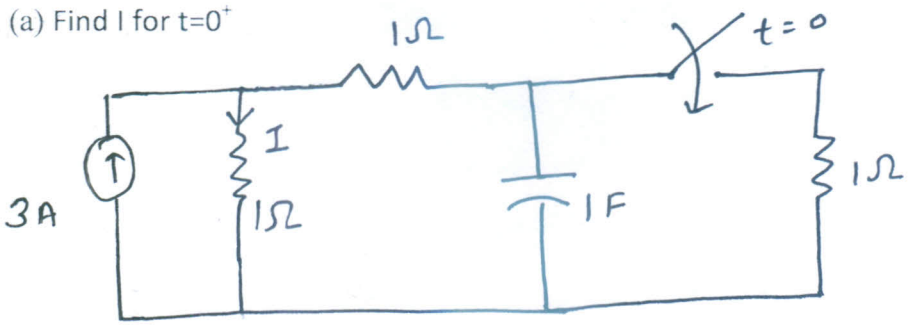
**JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY**

Electronics and Communication Engineering

**Electrical Science-2 (15B11EC211) – 2016 EVEN SEM**

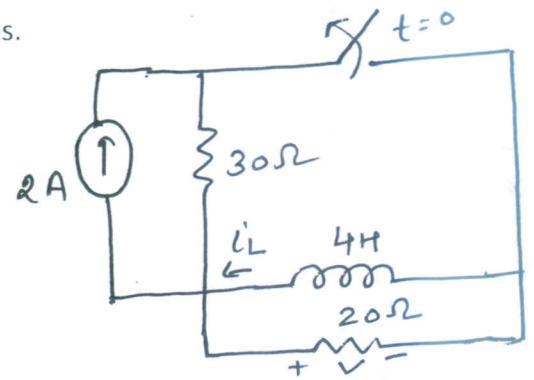
TUTORIAL -1 First order circuit response to DC and Non-constant input

Q.1 (a) Find I for $t=0^+$




Ans. $i(0^+) = 3A$

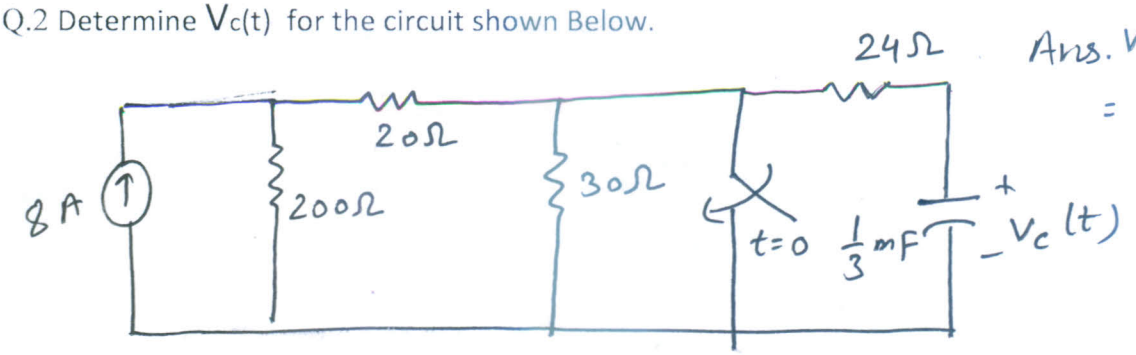
(b) The switch in the circuit shown below has been closed since dinosaurs last walked the earth. If the switch is opened at t=0, Find $i_L$ (0+) and V(0+), the instant after the switch changes.




Ans. $i_L(0^+) = 2A$

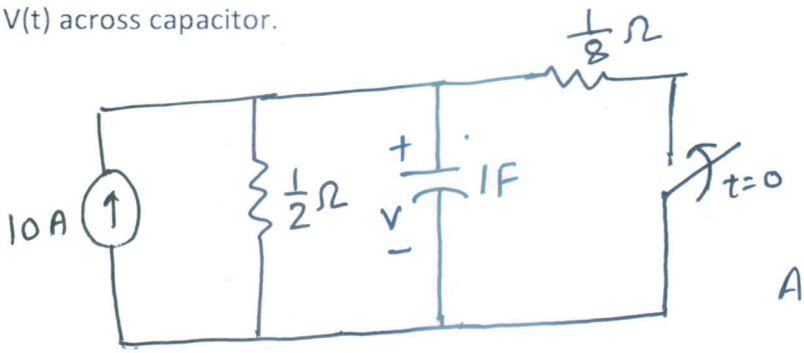
$V(0^+) = 40V$

Q.2 Determine $V_c(t)$ for the circuit shown Below.



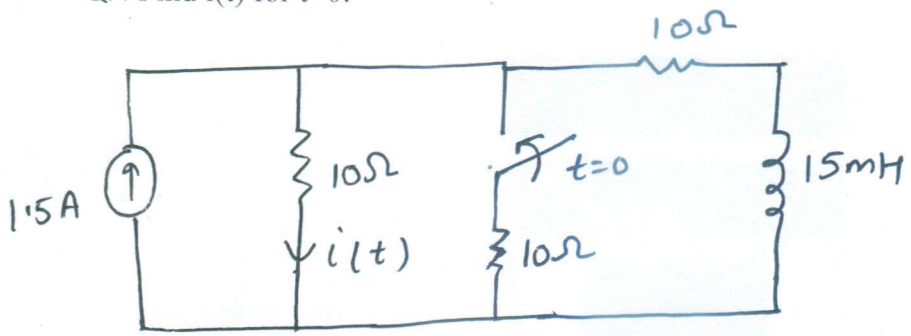

Ans. $V_c(t) = 192e^{-125t}$

Q.3 Find V(t) across capacitor.



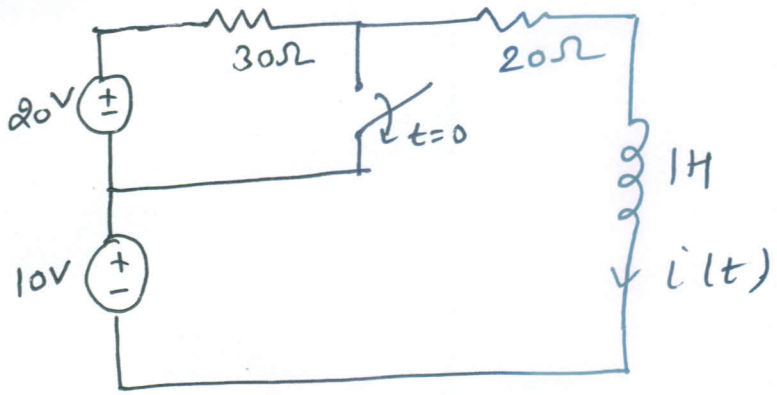

Ans. $V(t) = 1 + 4e^{-10t}$

Q.4 Find i(t) for t>0.




Ans. $i(t) = 0.5 - 0.125\,e^{-1000t}$ A

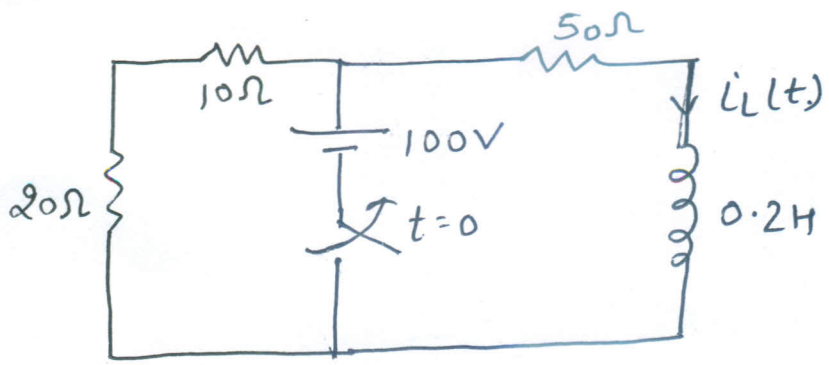
Q.5. Find i(t) for t > 0.




Ans.
$i(t) = 0.6 - 0.1\,e^{-50t}$

Q.6. After having been closed for a long time, the switch in opened at t=0.

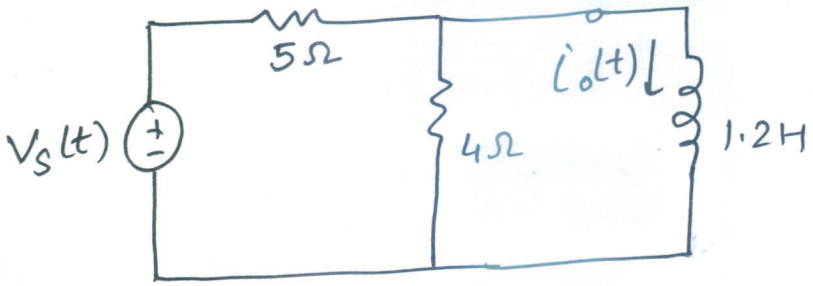
(a) Find $i_L(t)$ for t >0 (b) Find $t_1$ if $i_L(t_1) = 0.5\, i_L(0)$.




Ans.
$i_L(t) = 2\,e^{-400t}$

$t_1 = 1.73$ msec.

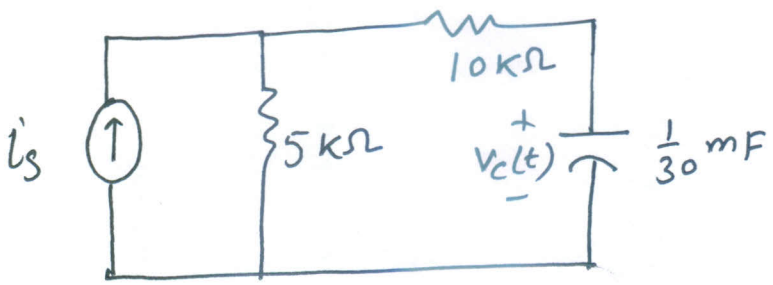
Q.7 The input to the circuit shown in figure is the voltage of the voltage source Vs(t). The output is the current across the inductor $i_o(t)$. Determine the output of this circuit when the input is Vs(t)= -7 + 13 U(t) V.




Ans. io(t)= { -1.4 A  t <= 0

$1.2 - 2.6\, e^{-1.85t}$ A  t >0 }

Q.8. Find Vc(t) for t >0 for the circuit shown in fig. when $i_s$ = [ 2cos2t] u(t) mA.




Ans. $V_c(t) = -5\, e^{-2t} + 5 \cos 2t + 5 \sin 2t$ V