QUES 02:-

A train, standing in a station yard, blows a whistle of frequency 400 Hz in still air. The wind starts blowing in the direction from the yard to the station with a speed of 10m/s. Given that the speed of sound in still air is 340m/s,

a. the frequency of sound as heard by an observer standing on the platform is 400Hz.
b. the speed of sound for the observer standing on the platform is 350m/s.
c. the frequency of sound as heard by the observer standing on the platform will increase.
d. the frequency of sound as heard by the observer standing on the platform will decrease.

Sol. (a) and (b) are correct.

v_0 = 400 Hz frequency of source of sound.

Velocity of wind v_w = 10m/s from source of listener.

Speed of sound in still air v_s = 340 m/s

As the listener is standing on platform.

Speed of sound with respect to listener = $v_z + v_w = 340 + 10 = 350$ m/s.

Verifies the option (b).

As the distance between listener and source does not change so frequency of sound does not change as heard by listener. i.e., he heard v_0 = 400 Hz. verifies option (a), rejects the option (c) and (d) as it is constant v_0 = 400 Hz.