Basic Electronics (ECE113)

Tutorial 5

Q1. For each circuit shown in Fig. 1, calculate the voltage labeled v_C.

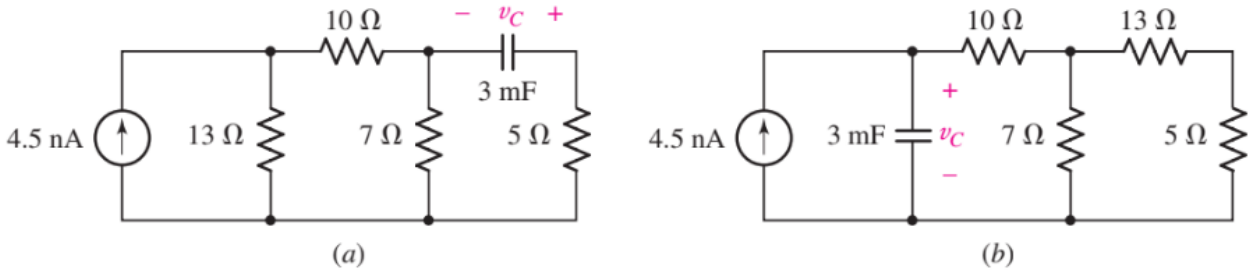


Fig.1

Q2. Calculate v_L and i_L for each of the circuits depicted in Fig. 2, if i_s = 1 mA and v_s = 2.1 V.

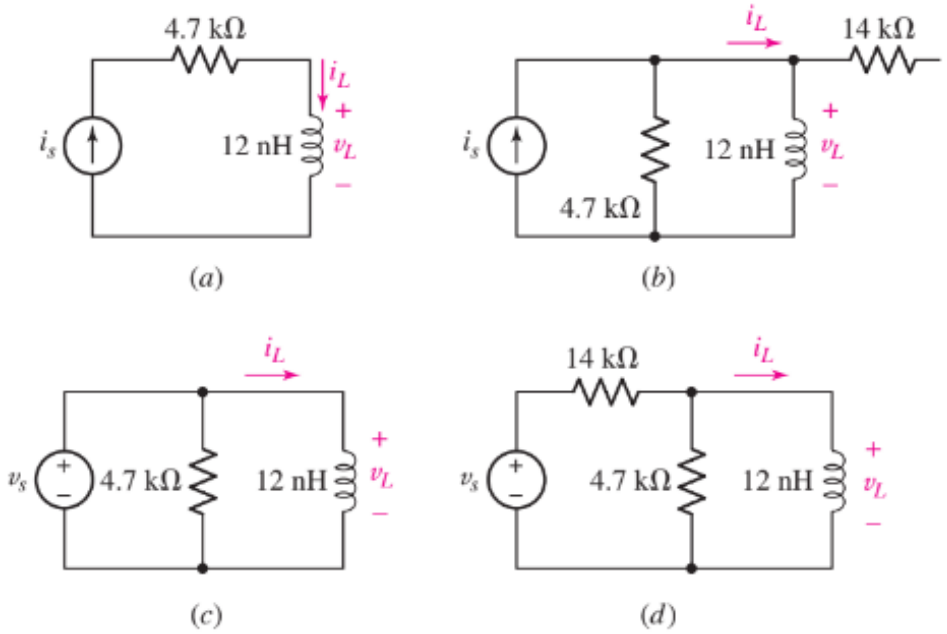
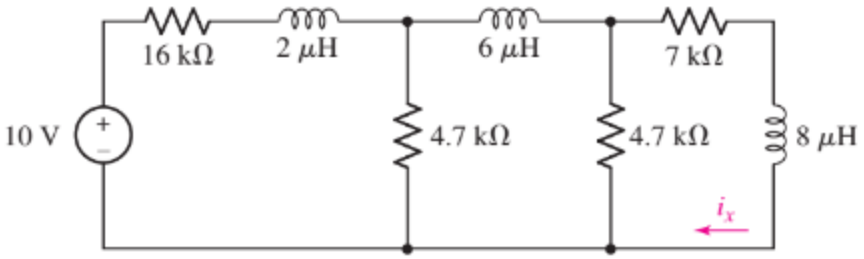
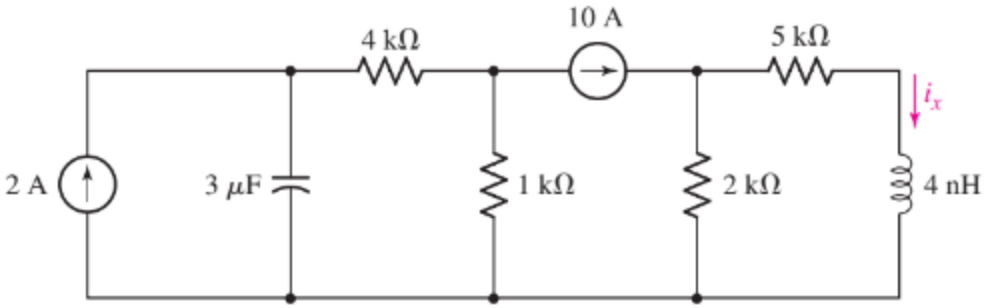


Fig.2

Q3. Making the assumption that the circuits in Fig. 3 have been connected for a very long time, determine the value for each current labeled i_x.



(a)



(b)

Fig.3

Q4. For the circuit shown in Fig. 4,
(a) compute the Thévenin equivalent seen by the inductor
(b) determine the power being dissipated by both resistors
(c) calculate the energy stored in the inductor.

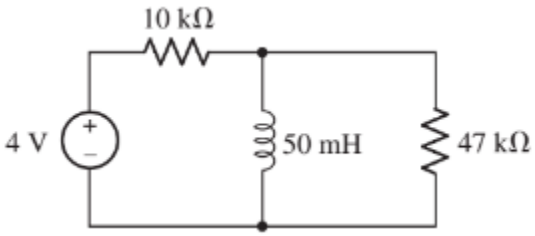


Fig.4

Q5. Reduce the circuit represented in Fig. 5 to the smallest possible number of components.

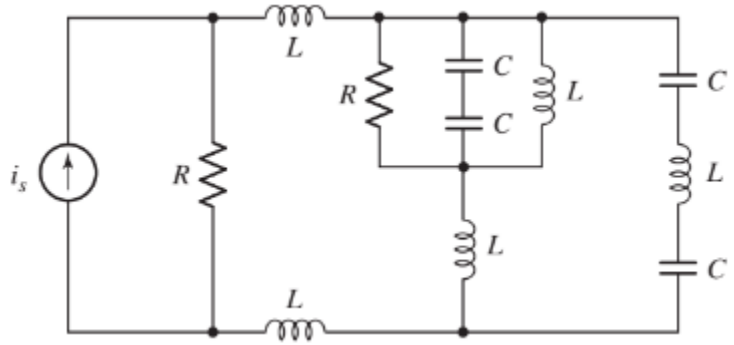


Fig.5

Q6. The switch shown in Fig. 6 has been closed for 6 years prior to being flipped open at t=0. Determine i_L, v_L, and v_R at t equal to (a) 0^- (b) 0^+ (c) 1 μs (d) 10 μs.

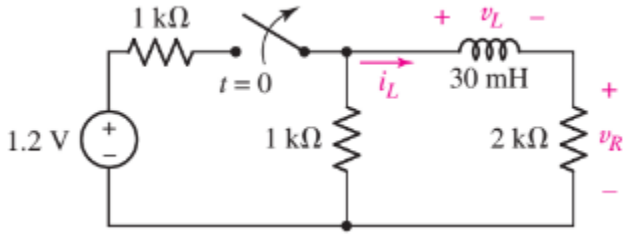


Fig.6

Q7. The circuit depicted in Fig. 7 contains two independent sources, one of which is only active for t > 0. (a) Obtain an expression for $i_L(t)$ valid for all t ; (b) calculate $i_L(t)$ at t = 10 μs, 20 μs, and 50 μs.

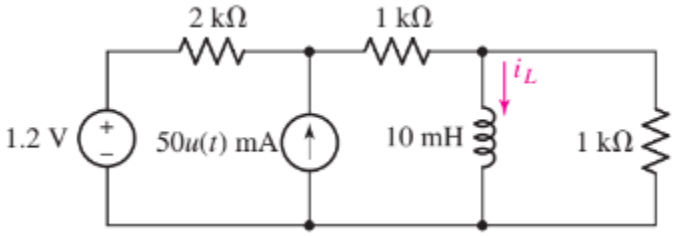


Fig.7

Q8. For the circuit represented in Fig. 8, (a) obtain an expression for v which is valid for all values of t; (b) sketch your result for 0 ≤ t ≤ 3 s.

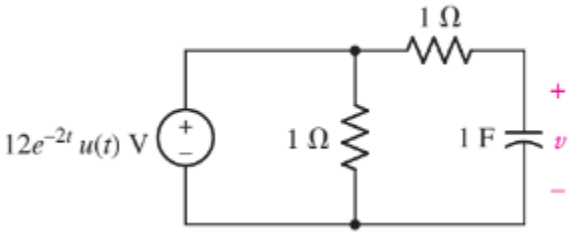


Fig.8