Physics 11 Doppler Effect

1. A train’s whistle sounds at 1350Hz. A stationary observer hears the whistle as a 1410Hz sound. Find the speed of the train and state whether the train is approaching or receding. **(14.6m/s, approaching)**

2. A cyclist rides toward a trumpet playing hippopotamus at 11m/s. The hippo, having no fingers, can only play a solitary note. The cyclist hears the note at 650Hz. What frequency is the hippo playing? **(630Hz)**

3. A car is traveling past a group of striking workers and honks in support. The cars horn produces a tone at 440.0Hz. As the car approaches the workers hear the tone as 462.5Hz.

 a. How fast is the car traveling in km/h? **(60.07km/h)**

 b. What tone will the workers hear as the car drives away? **(419.6Hz)**

4. The Doppler Effect also occurs for light. Low frequency light appears red and high frequency light appears blue. If the frequency is shifted downward it is called a Red Shift. If the frequency is shifted upward it is called a blue shift. A distant star composed of Hydrogen emits light at 4.600x1014Hz (Yellow). Astronomers see this light as 4.594x1014Hz. How fast is the star moving relative to Earth? Is it moving away from or toward us? **(3.918x105m/s, away)**

5. A criminal is fleeing police. The criminal is traveling at 160.0km/h east. The police are pursuing at 175.0km/h east. The siren produces a 1200.0Hz sound. What frequency does the criminal hear over their crazed cries of “You’ll never catch us, copper!”? **(1217Hz)**

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