4} = 58.21\angle 75.96°$

$V_{ab} = V_1 - V_2 = 14.55\angle 14.04° - 58.21\angle 75.96°$

$= -0.00636 - j52.94 = 52.94\angle -90°$

or $52.94\angle 270°$