Year 13 Science: AC circuits

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Find the peak voltage of a 12.0 V rms AC supply.

2. Find the reactance of a 0.0500 H inductor at 1000 Hz.

3. A 1.00 kΩ resistor and a 2.20 µF capacitor are in series with a 10.0 V rms, 100 Hz supply. Find X_C, the impedance and the current.

4. An AM tuner has a 250 µH coil and a 177 pF capacitor. Find its resonant frequency.

Exam-style question: a series LCR circuit

In a school lab, a 50.0 Ω resistor, a 0.150 H inductor and a 22.0 µF capacitor are connected in series to a 6.00 V rms supply whose frequency can be varied.

5. Calculate the resonant frequency of the circuit.

6. Calculate the rms current at resonance.

7. Calculate the rms current when the frequency is 50.0 Hz.

8. At 50.0 Hz, state whether the current leads or lags the supply voltage, calculate the phase angle, and explain why.

Fix the mistake

9. Correct this statement: "The supply voltage is 7.28 + 9.54 = 16.8 V."

10. Correct this statement: "Mains is 230 V, so the voltage never goes above 230 V."

11. Correct this statement: "In an inductor the current leads the voltage."

12. Correct this statement: "X_L = fL = 50.0 × 0.500 = 25.0 Ω."