

**VIT**Vellore Institute of Technology
(Approved by the University Grants Commission, India, under 12 of UGC Act, 1956)

School of Electronics Engineering

CAT II

Programme Name & Branch: B.Tech - ECE

Circuit Theory (BECE 203L)

Winter Semester 23-24

Slot: AI+TA1+TAA1

Exam Duration: 90 mins

Maximum Marks: 50

Answer all the questions

Q1.

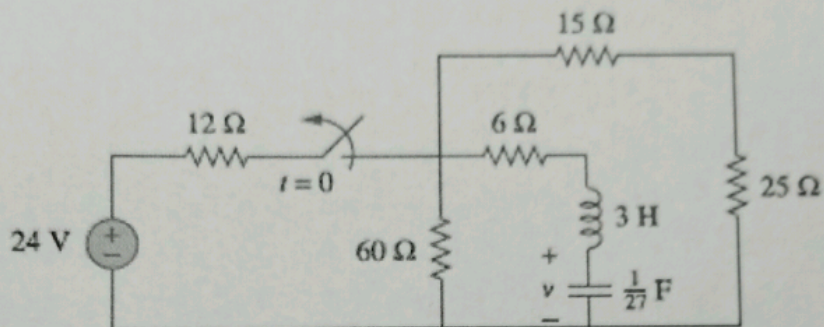
Calculate $v(t)$ for $t > 0$ using transient analysis of the circuit shown in Figure 1.

Figure 1

10 M

Q2.

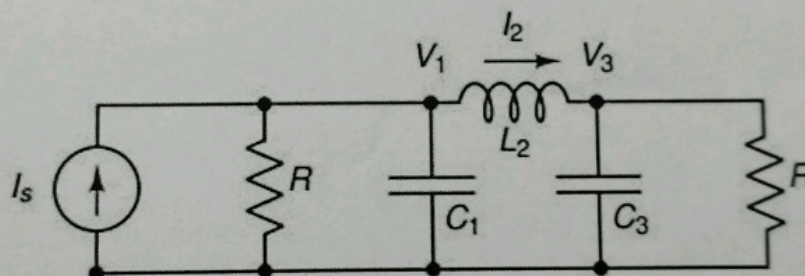
Apply Laplace transform and obtain the transfer function $H(s) = V_1(s)/I_s(s)$ for the circuit in Figure 2. Assume zero initial conditions.

Figure 2

10 M

Q3.

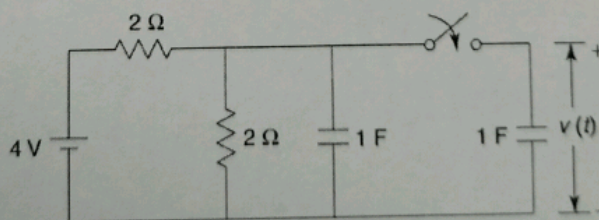
The network shown in Figure 3 has acquired a steady state at $t < 0$ with the switch open. The switch is closed at $t = 0$. Determine $v(t)$ by applying Laplace transform.

Figure 3

10 M

Q4.

Given the circuit shown in Figure 4 with $R = 10 \Omega$, $L = 2 \text{ H}$, and $C = 0.25 \text{ F}$. Determine the output signal $v_{out}(t)$, if the input signal $v_s(t)$ is given by the Fourier series

$$v_s(t) = 3 + \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\sin(n\pi t)}{n} \text{ V}$$

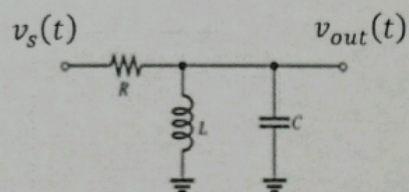


Figure 4

10 M

Q5.

Find the voltage across the capacitor of circuit shown in Figure 5 using Fourier transform approach.

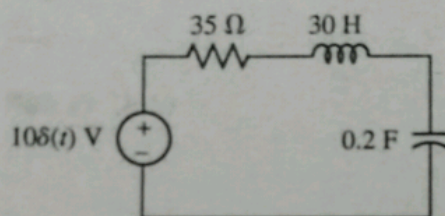


Figure 5

10 M