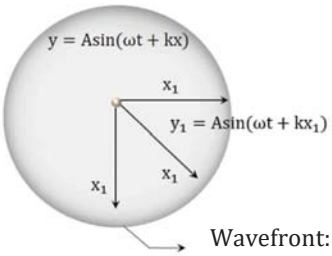
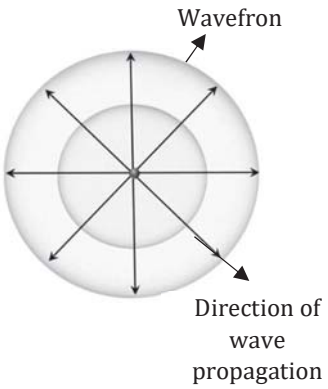
HUYGENS PRINCIPLE – WAVEFRONT

If we picture a point as the center and make a sphere around it, all the points on that sphere move in a regular back-and-forth motion and have the same timing. If we do the same thing with another point, its sphere of points also moves back and forth, but the timing is different from the first sphere. These surfaces are called wavefronts.

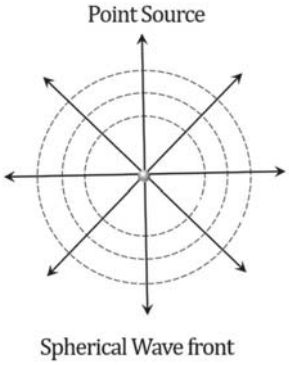


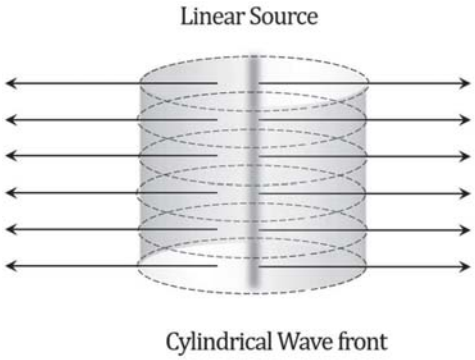
Wavefront: It is the locus of the particles having the same phase.

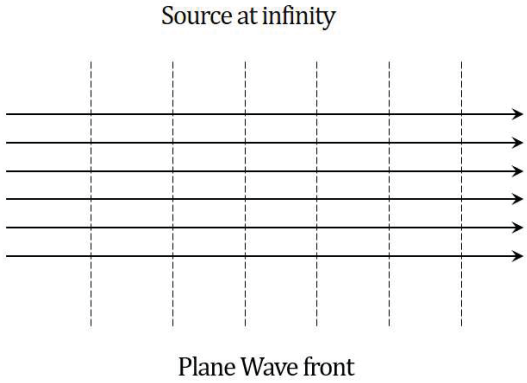
- Particles on the inner wavefront will be in the same phase.
- Similarly, particles on the outer wavefront will be in the same phase.
- But particles present on the inner and outer wavefronts will not be in the same phase.
- Direction of propagation of a wave is always perpendicular to the wavefront.
- Time taken by each ray to move from a particular wavefront to another wavefront is same.
- And if the medium is not changing with the time, velocity and distance will also be same.



Different types of wavefronts depending on the source:







- At every point along the wavefront, there's a new starting point for waves, known as a secondary wave source.
- Drawing a line tangent to the secondary wavelets in the direction they move creates the secondary wavefront.
- The main source sends energy in all directions.
- Secondary wave sources release energy in a particular direction, matching the wave's path.
- More energy is emitted by secondary wave sources in the direction of the wave's motion.
- A wavefront indicates where particles share the same phase.
- The wave travels perpendicular to the wavefront.
- Each ray takes the same time to travel between wavefronts.
- If the medium doesn't change, time, speed, and distance remain constant.
- Secondary wave sources mainly emit energy in the direction of the wave's movement.