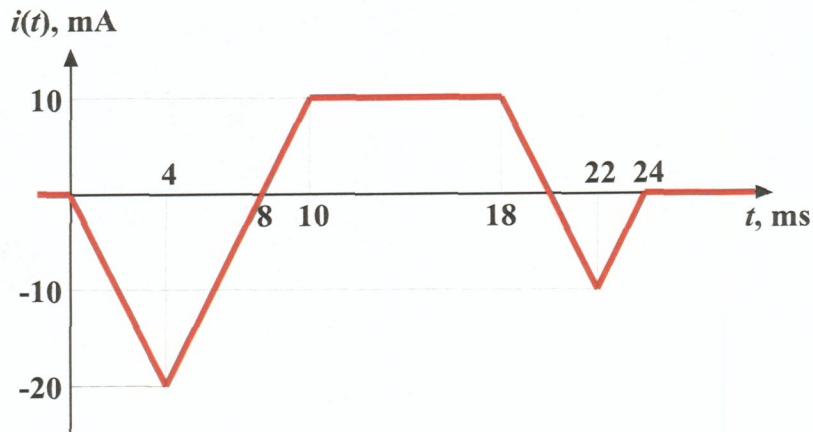


EE 2240  
**Problem #03**

The current in a 10 mH inductor is given by the waveform shown. Find, and accurately sketch, the waveform for the voltage across that inductor.



$$v = L \frac{di}{dt} = 10 \times 10^{-3} \frac{di}{dt} = 0.01 \frac{di}{dt}$$

$$\frac{di}{dt} = \begin{cases} -\frac{20 \text{ mA}}{4 \text{ ms}} = -5 \frac{\text{A}}{\text{s}} & : 0 < t < 4 \text{ ms} \\ \frac{30 \text{ mA}}{6 \text{ ms}} = 5 \frac{\text{A}}{\text{s}} & : 4 \text{ ms} < t < 10 \text{ ms} \\ 0 & : 10 \text{ ms} < t < 18 \text{ ms} \\ -\frac{20 \text{ mA}}{4 \text{ ms}} = -5 \frac{\text{A}}{\text{s}} & : 18 \text{ ms} < t < 22 \text{ ms} \\ \frac{10 \text{ mA}}{2 \text{ ms}} = 5 \frac{\text{A}}{\text{s}} & : 22 \text{ ms} < t < 24 \text{ ms} \\ 0 & : 24 \text{ ms} < t \end{cases}$$

$$v(t) = \begin{cases} -50 \text{ mV} & : 0 < t < 4 \text{ ms} \\ 50 \text{ mV} & : 4 \text{ ms} < t < 10 \text{ ms} \\ 0 & : 10 \text{ ms} < t < 18 \text{ ms} \\ -50 \text{ mV} & : 18 \text{ ms} < t < 22 \text{ ms} \\ 50 \text{ mV} & : 22 \text{ ms} < t < 24 \text{ ms} \\ 0 & : 24 \text{ ms} < t \end{cases}$$

(see next page for sketch)

