SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

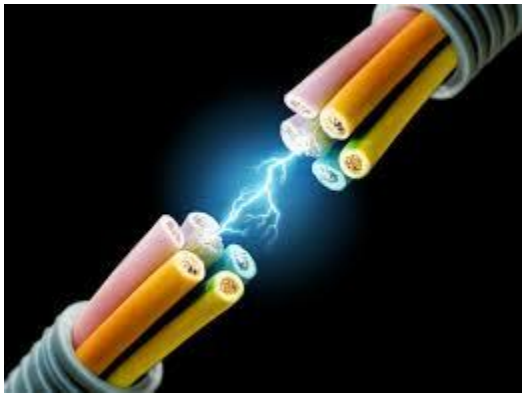
19EET103 / ELECTRIC CIRCUITS AND ELECTRON DEVICES

AC CIRCUITS

SINGLE PHASE CIRCUITS

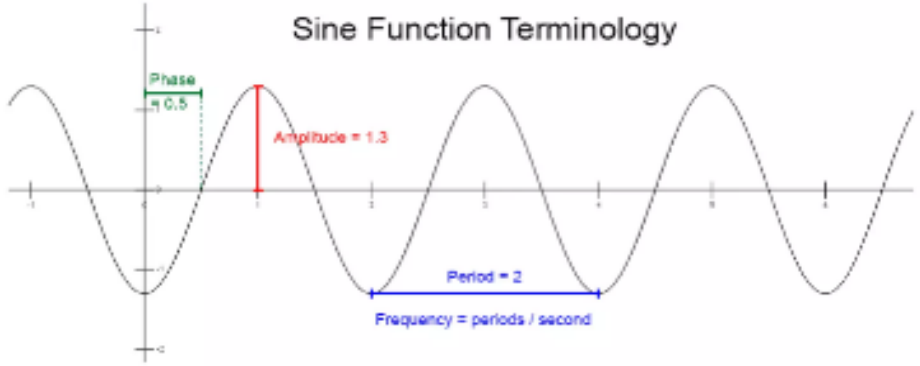
TOPIC OUTLINE

- AC fundamentals
- Peak and Period
- Peak value
- Effective value



SINGLE PHASE AC CIRCUITS

Till now, we have discussed about DC supply and DC Circuits. But, 90% of Electrical energy used now a days is AC in nature. Electrical supply used for Commercial purposes is alternative.



An alternating quantity changes continuously in magnitude and alternates in direction at regular intervals of time.

INTRODUCTION TO AC CIRCUITS ...

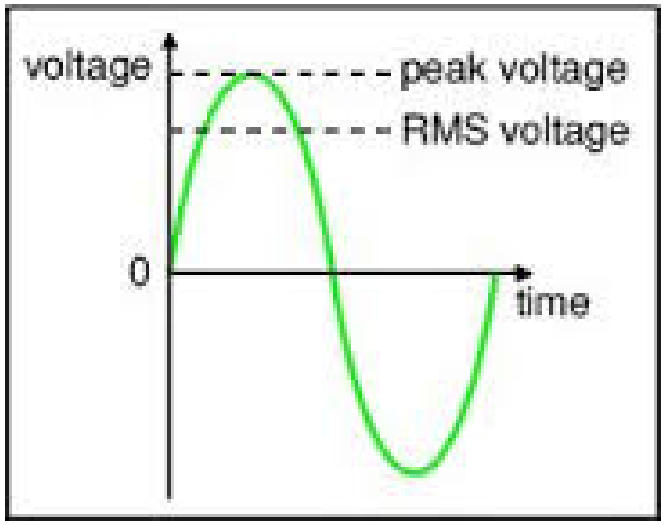
Single-Phase Circuits

Alternating current circuits with each of the individual components, resistor, capacitor or inductor. AC circuits with resistor, inductor and capacitor in series and parallel….

1. Introduction
2. Resistive circuit
3. Inductive circuit
4. Capacitive circuit
5. Series circuit
6. Parallel circuit

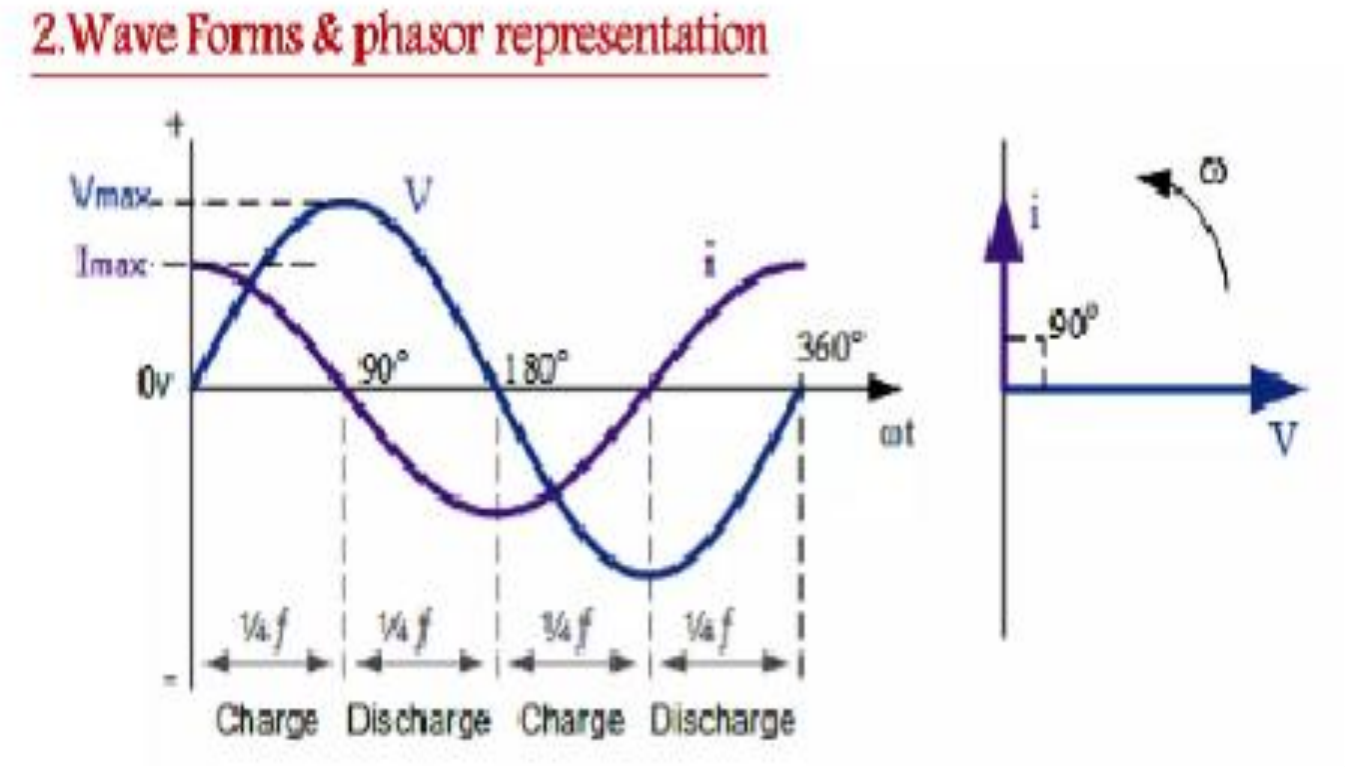
PARAMETER VALUES:

- Instantaneous (v, i)
- Peak (V_m, I_m)
- Average (V_{ave}, I_{ave})
- RMS (V, I or V_{rms}, I_{rms})



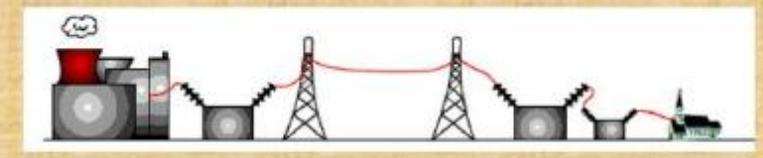
Parameters V and I are in sine wave.

Waveform

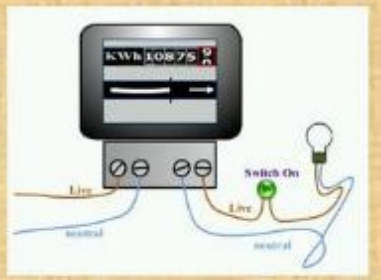

2.Wave Forms & phasor representation
+
Vmax
Imax
V
i
0v
90°
180°
360°
ωt
-
¼ f
¼ f
¼ f
¼ f
Charge
Discharge
Charge
Discharge
ω
i
90°
V

AC FUNDAMENTALS

- In the real world, electrical transmission line is in 3 phase → Red-Yellow-Blue (RYB) or DC



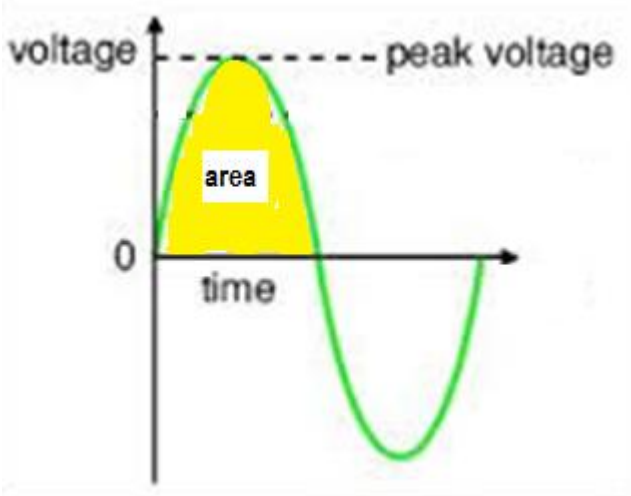
- To most home, only single-phase…..
  either Red or Yellow or Blue

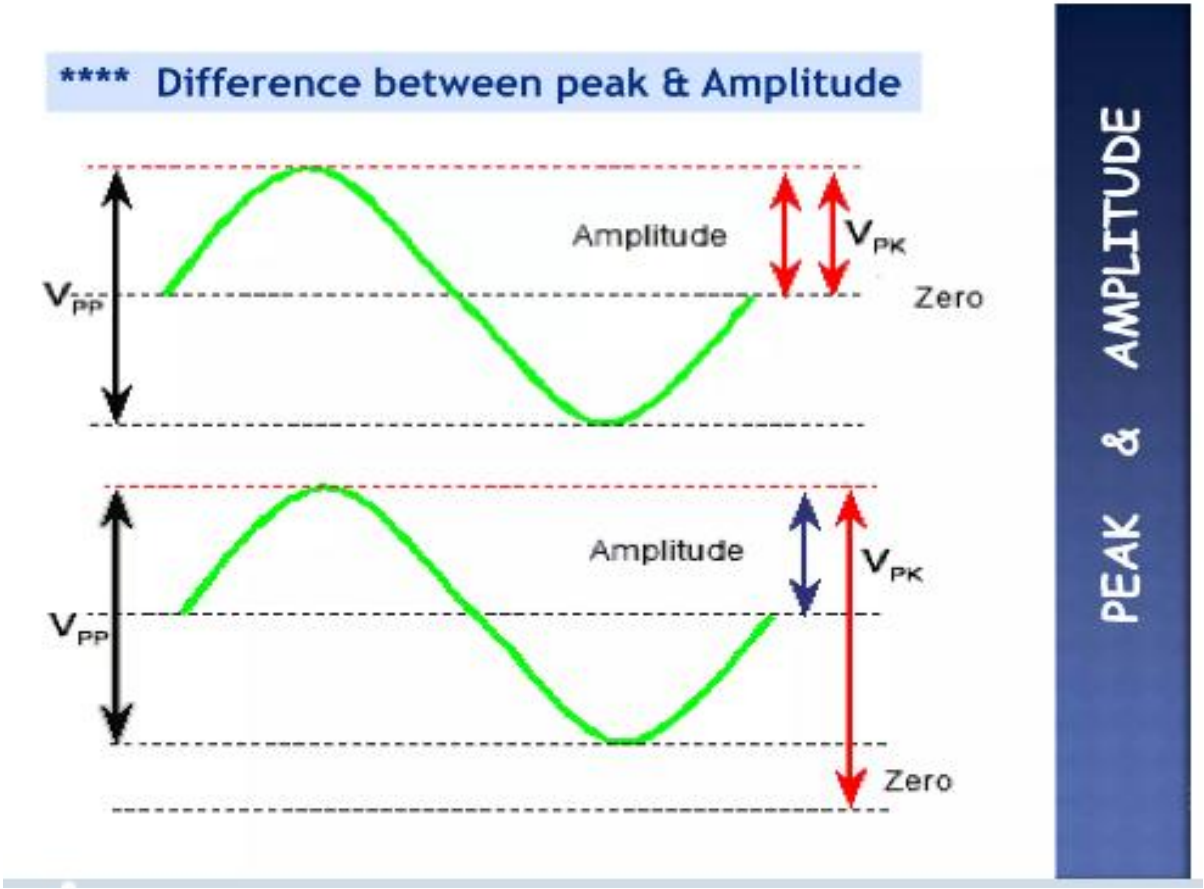


- Three phase – Chapter 3

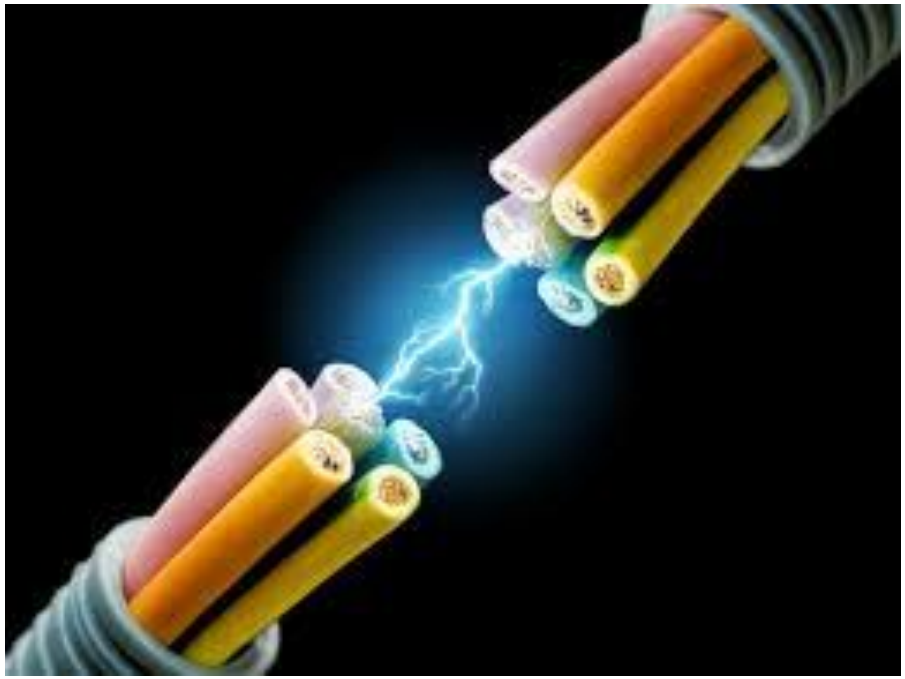
- **Peak (V_m, I_m) :** It is the maximum value

TERMINOLOGY	DEFINITION
Peak value (pk)	Peak is the maximum value, either positive (pk+) or negative (pk-), that a waveform attains. Peak values can be expressed for V,I & P .
Peak to peak (pk-pk)	Peak-to-peak is the difference between the maximum positive and the maximum negative amplitudes of a waveform, as shown below. If there is no direct current (DC) component in an alternating current (AC) wave, then the pk-pk amplitude is twice the peak amplitude.
Instantaneous Value	This is the value (voltage or current) of a wave at any particular instant. often chosen to coincide with some other event. E.g. The instantaneous value of a sine wave one quarter of the way through the cycle will be equal to the peak value.
Average	The average of an alternating quantity is defined as the athematic mean of all the values over one complete cycle.
RMS	The RMS value of a set of values (or a continuous-time waveform) is the square root of the arithmetic mean of the squares of the values, or the square of the function that defines the continuous waveform.
Form Factor	The ratio of RMS value to Average value is called Form factor.
Peak Factor (Crest factor)	It is defined as the ratio of Maximum value to RMS value of given alternating quantity




**** Difference between peak & Amplitude
Amplitude
V_{PK}
V_{PP}
Zero
Amplitude
V_{PK}
V_{PP}
Zero
PEAK & AMPLITUDE

RECAP….



…THANK YOU