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Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ELECTRONICS ENGINEERING
B.Tech (ECE)-CAT-II, Fall -2022-23

Course Code : BECE203L

Duration : 90 Minutes.

Course Name: Circuit Theory

Slot : C1+TC1+TCC1

Max. Marks : 50M

Answer all the questions

Q. No
1.

Question

Marks

Using Laplace transform, find i_1 and i_2 in the circuit in figure.1, when the dc voltage source is applied suddenly. Assume that the initial energy stored in the circuit is zero.

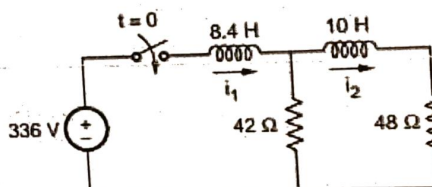


Figure 1

10

2.

In the network shown in figure.2, i_1 is shown and switch K is closed at time $t = 0$ placing 10Ω resistor in parallel with the series combination of $R = 10 \Omega$ and $L = 2H$. Find the resulting currents. Use Laplace Transform Techniques. Discuss how the circuit currents are modified if the switch K was initially closed and opened at $t = 0$.

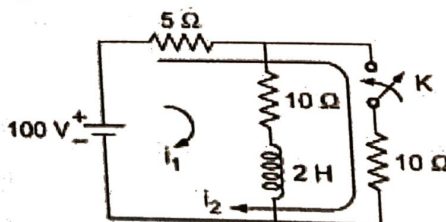


Figure 2

10
(8+2)

3. Considering the network in figure.3, find the transfer function $I_2(s)/V(s)$.
Mention the advantage and limitation of transfer function.

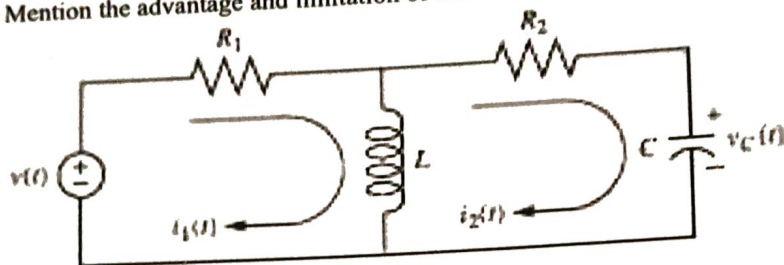


Figure 3

10(8+2)

4. Using Fourier Transform method, determine the voltage, $v_o(t)$, across capacitor in the figure 4 if the input $i_s(t) = 50e^{-t}u(t)$.

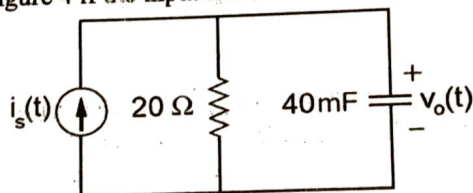


Figure 4

5. Find the response $i_o(t)$ of the circuit shown in Figure.5, if the input voltage $v_s(t)$ has the Fourier series expansion

$$v_s(t) = 5 + \sum_{n=1}^{\infty} \frac{1}{n} \cos 5nt \text{ V}$$

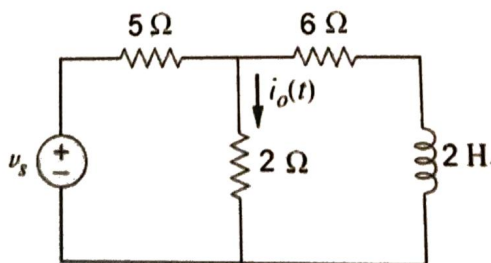


Figure 5