JAMES J. GRIFFIN 11/03/08A(2)

On a calm day an observer in a train station measures the speed of sound to be $v_S = 343$ m/s. An observer on a train moving with constant velocity, $V_T = 100$ m/s, in the same direction as the sound waves measures that speed to be _____ .

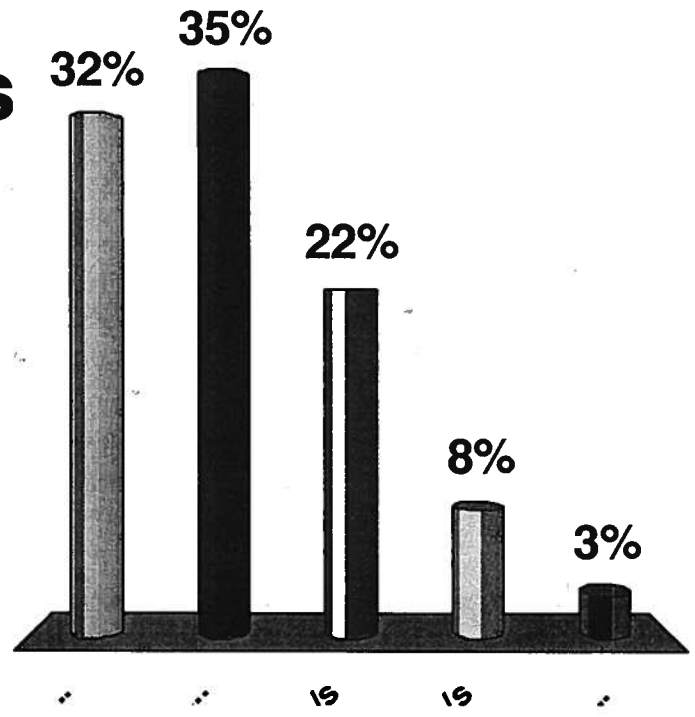
✔a) $v_S - V_T = 243$ m/s

b) $v_S + V_T = 443$ m/s

✔c) $v_S = 343$ m/s

d) $V_T = 100$ m/s

e) None of the above



The correct answer is (a): the measured speed is $v_S - V_T =$ 243m/s.

This is because sound travels in the atmospheric medium at a **fixed speed with respect to the medium**. Then by Galilean Relativity, an observer moving with speed, V_T, in the direction of the wave measures the speed of the sound wave as $v'_S = v_S - V_T$.; as follows,

$x = x' + Vt$, and $x' = x - Vt$;

Therefore,

$v' = \Delta x'/\Delta t = \Delta x/\Delta t - V(\Delta t/\Delta t) = v - V$