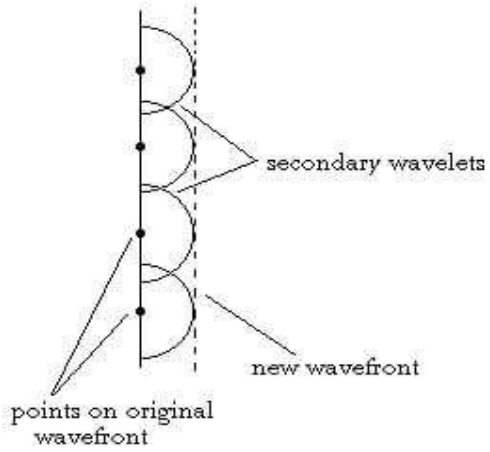
HUYGEN'S PRINCIPLE:

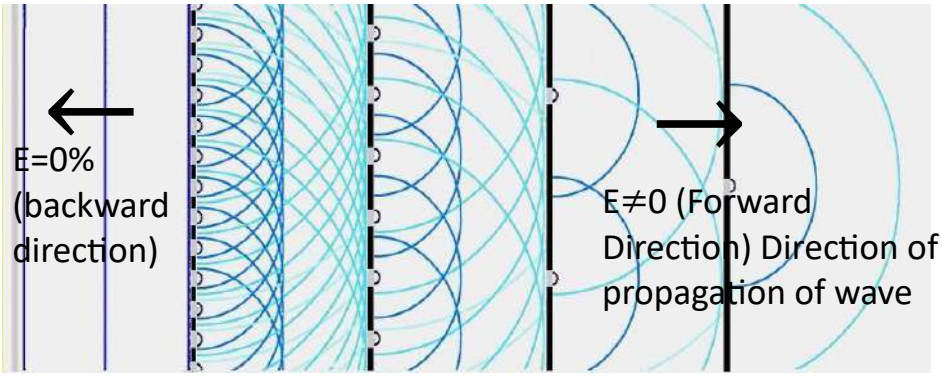
Huygens's principle says

(a) Every point of a wave front is a source of secondary wavelets; and

(b) The wave at a given time is constructed by applying the principle of composition to the wavelets generated by the wave front at an earlier time.

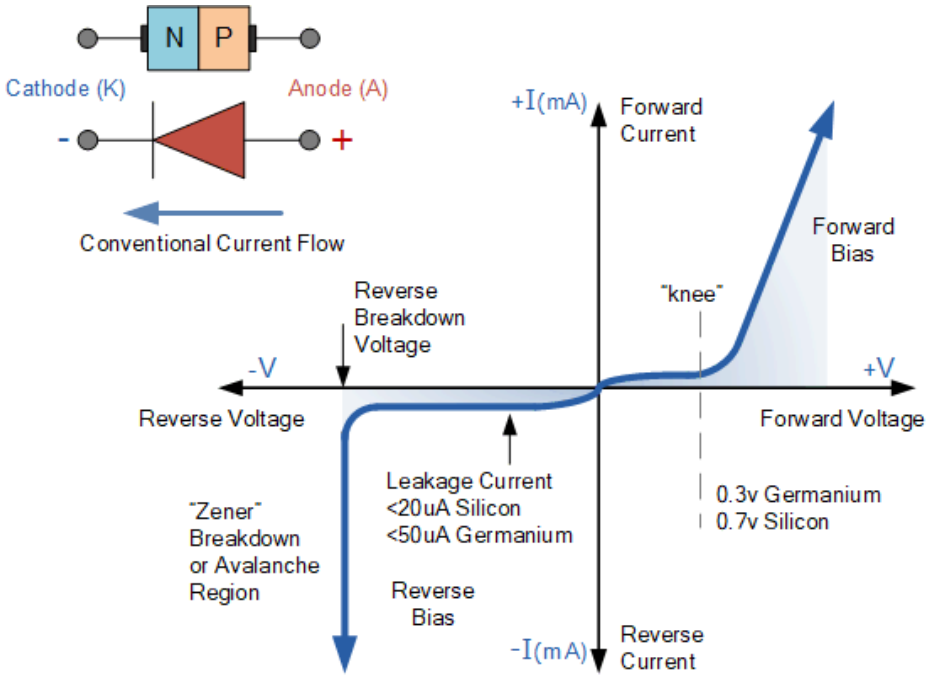


HUYGEN'S-FRESNEL CORRECTION:



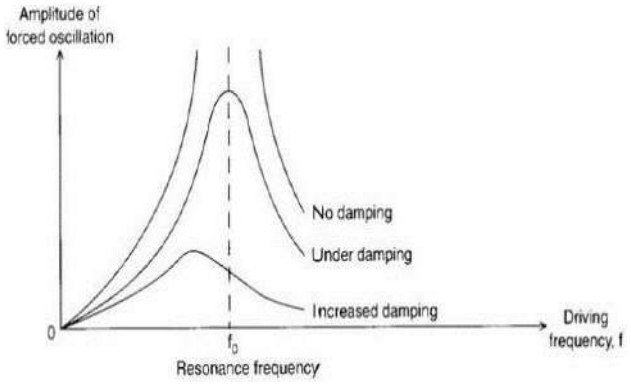
- **Huygens's principle** that each point on a wave front represents a source of spherical waves is conceptually useful but is incomplete; the backward parts of the wavelets have to be neglected, otherwise backward waves are generated.
- **The Huygens-Fresnel principle** introduces a correction factor to Huygen's principle when dealing with waves in an optical system. It takes into account the direction-dependent amplitude and phase changes that occur as waves propagate through an aperture or lens.

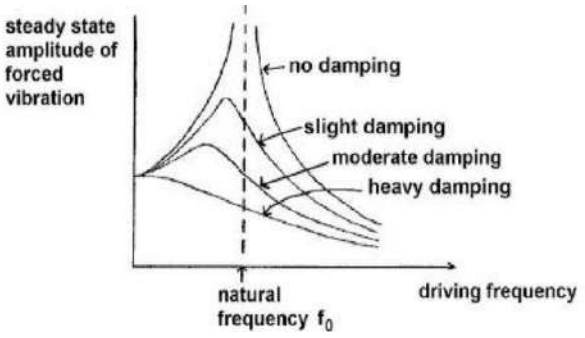
V-I CURVE OF PN JUNCTION DIODE:



- In forward bias condition p-type is connected to positive terminal of battery and the n-type to the negative terminal of the battery, the potential barrier for germanium diodes is 0.3 V, and for silicone diodes is 0.7 V, as the potential barriers decrease and there is a flow of current.
- **In forward bias** voltage on the junction diode results in the depletion layer becoming very thin and narrow which represents low impedance through the junction thereby allowing high currents to flow. The point at which this sudden increase in current takes place is represented I-V characteristics curve above as the “knee” point and exponential curve is obtained.
- **In reverse bias**, this results in an increase in the potential barrier and resistance also increases. Minority carriers are present in the junction which creates reverse saturation current flows in the beginning, a very small reverse leakage current does flow through the junction which can normally be measured in micro-amperes, (µA).
- If the applied voltage increases rapidly, there is increased kinetic energy due to minority charge carriers which affect the majority charges. In this stage the diode breaks down or the voltage is called breakdown voltage, this may also destroy the diode.

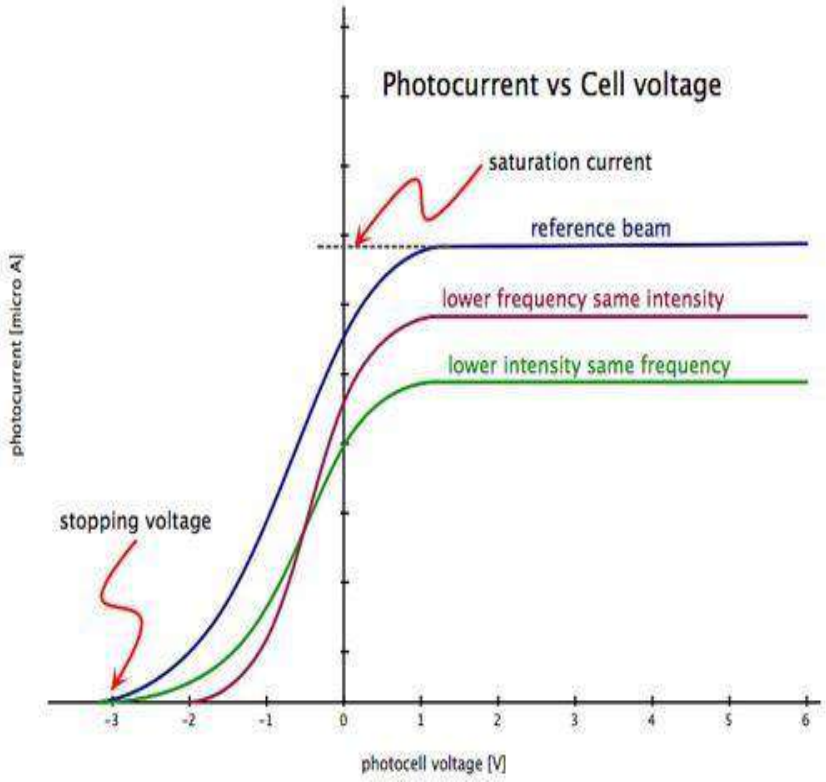
FORCED OSCILLATION, RESONANCE AND DAMPING:





- When a system oscillates without an external driving force, the system is said to be oscillating at its natural frequency.
- Resonance occurs when the driving frequency most efficiently transfers its energy to the driven system. The amplitude therefore increases as more of the driving force's energy is taken into the system.
- From the graph you can see that all systems exhibit resonance when the driving frequency is equal to their natural frequency.
- In a **lightly-damped system**, the amplitude of oscillation decreases slowly as time goes on.
- A **heavily-damped system** moves slowly until coming to rest. It does not oscillate.
- **Critical damping** causes a system's amplitude to reach zero (and stay there) in the shortest time possible. Shock absorbers on cars are critically damped.

PHOTOELECTRIC EFFECT:



- For a given metal (photosensitive material), the photoelectric current is directly proportional to the intensity of the light used, above a minimum value of frequency called the threshold frequency.
- The saturation current depends on the intensity for a known value of frequency. At the same time, we see that the stopping potential does not depend on the intensity over a specific value of frequency.
- The Photoelectric effect does not occur below threshold frequency. If the frequency of light is above the threshold frequency, the stopping potential is directly proportional to the frequency.
- In other words, to stop an electron emitted by a higher frequency, stopping potential provides this energy.