RACE # 69		DOPPLER'S EFFECT		PHYSICS
1.	When a source of frequency $f_0$ moves away a stationary observer with a certain velocity an apparent frequency f' is observed. When it moves with same velocity towards the observer, the observed frequency is 1.2 f'. If velocity of sound in v, then the speed of source is -			
	(A) $\frac{\mathrm{v}}{\mathrm{6}}$	(B) $\frac{v}{11}$	(C) $\frac{3}{4}$ v	(D) None of these
2.	A source and a listener are in unidirection at motion with velocities 30 and 45 km/hour respectively. If both have started to move simultaneously from same place, then apparent frequency heard by the listener will be -			
	(A) always less than true frequency (B) always more than tru		e than true frequency	
	(C) more than ac	more than actual frequency (D) less than the actual frequency first and then more		
3.	A person is sitting in a car which is moving with a velocity of 50 m/s away from a source which is emitting a sound of frequency 600 Hz. what frequency would be heard by person sitting in car if speed of sound is 340 m/s			
	(A)550 Hz.	(B) 511 Hz	(C) 612 Hz	(D) 580 Hz
4.	Two trains are moving towards each other at a speed of 72 km/hr and 54 km/hr relative to the ground. The first train sounds a whistle of frequency 1000 Hz. find the frequency of whistle heard by the passenger sitting in the second train. Speed of sound is 340 m/s.			
	(A) 1109 Hz	(B) 1008 Hz	(C) 1050 Hz	(D) 1075 Hz
5.	A whistle sends out 256 waves in a second. If the whistle approaches the observer with velocity 1/3 of the velocity of sound in air, the number of waves per second the observer will receive-			
	(A) 384	(B) 192	(C)300	(D) 200
6.	The apparent frequency of a note, when a listener moves towards a stationary source, with velocity of 40 m/s is 200 Hz. When he moves away from the same source with the same speed, the apparent frequency of the same note is 160 Hz. The velocity of sound in air is (in m/s)-			
	(A) 360	(B) 330	(C) 320	(D) 340
7.	When an engine passes near to a stationary observer then its apparent frequencies occurs in the ratio 5/3. If the velocity of engine is. Speed of sound is 340 m/s.			
	(A) 540 m/s	(B) 270 m/s	(C) 85 m/s	(D) 52.5 m/s
8.	Apparent frequency of train A is heard by observer in train B as 3/4 of the true frequency. Find the value of velocity of train B in m/sec. taking train A to be stationary. If the sound velocity is 332 m/sec			
	(A) 110	(B) 108	(C) 75	(D) 83
9.	A racing car moving towards a cliff sounds its horn. The driver observed that the sound reflected from the cliff has a pitch one octave higher than the actual sound of the horn. If $V =$ the velocity of sound, the velocity of the car is –			
	(A) V/ $\sqrt{2}$	(B) V/2	(C) V/3	(D) V/4
10.	A bus is moving with a velocity of 5 m/s towards a huge wall. The driver sounds a horn of frequency 165Hz. If the speed of sound in air = $335$ m/s, the number of beats heard per second by a passenger on the bus will be			
	(A) 3	(B) 4	(C) 5	(D) 6

11. A source and an observer are located at the same point. The source starts moving away from the observer at t = 0, with a constant acceleration a. If natural frequency of the source is  $n_0$  and speed of sound in air is v, then frequency received by the observer at time t will be –

(A) equal to 
$$\left(\frac{n_0 v}{v+at}\right)$$
 (B) equal to  $\left(\frac{n_0 v}{v-at}\right)$   
(C) greater than  $\left(\frac{n_0 v}{v+at}\right)$  (D) None of these

- 12. A source of sound S is moving with a velocity 50 m/s towards a stationary observer. The observer measures the frequency of the source as 1000Hz. What will be the apparent frequency of the source when it is moving away from the observer after crossing him? The velocity of sound in the medium is 350 m/s -
  - (A) 750 Hz (B) 857 Hz (C) 1143 Hz (D) 1333 Hz
- **13.** The apparent frequency of sound heard by a listener is 10% more than the actual frequency of the note emitted by the source when the source moves towards the stationary listener with velocity v. When the source moves with a velocity 2v, the apparent frequency will be more than the actual frequency by–
  - (A) 17.5% (B) 20% (C) 22.22% (D) 21%
- 14. A source of sound waves of frequency 1080 Hz moves to the right with a speed of 108 ft/s relative to the ground. To its right is a reflecting surface moving to the left with a speed of 216 ft/s relative to the ground. If the speed of sound is 1080 ft/s, the wavelength of sound emitted in air by the source is -
  - (A) 0.5 ft (B) 0.9 ft (C) 1.0 ft (D) 1.8 ft
- 15. Doppler's effect will be more effectively observed when the observer -
  - (A) is moving along line joining be the source
  - (B) is in motion in a direction perpendicular to the source
  - (C) is moving in any direction relative to the source
  - (D) None of the above
- 16. Doppler's effect is not applicable for -
  - (A) audio waves (B) ultrasonic waves (C) shock waves (D) infrasonic wave
- 17. Doppler's effect can be observed for -
- (A) Supersonic speeds (B) Sound waves (C) both the above (D) neither of them
- 18. Doppler's effect will not be observed, if velocity of sound is -
  - (A) Less than the velocity of source (B) Less than the velocity of medium
    - (C) Less than the velocity of observer (D) All of the above

## Answers

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 1.
 (B)
 2.
 (A)
 3.
 (B)
 4.
 (A)
 5.
 (A)
 6.
 (A)
 7.
 (C)
 8.
 (D)
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 (C)
 10.
 (C)

 11.
 (C)
 12.
 (A)
 13.
 (C)
 14.
 (C)
 15.
 (A)
 16.
 (C)
 17.
 (B)
 18.
 (D)