AC Power (1:14:38)

Describe the shape of the power curve for sinusoidal voltage and current.

Describe the significance of positive and negative power.

Describe the nature of real, active, or true power.

Describe the nature of apparent power.

Describe the nature of reactive power.

Describe the nature of apparent, real, and reactive power for occasions in which there is no phase shift between voltage and current.

Describe the nature of apparent, real, and reactive power for occasions in which there is increasing phase shift (leading or lagging) between voltage and current.

Describe the nature of apparent, real, and reactive power for occasions in which there is a full 90^{o} phase shift (leading or lagging) between voltage and current.

Describe the means of differentiating reactive power for leading vs lagging current.

Describe the behavior of apparent, real, and reactive power as a function of phase shift.

Describe two methods of numerically representing power in AC circuits.

Describe the means of converting between power represented in rectangular format to polar format.

Describe the means of converting between power represented in polar format to rectangular format.

List methods of calculating power when voltage and current are expressed using phasor format.

Identify the significance of the complex conjugate operation.

Identify the condition regarding voltage and current when calculating AC power using phasor format.

List methods of calculating power when voltage and current are <u>not</u> expressed using phasor format.

Describe power factor and discuss its utility. Discuss other methods of calculating power factor.

Discuss how the angle of apparent power when expressed using polar format can be calculated using power factor.

Discuss how the angle of apparent power when expressed using polar format relates to impedance angle and the phase shift of current with respect to voltage. Draw graphs of the impedance, voltage/current, and power domain.

Determine the relative phase shift between **V** = 48V ∠25° and **I** = 150mA ∠-15°.

Differentiate between cos and sin for angles between -90º and +90º. Discuss the significance of this observation regarding the calculation of reactive power.

Given the below information calculate the resultant apparent, real, and reactive power.

1) **V** = 120V ∠0° and **I** = 700mA ∠0°
2) **V** = 120V ∠0° and **I** = 700mA ∠-30°
3) **V** = 120V ∠0° and **I** = 700mA ∠-90°
4) **V** = 120V ∠0° and **I** = 700mA ∠45°
5) **V** = 120V ∠0° and **I** = 700mA ∠90°

Plot apparent, real, and reactive power as a function of phase shift.