- **Laplace correction**

Newton assumed that the pressure variations in a medium during propagation of sound are isothermal.

Laplace pointed out that the pressure variations in the gases when sound propagates are so fast that the heat does get enough time to flow to surroundings or from surroundings to keep the temperature constant. Therefore, the variations are adiabatic and not isothermal.

The speed of sound in a gas is -

$$V = \sqrt{\frac{\gamma P}{\rho}}$$

NOTE :- For air $\gamma = 7/5$

- **The principle of superposition of waves -**

The phenomenon of intermixing of two or more waves to produce a new wave is called superposition of waves.

Therefore according to it, if several waves propagate in a medium simultaneously, then the resultant displacement of any particle of the medium at any instant is equal to the vector sum of the displacements produced by individual waves.

If $y_1 = f_1(x - vt)$
$y_2 = f_2(x - vt)$
$y_n = f_n(x - vt)$

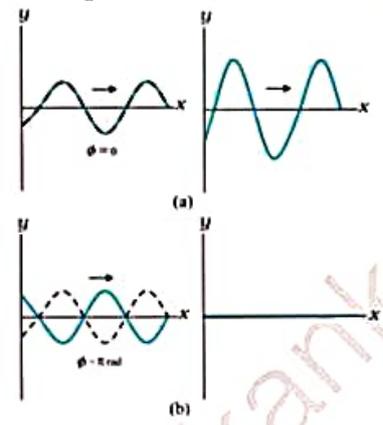

Then, $y = y_1 + y_2 + \ldots + y_n$

Fig. 15.10 The resultant of two harmonic waves of equal amplitude and wavelength according to the principle of superposition. The amplitude of the resultant wave depends on the phase difference φ, which is zero for (a) and π for (b)