AC Power Examples (56:09)

Determine the relative phase shift between **V** = 60V ∠30° and **I** = 200mA ∠10°.

1-1) Given **V** = 24V ∠0° and **I** = 380mA ∠-23.4° solve for **S**, P, and Q.

1-2) Given **V** = 90V ∠0° and **Z** = 150Ω ∠ -50° solve for **S**, P, and Q.

1-3) Given **I** = 1.6A ∠ -34° and **Z** = 75Ω ∠ 34° solve for **S**, P, and Q.

1-4) Given V=208V, S=249.6VA, and PF=.87 lagging solve for I, P, **I**, Q, and **Z**.

1-5) Given **V** = 9.8V ∠0° and **I** = 40mA ∠ 90° solve for **S**, P, and Q.

Describe how apparent, real, and reactive power for purely resistive, purely capacitive, and purely inductive elements are illustrated in the power domain.

2-1) Given **V** = 86V ∠17° and **I** = 80mA ∠ 35° solve for **S**, P, and Q.

2-2) Given **V** = 120V ∠22° and **I** = 800mA ∠ 22° solve for **S**, P, and Q.

2-3) Given **V** = 105V ∠-14° and **Z** = 280Ω ∠ 40° solve for **S**, P, and Q.

Given an unloaded motor that draws 507mA of current at a PF of 0.17 calculate S, P, and Q.

Given a loaded motor that draws 994mA of current at a PF of 0.84 calculate S, P, and Q.

Compare and contrast the unloaded and load motor's power consumption.

Describe the significance of low and high power factor values.

Given a transformer powered by 120V with $\mathbf{V}_{\mathbf{SECONDARY}}$ = 24V ∠0° and $\mathbf{I}_{\mathbf{SECONDARY}}$ = 4.8A ∠ 0° solve for **S**, P, and Q for both the primary and secondary assuming ideal conditions, additionally solve for current in the primary.

Given a transformer with: $\mathbf{V}_{\mathbf{PRIMARY}}$ = 120V ∠0°
$\mathbf{I}_{\mathbf{PRIMARY}}$ = 1A ∠ -7°
$\mathbf{V}_{\mathbf{SECONDARY}}$ = 24V ∠0°
$\mathbf{I}_{\mathbf{SECONDARY}}$ = 4.8A ∠ 0°
solve for **S**, P, and Q for both the primary and secondary. Determine the efficiency of this non-ideal transformer.

Determine the efficiency of a motor producing 86W of useable power that consumes 119.3VA at a power factor of .84 lagging.

Determine the useable power output of a 95% efficient device consuming 1kVA with a power factor of .9 lagging.

Determine the input power for a 92% efficient motor producing 400W with a power factor of .87 lagging.