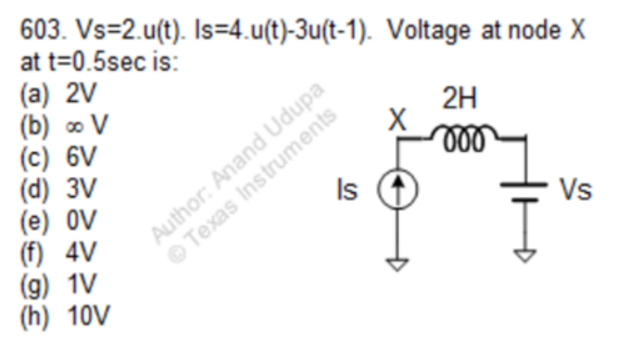
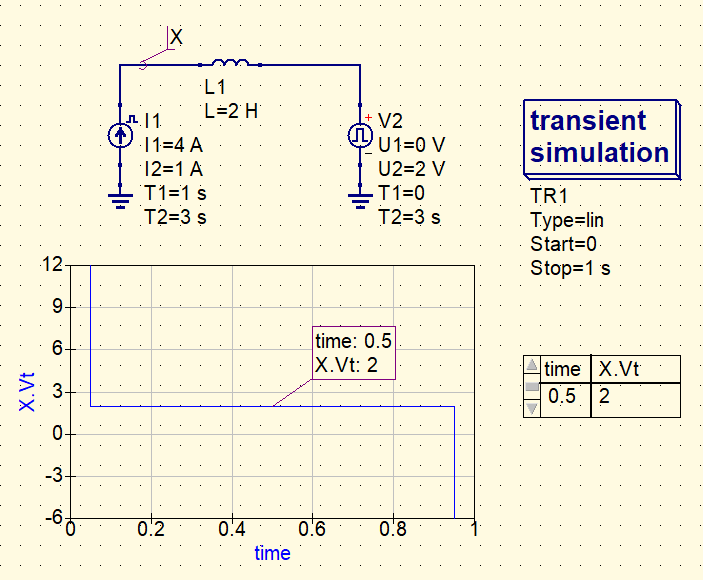
**TI BYTE Simulation Exercise**

**Week 3 : RL Circuits**

* **Question 1:**

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* **QUCS Circuit:**

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* **X is used to label the node and find the voltage at that node.**
* **Both the inductors have zero initial current through them.**
* **QUCS Result:**

**Therefore, from the simulation, we get our answer as:**

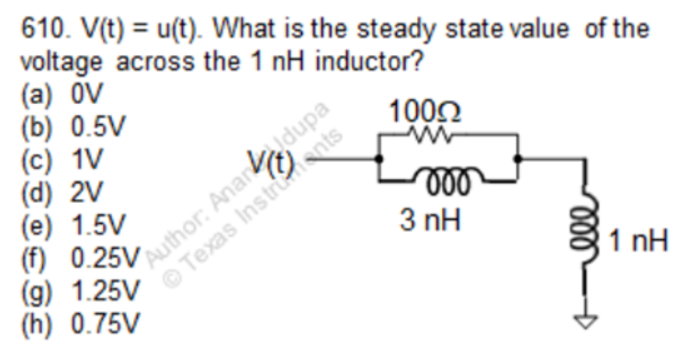
**Vx = 2V**

**Answer: (a)**

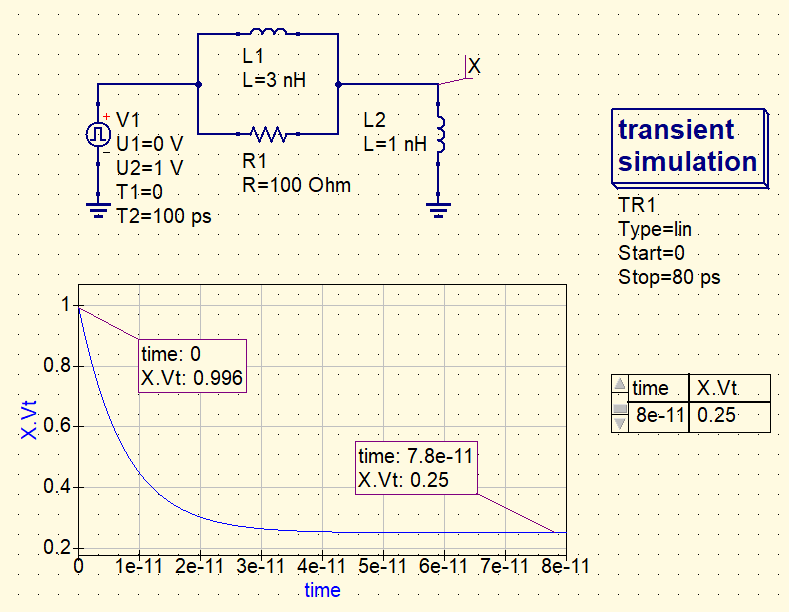
* **Conclusion:**
* **The final voltage at X can be found out using the Superposition Theorem.**
* **Upon considering the current source I1 only,**
* **Thus, voltage across the inductor due to the current source only,**
* **Due to the voltage source V2, the voltage at X is 2V.**
* **Therefore, it can be said that, at t = 0.5s, the voltage at X is**

**Vx= VL + V2 = (0 + 2) V = 2V.**

* **Question 2:**

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* + **QUCS Circuit:**

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* **X is used to label the node at which the unknown voltage is to be determined.**
* **Both the inductors L1 and L2 are initially uncharged, i.e., having zero initial current in them.**
* **QUCS Result:**

**Therefore, from the simulation, we get our answer as:**

**Vx = 0.25V**

**Answer: (f)**

* **Conclusion:**
* **At t = 0, since both the inductors are uncharged, they have high impedances and behave as open circuits (o.c.).**
* **Thus, no current flows through them, or even through the R1.**
* **Therefore, the voltage at node X is**
* **Now, at t = ∞, both the inductors have reached steady state and have low impedance and behave as almost short circuits (s.c.).**
* **Since the current gets low impedance path through L1, the equivalent impedance becomes,**
* **Thus, the voltage at X at t = ∞ (), is just a voltage divider between L1 and L2,**
* **The final voltage at X = = = 0.25 V**