HUST
School of Electrical Engineering

Signature of Department Leader

FINAL EXAMINATION: LINEAR CIRCUIT 2
Exam duration: *90 minutes*

(*Documents are allowed to use. Return the question sheet*)

Signature of Lecturer

Sheet No. 01
8/2021

Student's name:..... **Student's Code:** .....

Question 1 (3 pts)

Given a circuit as in the figure 1.

Write the system of equations for the given circuit by the mesh current method? Express branch currents in terms of chosen mesh currents?

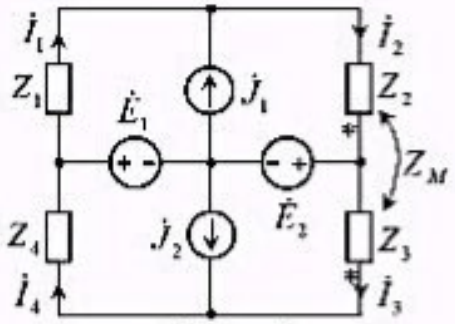

Figure 1

Question 2 (3 pts)

Given a circuit as in the figure 2, where: $R_1 = 20\Omega$, $R_2 = 80\Omega$, $C_2 = 5.10^{-4} F$, $L = 0.5H$, $V_S = 60V$ (DC).

Using the Laplace transformation, find the step response $v_c(t)$ when the switch S is opened at the time $t = 0$? (Note that, for $t < 0$, the given circuit was being in steady state)

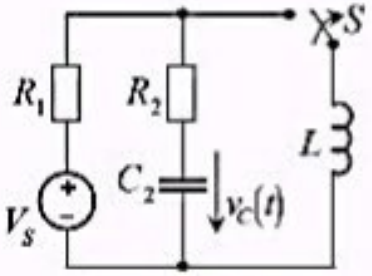

Figure 2

Question 3 (3 pts)

Given a circuit as in the figure 3, where:

$Z_2 = 20 + j20\Omega$, $Z_3 = 40 + j60\Omega$,

$Z_4 = 40 + j10\Omega$, $\dot{J}_3 = 2A$(RMS), $\dot{J}_2 = \alpha \dot{I}_3 A$,

$\dot{J}_5 = \beta \dot{I}_3 A$, $\alpha = 0.5, \beta = 2$.

a) – Choose *C* as reference node, calculate the value of $\dot{I}_2$ and $\dot{I}_4$ by the nodal voltage method?

b) – Applying appropriate transformation technique to calculate the value of $\dot{I}_2$ and $\dot{I}_4$ from one KVL equation?

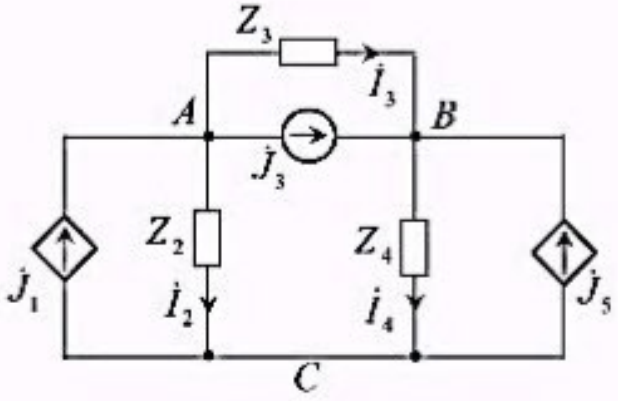

Figure 3

Note: Good presentation: **1 pt**