Transverse and Longitudinal Waves

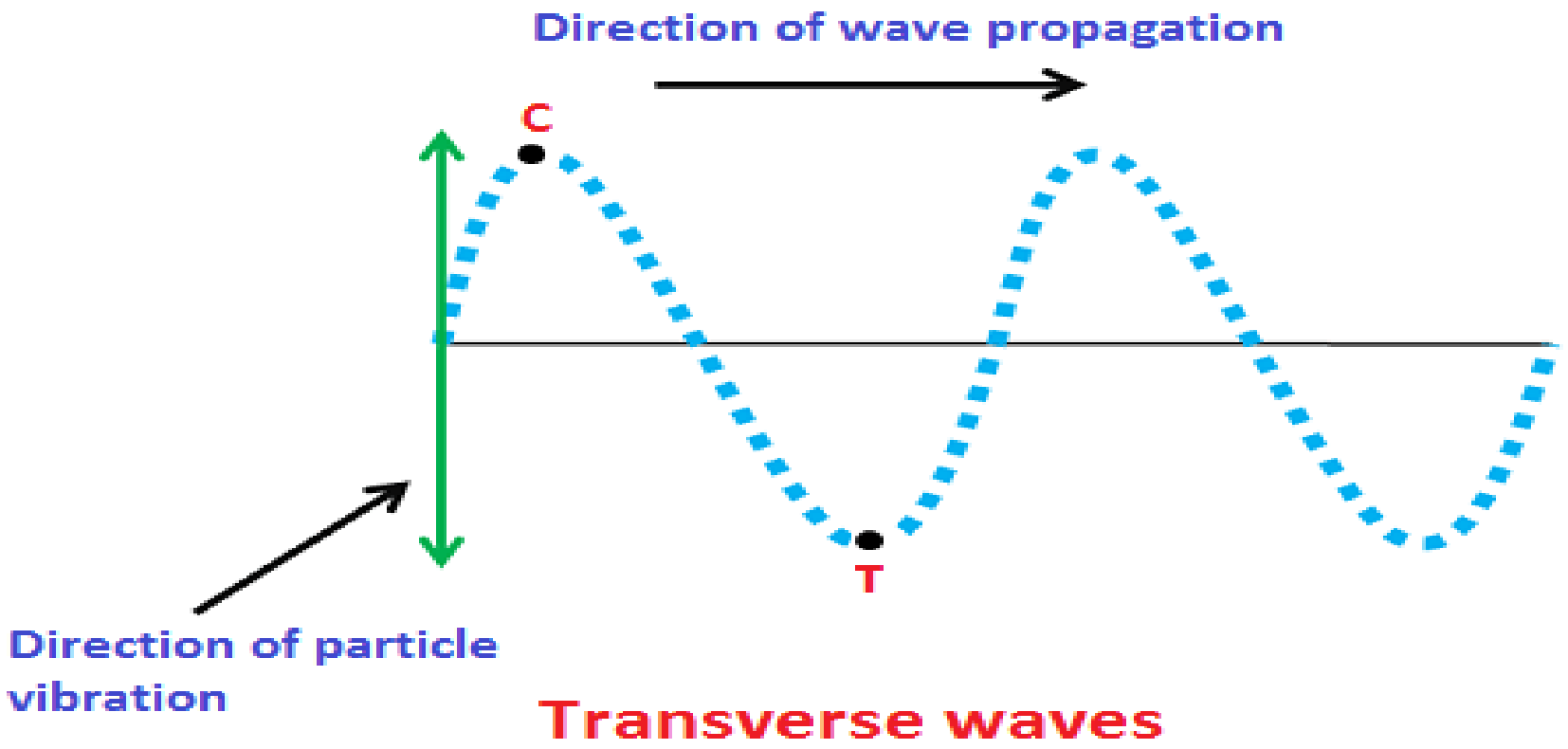
DR. YOGESH B. RASAL

SMT. S.K. GANDHI ARTS, AMOLAK SCIENCE AND P.H. GANDHI COMMERCE COLLEGE KADA ,

TAL. ASHTI, DIST. BEED

Transverse waves

If the particles of the medium vibrate in a direction perpendicular to the direction of propagation of the wave, it is called a transverse wave.



In transverse waves, the particle movement is perpendicular to the direction of wave propagation.

Light and other types of electromagnetic radiation are examples of transverse waves. Some other examples of transverse waves include a ripple on a pond and a wave in a string.

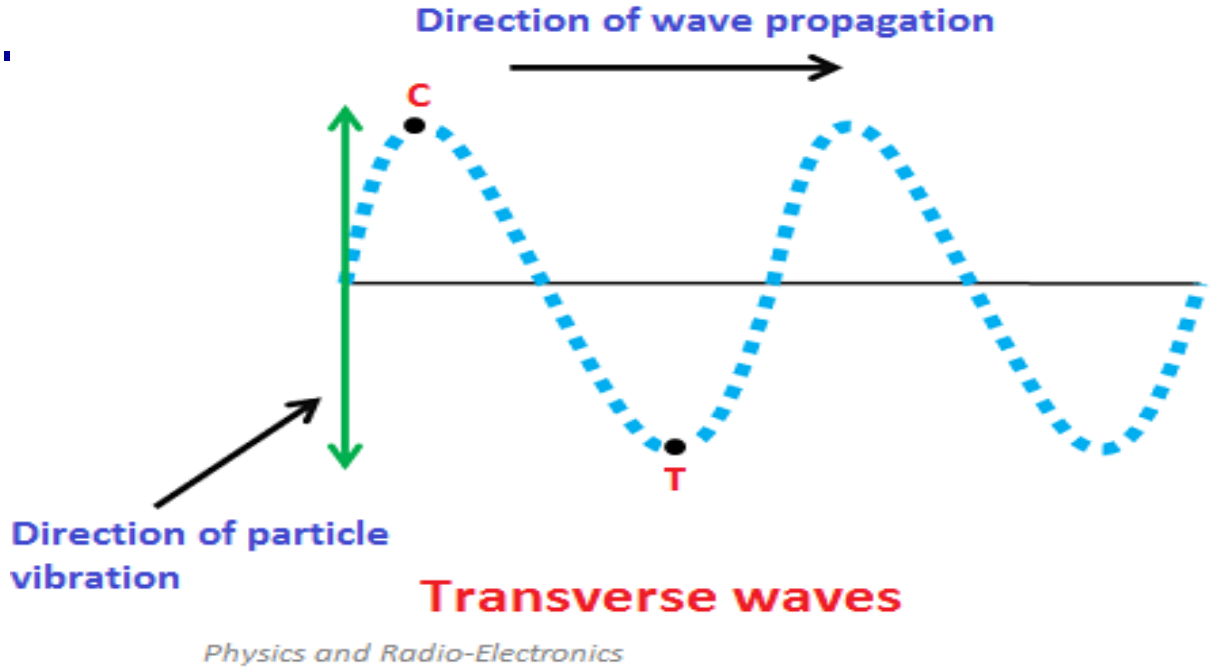
The particles do not move along the wave, they simply move up and down relative to the wave propagation.

Example 1:

The circular ripples produced on the surface of the water expand and propagate through water.

Example 2:

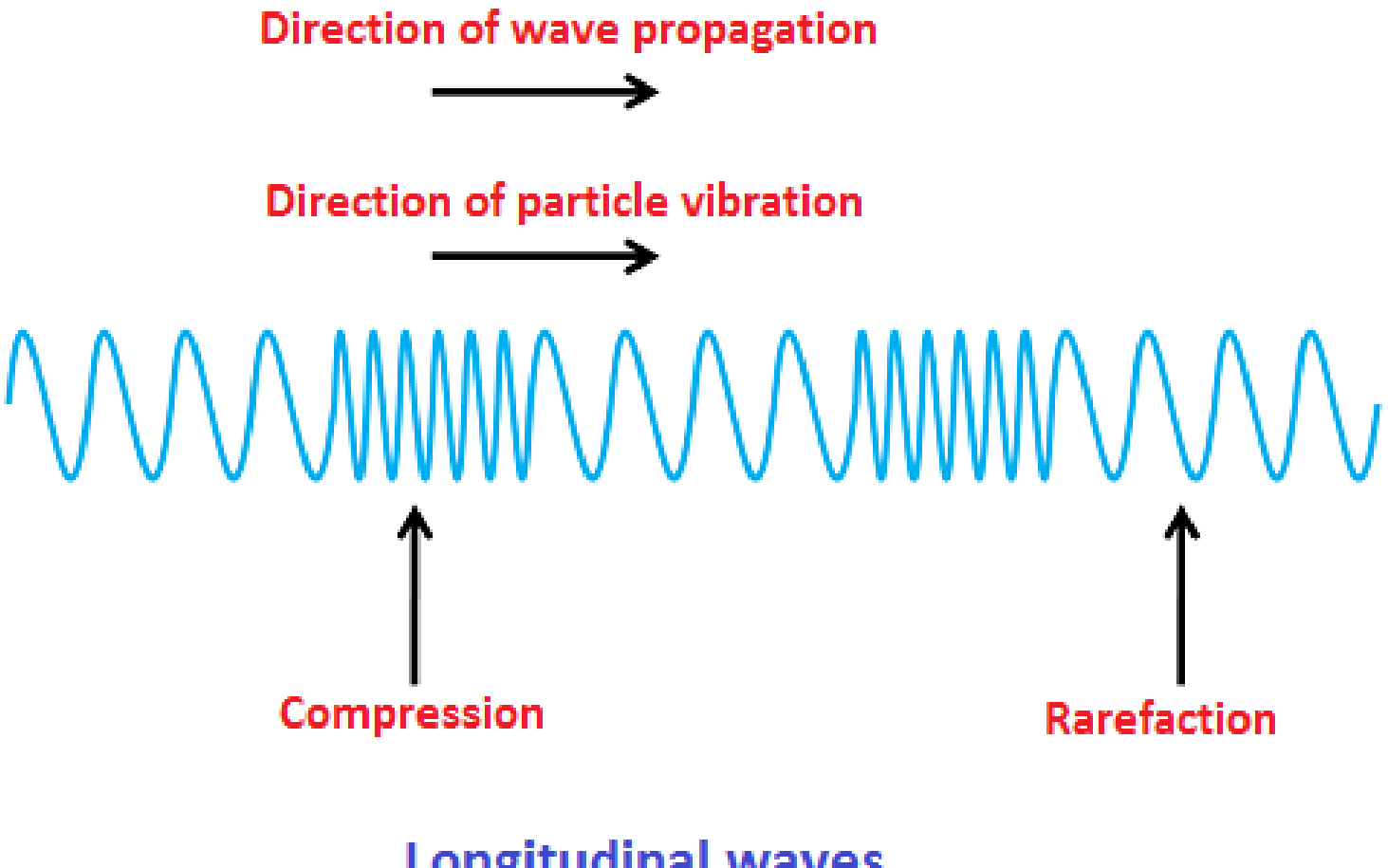
Take a string of certain length, with one end attached to a fixed support. Hold the other free end of the string in hand, stretch and vibrate it in a perpendicular direction to the length of the string. A wave pattern is observed in the string as shown in the figure.



The uppermost point of the wave is known as crest (C) and the lowest point in the wave is known as trough (T). As the wave propagates from left to right, the particles of the string vibrate up and down, thus forming a transverse wave in the string.

Longitudinal waves

If the particles of the medium vibrate in a direction parallel to the direction of propagation of the wave, it is called a longitudinal wave.



Longitudinal waves

In longitudinal waves, the particle movement is parallel to the direction of wave propagation.

Longitudinal waves can travel through solids, liquids, and gases, as the medium requires only elasticity of volume for its propagation.

The longitudinal waves travel through a medium in the form of compressions and rarefactions. The region of high pressure is called compression and the region of low pressure is called rarefaction.

Sound waves and waves in a stretched spring are some examples of longitudinal waves.

Some waves are not purely transverse or longitudinal. For example, the seismic (earthquake) waves produced in the interior of earth travel both in the form of longitudinal and transverse waves.