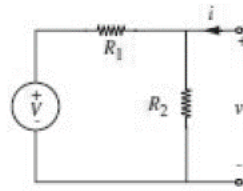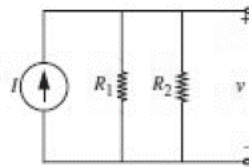# Homework 1

Q.1) Find the Norton and Thévenin equivalent networks and their $v\,i$ characteristics for the two circuits shown in figure
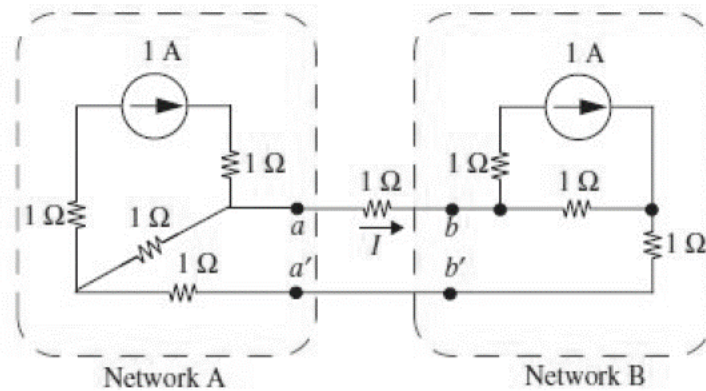

(a) Network I
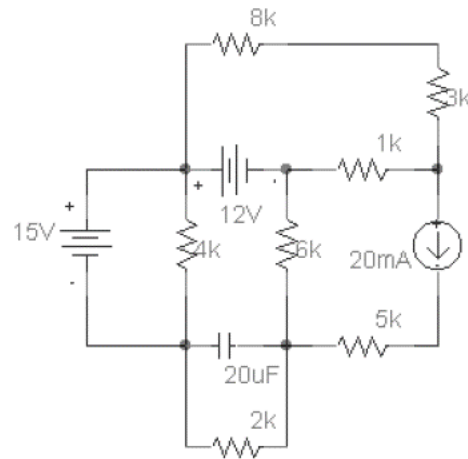
(b) Network II

Q.2) Determine the current I in the branch a-b in the circuit in figure by dividing circuits A and B into Thévenin equivalent networks.


Network A

Network B

Q.3) Find the Norton Equivalent with respect to the 20uF capacitor.


Q.4) Find the Thévenin equivalent with respect to the capacitor in the circuit shown. Then replace the capacitor with a resistor chosen for maximum power transfer. What is the value of the resistor? What is the power absorbed by this resistor?
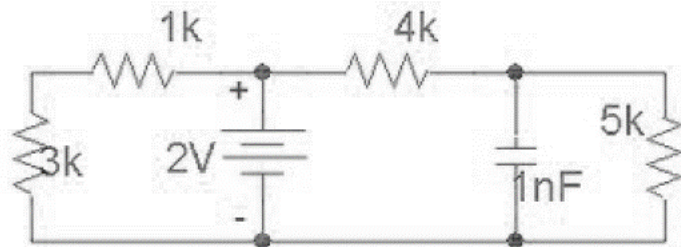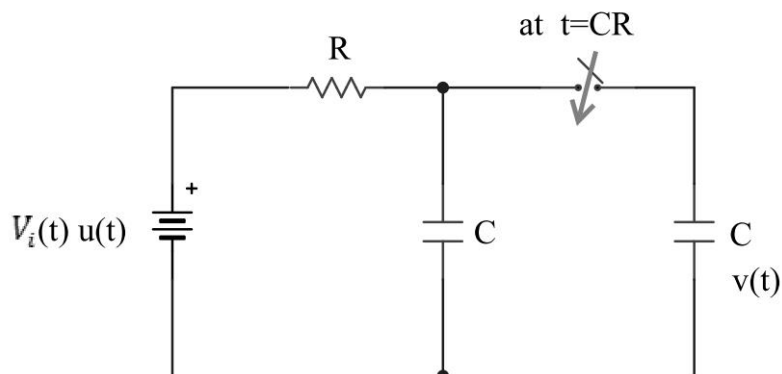
Q5. For the parallel RLC circuit given in fig below, suppose that R= 0.4 ohm, L=0.25 H and C= 0.25 F/ Find the response i(t) and v(t) to a unit step function, i.e. the response when the applied current is u(t) A.
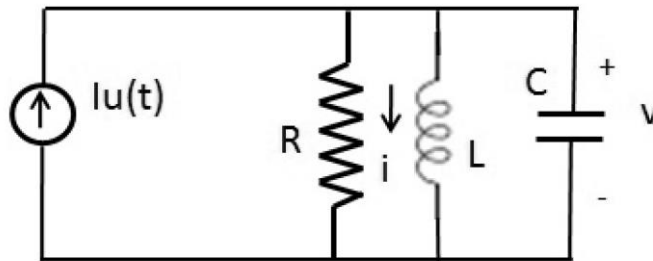
Q6) The trapezoidal voltage waveform $V_i(t)$ of fig. (a) is applied to the input of the initially unenergised CR circuit shown in fig. (b). Express $V_i(t)$ in terms of ramp and step function and Calculate and plot $V_0(t)$.
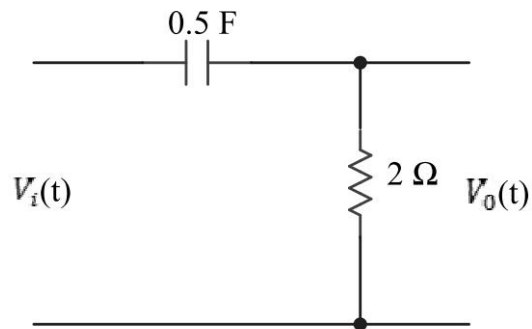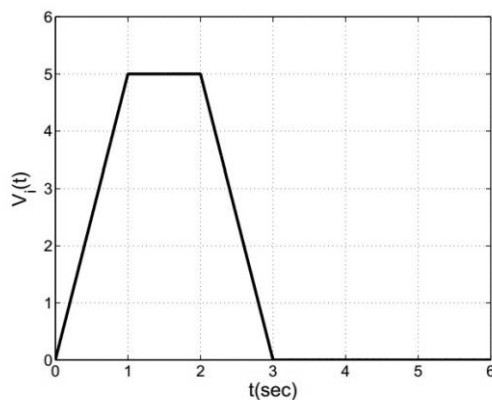
Q7) In the ckt. Switch S is closed at t=CR. Assume that all currents and voltages at t=0- are zero. Determine the voltage v(t) for $0 \leq t < \infty$.

Q8) Find $v_0(t)$ for $t > 0$ for the following ckt.

Circuit: A voltage source $7u(t)$ with $+$ terminal on top, in series with a $3\,\Omega$ resistor and a $0.5\,H$ inductor along the top branch. On the right side, $v_0(t)$ is measured across a $1\,\Omega$ resistor in parallel with a $0.2\,H$ inductor.