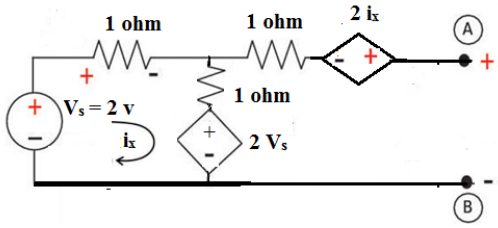
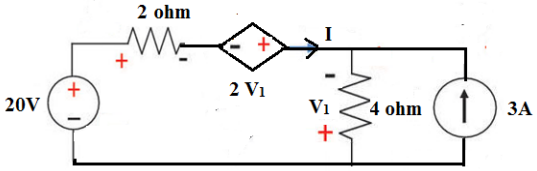
THIRD SEMESTER B.TECH(ELECTRONICS AND INSRUMENTATION ENGG)
END SEMESTER DEGREE EXAMINATIONS NOVEMBER – 2019
NETWORK ANALYSIS AND SIGNALS- ICE 2154

Q1A. Looking at terminals A and B, find the Thevenin and Norton equivalent circuit for the circuit shown in figure below. (5)

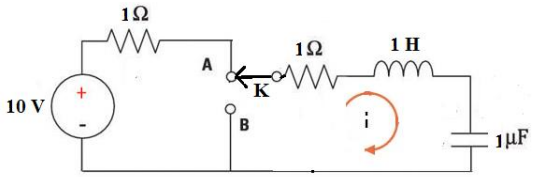


Q1B. Find the current I in the circuit shown below by superposition theorem. (3)

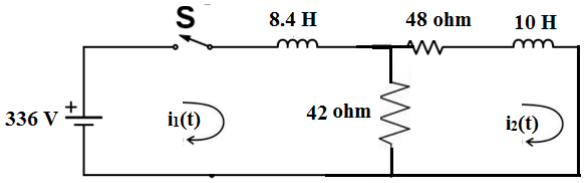


Q1C. In the circuit shown in figure below, the switch is moved from A to B at t=0, a steady state having previously been attained. Find

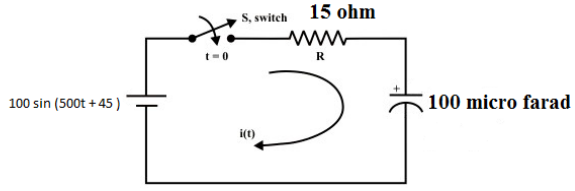
$i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at t = 0 (2)



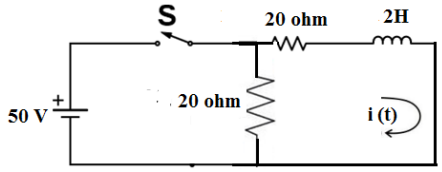
Q2A. In the network shown below, at t = 0 the switch is closed. Obtain the expressions for $i_1(t)$ and $i_2(t)$, assuming no initial energy stored in the inductors. Use transform method. (5)



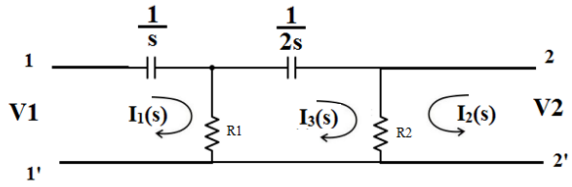
Q2B. For the circuit shown below, the switch S is closed at t = 0. Derive an expression for current $i(t)$ assuming no initial charge on capacitor. (3)



Q2C. In the circuit shown in figure below, the switch is opened at t=0, a steady state having previously been attained. Find the current equation i (t). (2)



Q3A. Find the Z parameters of the transformed network shown in figure below. Take R1=R2= 1 Ohm. (5)



Q3B. State with justification whether the system $y(t)= t^2x(t-1)$ is memory less, causal, linear, time invariant, stable and invertible. (3)

Q3C. Determine whether or not each of the following signal is periodic. If periodic, specify the fundamental period.

(i) $x(t)=e^{jt}$ (ii) $x(n) = Cos(3n)$ (2)

Q4A. Evaluate and plot *y(t).* (5)

$y(t) = x(t)*h(t)$, where $x(t) = u(t+1)-u(t-1)$ and $h(t) = u(t+1)-2u(t)+u(t-1)$

Q4B. Find Fourier representation and sketch the magnitude spectrum of

(i) $x(t) = \delta(t+1) + \delta(t-1)$ (ii) $x(t) = e^{-2t}\, u(t)$ (3)

Q4C. Evaluate energy and power of $x(t) = 1+ Cos(\pi t) + Cos(2\pi t) + Sin(5\pi t)$. (2)

Q5A. An LTI system is described by the differential equation

$$\frac{d^2}{dt^2}y(t) + 5\frac{d}{dt}y(t) + 4y(t) = \frac{d}{dt}x(t) + x(t)$$

Determine (i) Frequency response of the system (ii) Impulse response of the system (iii) Output of the system for an input *of* $x(t) = e^{-t}\, u(t)$. (5)

Q5B. Find *x(t)* if

$$X(j\omega) = \frac{j\omega}{(1+j\omega)^2}$$ (3)

Q5C. Evaluate Fourier transform of

$$x(t) = \frac{1}{2 - jt}$$ (2)