

## Definitions and Concepts for WJEC (Wales) Physics A-level

### Unit 4 - Option A: Alternating Currents

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**Alternating Current:** Electric current that periodically changes direction and constantly changes its magnitude.

**Capacitor Phase Lead:** The phase difference between the current and the potential difference in a capacitor. The potential difference leads the current by  $\frac{\pi}{2}$  radians.

**Current-Voltage Phase Lag:** The phase difference between current and potential difference in an AC circuit.

**Flux Linkage:** The product of the number of turns in a coil and the magnetic flux.

**Impedance:** The overall opposition to current in a circuit.

**Inductor Phase Lag:** The phase difference between the current and the potential difference in an inductor. The current lags behind the potential difference by  $\frac{\pi}{2}$  radians.

**Inductor:** A component in a circuit that stores energy in a magnetic field when a current flows through it.

**Oscilloscope:** A device used to display and analyse waveforms.

**Peak Value:** The maximum value achieved by a waveform.

**Phase Angle:** The difference in phase between two waves (such as the potential difference and current in an AC circuit) measured as an angle.

**Power Dissipated:** The amount of power dissipated in a resistor.  $P = IV = I^2R = \frac{V^2}{R}$

**Q Factor:** A dimensionless parameter describing the dampening in a circuit.  $Q = \frac{2\pi f_0 L}{R}$  where  $f_0$  is the resonant frequency.

**RC Circuit:** A circuit containing a resistor and a capacitor.

**RCL Circuit:** A circuit containing a resistor, capacitor and an inductor.

**Reactance:** The opposition of a circuit element to the flow of current due to that element's inductance or capacitance

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**Resonance:** Resonance occurs when the frequency of oscillations is equal to the natural frequency of the oscillating system. The rate of energy transfer is at a maximum during resonance. In an AC circuit the resonant frequency is given by  $f_0 = \frac{1}{\sqrt{LC}}$ .

**RL Circuit:** A circuit containing a resistor and an inductor.

**Rms Value:** The amount of DC current required to achieve the same power as a given AC current.  $V_{rms} = \frac{V_{peak}}{\sqrt{2}}$  where  $V_{peak}$  is the peak voltage of the AC current.

**Sharpness of Resonance:** Is the Q factor. The larger the Q factor the sharper the resonant frequency curve.

