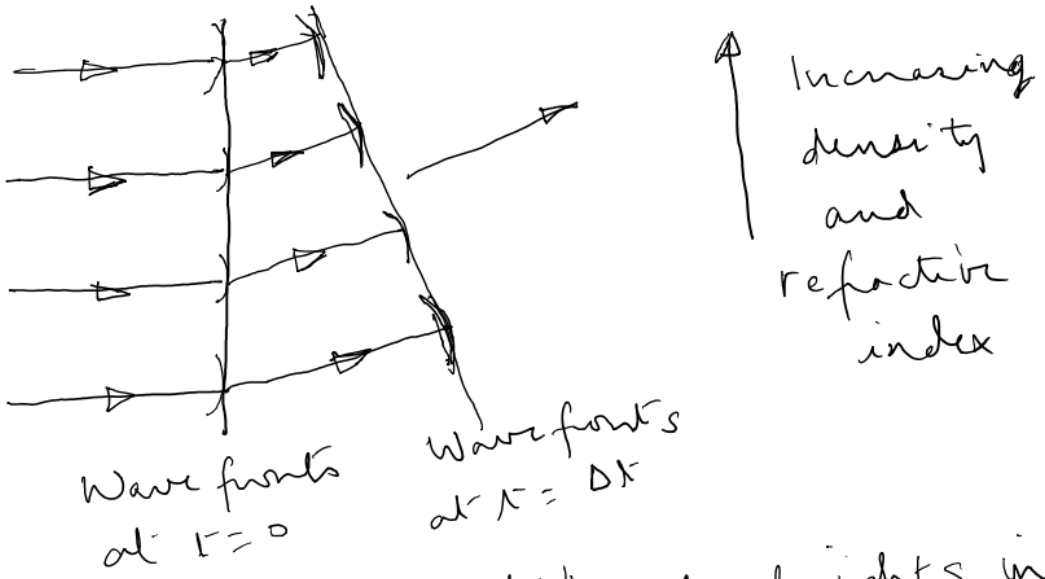
15. On a hot summer night, the refractive index of air is smallest near the ground and increases with height from the ground. When a light beam is directed horizontally, the Huygens' principle leads us to conclude that as it travels, the light beam :

(1) bends downwards

(2) bends upwards ← Correct

(3) becomes narrower

(4) goes horizontally without any deflection



Light rays at different heights in the medium will travel at different speeds. Therefore, the tangent drawn to the wavefronts at $t = \Delta t$, will be at an angle to the vertical direction. Since light always travels normal to the wavefront, hence the light beam will bend upwards.