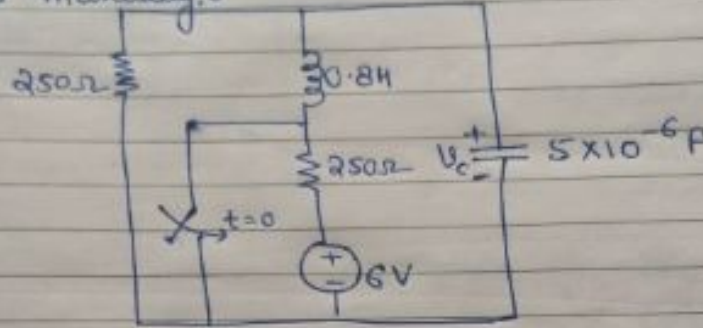


Assignment - 3

NOTE: In the lab will give any three questions randomly from the following five questions. Along with three questions one more surprise question will be given during lab.

Assignment-3

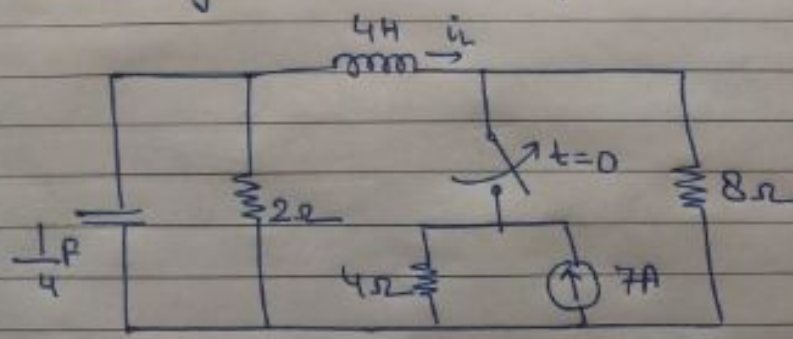
Q.1 A communication system from space station uses short pulses to control a robot operating in space. The transmitter circuit is modelled in fig 1. Find Output voltage V_c for $t > 0$? Solve it in LT spice and manually.



The circuit diagram for Q.1 shows a network of components. On the left, there is a vertical branch with a 250Ω resistor. To its right is another vertical branch containing a $0.8H$ inductor in series with a 250Ω resistor. A switch, labeled with an 'X' and $t=0$, is connected between the node between the two 250Ω resistors and the top wire. Below the switch is a $6V$ DC voltage source. On the far right, a vertical branch contains a $5 \times 10^{-6}F$ capacitor, with the output voltage V_c measured across it.

Fig 1

Q.2 A 240-W power supply circuit is shown in fig. 2. This circuit employs large inductor and large capacitor. Find i_L for $t > 0$. Solve it manually and in LT spice.



The circuit diagram for Q.2 features a top horizontal wire and a bottom horizontal wire. On the top wire, from left to right, there is a $4H$ inductor with current i_L indicated by an arrow pointing right, followed by a switch labeled $t=0$, and finally an 8Ω resistor. On the bottom wire, from left to right, there is a $\frac{1}{4}F$ capacitor, a 2Ω resistor, a 4Ω resistor, and a $7A$ current source pointing upwards.

Fig 2

Q.3. Determine $i(t)$ for $t > 0$ for given circuit below in fig 3. Solve it in LT Spice.

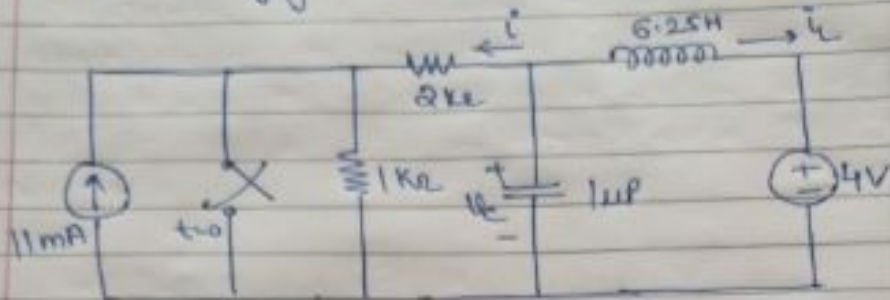


Fig. 3

Q.4. Determine $V(t)$ for $t > 0$ for the circuit shown in fig 4. Solve it in LT Spice.

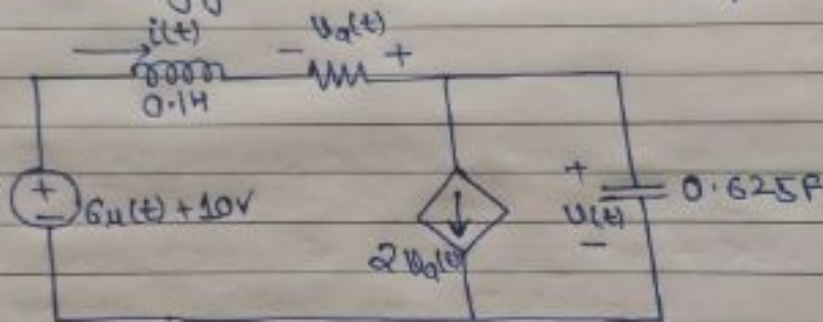


Fig 4

Q.5. An experimental space station power supply system is modelled in fig 5. Find $V(t)$ for $t > 0$ in LT Spice.

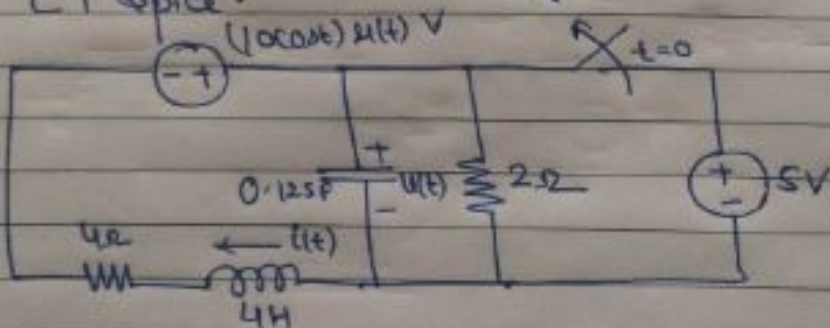


Fig 5