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**WORKSHEET No.7**

**Doppler Effect**

1. Use the Doppler equation for a moving source to calculate the observed frequency for a 250.-Hz source of sound if it is moving with a speed of \_\_\_\_ . (Assume that the speed of sound in air is 340. m/s.)
2. 30. m/s towards the observer.
3. 30. m/s away from the observer.
4. 300. m/s towards the observer.
5. 300. m/s away from the observer.
6. 320. m/s towards the observer.
7. 335 m/s towards the observer.
8. The frequency of a train’s whistle is 1000 Hz. (a) A train is approaching a stationary man at 40 m/s. What frequency does the man hear now? (b) The train is stationary, and the man is driving toward in a car whose speed is 40 m/s. What frequency does the man hear now?
9. A person in a car is driving at 60 km/hr toward a ferry whose whistle is blowing at 400 Hz. (a) what frequency does she hear? (b) The ferry leaves the dock and heads directly away from the driver at 15 km/hr, still blowing its whistle. What frequency does she hear now?
10. A stationary source of sound emits a signal at a frequency of 290 Hz. What are the frequencies heard by an observer (a) moving toward the source at 20 m/s, (b) moving away from the source at 20 m/s?
11. A 500 Hz train whistle is heard by a stationary observer at a frequency of 475 Hz. What is the speed of the train? Is it moving toward the observer or away from the observer?

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**WORKSHEET No.5**

**Speed of Sound**

Solve for the following problems.

* 1. You and your friend are out on a picnic when you see a lightning flash and hear the resulting thunder 9 s later. How far away was the storm? If the storm is traveling at 60 km/hr, how much time is there before the storm reaches your picnic site? ( assume that the velocity in air is 340 m/s)
  2. A dynamite is exploded on the surface of the sea where the temperature is 250C. The sound of the explosion is also propagated through air at 250C. What will be the time interval between the arrivals of the two signals to a station that is 5 km away?
  3. A sound wave is sent from a ship too the ocean floor, where it is reflected and returned. If the round trip take s 0.6 s, how deep is the ocean floor? Consider the bulk modulus for seawater to be 2.1 x 109 Pa and its density to be 1030 kg/ m3?
  4. Compare the theoretical speeds of sound in hydrogen ( M = 2.0 g/ mol, ц = 1.4) with Helium ( M= 4.0 g/mol, ц= 1.66) at 00C.

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**WORKSHEET No.6**

**Intensity and Intensity Level**

Solve for the following problems.

1. A machine produces a sound with an intensity of 2.9 x 10-3 W/m2. What would be the decibel rating if four of these machines occupy the same room?
2. What is the intensity level in decibels of a sound that has an intensity of 4.5 x10-5 W/m2?
3. The intensity of a sound is 6 x 10-8 W/m2, what is the intensity level?
4. A 60-dB sound is measured at particular distance from a whistle. What is the intensity of this sound in W/m2?
5. What is the intensity of a 40-dB sound?
6. Compute the intensities for sounds of 10dB, 20dB, and 30 dB.
7. Compute the intensity level for sounds of 1 x 10-6 W/m2, 2 x 10-6 w/m2, and 3 x 10-6 W/m2?

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