Q3
Apply Ohm's law: V = IR
Only magnitude is affected in a resistor since V and I are in phase in a resistor.

Q4
Impedance Z describes the relationship between current and voltage
Apply Z = V/I = 1/jωC Text
Therefore V lags I by 90^o (because of -j) and V is reduced by 1/ωC relative to I
Magnitude of voltage = 4/ωC
Phase of voltage relative to the current = $25^o - 90^o$

Q5
Impedance Z describes the relationship between current and voltage
For an inductor: Z = V/I = jωL ⇨ V leads I by 90^o (see j) and V is larger than I by ωL
⇨Magnitude of current = 60/ωL
⇨Phase of current relative to the voltage = $-65^o - 90^o$

Q6
Compare the phase of V relative to I ⇨ V leads I by 90°
Therefore apply the impedance formula for an inductor: Z = V/I = jωL

Q7
Apply voltage divider rule for both cases using the impedance expressions (jωL, 1/jωC)

Q8
R_2 in series with C ⇨ Z_1
R_1 in series with L ⇨ Z_2
Total impedance seen by the source: $Z = Z_1 \| Z_2$

$$Z = \left(R_2 + \frac{1}{j\omega C}\right) \| \left(R_1 + j\omega L\right) = \frac{\left(R_2 + \frac{1}{j\omega C}\right)\left(R_1 + j\omega L\right)}{R_1 + R_2 + j\left(\omega L - \frac{1}{\omega C}\right)}$$

Q9

$$\begin{aligned} Z_{eq} &= R + \frac{1}{j\omega C} + j\omega L \\ &= R + j\left(\omega L - \frac{1}{\omega C}\right) \end{aligned}$$

Q10
Find admittance first and convert to impedance. In this case, given that the components are in parallel, it is easier to find the admittance
Y = 1/Z = jωC + 1/R + 1/jωL ⇨ Z = 1.664∠-0.983 Ω (Note that the phase is given in radians here)
Finally apply V = IZ ⇨ V = 16.64∠-0.983 V