PHYSICS

BOOKS - CHHAYA PHYSICS (BENGALI ENGLISH)

DOPPLER EFFECT IN SOUND

Example

1. The frequency of the whlstle of a train Is 512 Hz . The train crosses a station at a speed of 72

km . h^{-1} Calculate the frequency of the sound heard by a Iistener, standing on the platform , before and after the train crosses the station. Neglect the effect of wind . Velocity of sound is 336 , m s^{-1} .

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2. A sound of frequency 512 Hz is emitted from a stationary source . A train running at a speed of 72 km . h^{-1} passes the source . What will be the frequency of the sound heard by a passenger of the train before and after passing the source ?

Neglect the effect of wind . Velocity of sound is 336 . ms^{-1} .

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3. When a train approaches a listener , the apparent frequency of the whistle is 100 Hz , while the frequency appears to be 50 Hz when the train recedes . Calculate the frequency when the listener is in the train .

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4. Two engines pass each other in opposite directions . One of them blows a whistle of frequency 540 Hz .

Find the freqauencies heard by a passenger sitting on the other engine before and after passing each other .

Velocity of both engines = $72kmh^{-1}$, velocity of sound = $340ms^{-1}$.

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5. A cr travelling at a speed of 36 h^{-1} sounds its horn of frequency 500 Hz . It is heard by the dirver of another car which is travelling behind the frist car in the same directrion with a velocity of $20ms \cdot s^{-1}$.

Another sound is heard by the driver of the secound car after reflection from a bridge ahead . What will be the frequencies of the two sounds heards heard by the drive of the Sound travels in air with a speed of $340m \cdot S(-1)$.

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6. Each of two persons has a whistle of frequency 500 Hz . One person is at rest at a particular place nad the second person recedes from him with a velocity of $1.8m \cdot s^{-1}$

If both of them blow whistles , how many beats will be heard by each of them ? Velocity of sound = 330 m s^{-1}

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7. A siren placed at a railway platform is emitting sound of frequency 5 KHz.

A passenger sitting in a moving train A records a frequency of 5.5 KHz while the train approaches the siren . During his return journey in a different train B he records a frequency of 6.0 KHz while approaching the same siren . what is the ration of velocity of train B to that of train A ?

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8. A railway track and road are in mutually perpendicular . A train is approaching the railway crossing with a speed 80 km/h.

When the train is at a distance 1 km from the crossing it blows whistle of frequency 400 Hz which frequency of sound will be heard by a man on a road at a distance 600 m from the crossing ? volecity of sound = 330 m s^{-1} .

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Higher Order Thinking Skill Hots Questions

1. Each of two men A and B is carrying a source of sound of frequency n . If A approaches B with

a velocity u

how many beats per sound will be heard by A and B

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2. Each of two men A and B is carrying a source of sound of frequency n . If A approaches B with a velocity u

how many beats per second will be heard by B ? (Velocity of sound = c)

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3. A car is approaching a hill at a high speed . At that time, it the horm of the car is blown, that driver hears the echo sharper than the original sound . Explain the reason.

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4. Certain characteristic wavelength in the light from a galaxy has a longer wavelength compared to that from a terrestrial source . Is the galaxy approaching or receding ?

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5. Show that the approaches frequency f' of a source of sound moving with a speed v_s towards a stationary receiver if $f' = \frac{fc}{c - v_s}$, where c is the velocity of sound and f is the frequency .

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6. two sources, each emitting a sound of wavelength λ , are kept at a fixed distance . How

many number of beats will be heard by a listener moving a velocity u along the line joining the two sources ?

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7. A car is moving towards a high cliff. The car driver sounds a horn of frequency f. The reflected sound heard by the driver has frequency 2f . If v is the velocity of sound , what will be the velocity of the car ?

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8. What should be the velocity of a source of sound so that the apparent frequency to a listener will be half the actual frequency of the source? Velocity of sound in air = v .

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9. What should be the velocity of a source of sound so that the apparent frequency to a listener will be twice the actual frequency of the source? Velocity of sound in air = v .

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10. What should be the velocity of a listener so that the apparent frequency of the sound coming from a stationary source to him will be twice the actual frequency ? Velocity of sound in air = v .

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11. Doppler effect given an idea of a continuously expanding universe-explain .

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12. A listener moving with constant velocity passes a statlonary source. Draw a graph to show the change of apparent frequency of the source to the listener with time . Actual frequency of source is n.

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13. Both of a sound source and a listener are approaching towards each other with the same

speed $\frac{c}{10}$ (speed of sound in air = c) . What will be the percentage of apparent increase or decrease in frequency of sound ?

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14. A band music at a frequency f is moving towards a wall at a speed v_b . A motorist is following the band with a speed v_m . If v is the speed of sound , obtain an expression for the beat frequency heard by the motorist .

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15. Why Doppler effect is cleary realised in case of sound but not in case of light wave?

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Exercise

1. A source of sound with frequency 256 Hz is moving with a velocity v towards a wall and an oberver is stationary between the source and wall . When the observer is between the source and the wall

A. he will hear beats

B. he will hear no beats

C. he will not get any sound

D. he will get the sound of same frequency

Answer:

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2. The frequency of a progressive wave may change due to

A. reflection

B. refraction

C. interference

D. Doppler effect

Answer:

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3. A train blowing a whistle of frequency 1000 Hz is moving with uniform velocity from west to east . The apparent frequency of the sound of

the whistle to a stationary listener is 990 Hz . The position of the listener relative to the train is

A. on the north

B. on the south

C. on the east

D. on the west

Answer:

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4. A source of sound and a listener are moving in the same direction with the same velocity . If the actual frequency of sound is 200 Hz , the apparent frequency of the sound to the listener is

A. 200 Hz

B. less then 200 Hz

C. greater then 200 Hz

D. none of these

Answer:

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5. A bus is moving towards a hugs wall with a velocity 5 .m s^{-1} . The driver sounds a horn of frequency 200 Hz. The beat frequency heard by the passenger will be

A. 4

B. 6

C. 8

D. 2

Answer:

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6. A motor car sounding a horn is approaching a large reflector . If the frequency of the horn is 1000 Hz, the frequency of the echo to the driver will be

A. 1000 Hz

B. less then 1000 Hz

C. greater then 1000 Hz

D. none of these

Answer:

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7. An observer standing on a railway crossing receives frequency of 2.2 kHz and 1.8 kHz when the train approaches and recedes from the observer . Speed of the sound in air is 300 . s^{-1} . Velocity of the train (in m . S^(-1)`)

A. 60

B. 30

C. 90

D. 70

Answer:

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8. A whistle producing sound waves of frequency 9500 Hz and above is approaching a stationary person with speed vms^{-1}. The velocity of sound in air is $300ms^{-1}$. If the person can hear frequencies up to 10000 Hz,

the maximum value of v upto which he can hear the whistle is

A. $16\sqrt{2}m.\ s^{-1}$

B. $15/\sqrt{2}m.\ s^{-1}$

C. $15m \cdot s^{-1}$

D. $30m \cdot s^{-1}$

Answer:

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9. What do you undersetand by the red shift of a star or of a galaxy of stars ?

A. they are gradually receding from the earth

B. they are gradually approaching the earth

C. they are stationary

D. none of the above

Answer:

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10. When a source of light and a observer approach each other, the apparent change of the wavelength of light is called

A. red shift

B. violet shift

C. blue shift

D. black shift

Answer:

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Very Short Answer Type Questions

1. Which property of sound undergoes an apparent change due to Doppler effect ?

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2. When a source moves at a speed greater than that of sound, will Doppler effect hold ?

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3. Will there be a Doppler effect for sound when the source and listner moves at right angle to the line joining them ?

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4. When a source of sound approaches a stationary listener, the sound appears to be _____ to the listener . (Fill in the blank)

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5. When a listener approaches a source of sound , the sound appears to be _____ to the listener. [Fill in the blank]

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6. The apparent change of frequency of sound due to Doppler effect is called Doppler _____ [Fill in the blank]

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7. If there is a relative motion between a source of light and an observer, a change of colour of the light appears in the eyes of the observer. What is the name of this phenomenon ?

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8. When a source of light and an observer move away from each other, the apparent change in the wavelength of light is called _____ shift . [Fill in the blank]

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Short Answer Type Questions I

1. Two sirens , situated at two places 1 km apart, are sounding with the same frequency, A man while moving along the road in between the two sirens heard beats . Explain .

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2. What would a person hear , if he moves away from a source of sound with the speed of sound ?

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Short Answer Type Questions Ii

1. A source produces a sound of frequency n . Calculate the aparent frequency and Doppler shift in the following cases :

The source is stationary and the listener is receding with velocity u from the source .

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2. A source produces a sound of frequency n . Calculate the apparent frequency and Doppler shift in the following cases :

The source is stationary and listener is approaching the source with velocity u.

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3. A source produces a sound of frequency n . Calculate the aparent frequency and Doppler shift in the following cases :

The listener is stationary and the source is approaching the listener with velocity u .

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4. When a source of sound passes us , whether it be a car horn or a train whistle , the pitch we hear goes from high to low . Explain why ? Use any relation to support your explanation .

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Problem Set I

1. A sound of frequency 1000 Hz is emitted from a roadside siren. A car moving along the road with a unifrom velocity of 50 km . h^{-1} crosses the siren . Calculate the frequency of the siren relative to the pasenger of the car before and after crossing the siren . (Velocity of sound = 340 m s^{-1})

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2. A train sounding a horn of frequency 1000 Hz crosses a station at a unifrom velocity of 50 km h^{-1} Calculate the frequency of the whistle relative to a listener, standing on the platform, before and after the crossing of the station . (velocity of sound = 340 m s^{-1})

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3. A moter car blows a horn of frequency 100 Hz . While approaching a large reflector with a

uniform velocity of 50 km h^{-1} . Calculate the frequency of the echo relative to the passenger of the car . (Velocity of sound $= 340 ms^{-1}$)

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4. A police standing at a place detected a 10% change in frequency of the sound of a horn of a fast moving car approaching towards him . If the velocity of sound is 340 m s^{-1} , what is the speed of the car ?

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5. What will be the percentage difference between the frequency of the sound heard by an observer and the actual frequency of the whistle of a train approaching at a speed of 100 m s^{-1} towards the observer? Velocity of sound in air = 330 m s^{-1}

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6. Due to Doppler effect , the shift in wavelenght observed is 0.1Å for A star

producing a wavelength of 6000 $\mathring{A}$

What is the velocity of recession of the star ? `

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7. A star is moving away from the earth at a velocity of $10^5 ms^{-1}$. What will be the shift in wavelength of the spectral line of length $5700\mathring{A}$ as observed on the earth?

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Problem Set Ii

1. Two trains are approaching each other, each sounding a horn of frequency n = 1000 Hz , with velocities

$v_1 = 10ms^{-1}$ and $v_2 = 20m \cdot s^{-1}$,

respectively . In this case (i) calculate the frequency of the second whistle relative to a passenger of the first train and the frequency of the first whistle relative to a passenger of the second train (ii) What will be these two frequencies after the two trains cross each other ? (Velocity of sound $= 340m \cdot s^{-1}$)

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2. A bus is moving towards a huge wall with a velocity 5 .m s^{-1} . The driver sounds a horn of frequency 200 Hz. How many beats will a passenger of the bus hear? (Speed of sound in air = 342 m s^{-1})

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3. A motor car is moving towards a vertical wall . The driver observes that the frequency of the

sound of his horn changes from 440 Hz to 480 Hz when it gets reflected from the wall. If the velocity of sound is $330ms^{-1}$, what is the speed of the car ?

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4. Two sources , separated by a certain distance, are each producing a sound of frequency 1360 Hz . A listener from the middle of the two sources starts moviing towards a source . If the number of beats heards by the listener per

sound is 4, calculate his speed . Velocity of sound in air = 340 m s^{-1}

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5. A car is moving towards a high cliff . The car driver sounds a horn of frequency f . The reflected sound heard by the driver has frequency 2f . If V is the velocity of sound , what will be the velocity of the car ?

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6. A police caar moving at 22 m . s^{-1} chases a motor cycle . The man in the car sounds his horn at 170 Hz while both of them move towards a stationary siren of frequency 165 Hz . Calculate the speed of motor cycle if the motor cyclist does not listen any beat .

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7. A policeman in a car with a siren of frequency 8kHz is moving with uniform velocity 36km/h towards a tall building which reflects the sound

waves . The speed of sound in air is 320 m s^(-1)` . Calculate the frequency of the siren heard by the car drive

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Hots Numberical Problem

1. A band playing music at frequency f is moving towards a wall at a speed of v_b . A motorist is following the band with a speed of v_m . If v is

the velocity of sound , obtain an expression for the beat frequency heard by the motorist

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2. A siren placed at a railway platfrom is emitting a sound of 5kHz . A passenger sitting in a moviing train A records a frequency of 5.5 kHz while the train A approaches the siren . During his return journey in a different train B he records a frequency of 6.0 kHz while approaching the same siren . What is the ratio of the velocity of train B to that of train A ?

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3. train , standing at the outer signal of a railway station blows a whistle of frequency 400 Hz in still air . (i) What is the frequency of the whistle for a platfrom observer when the trian (a) approaches the platform with a speed of 10 m s^{-1} (b) recedes from the platfrom with a speed of 10 m s^{-1} ? (ii) What is the speed of sound in each case ? The speed of sound in still air can be taken as $340m \cdot s^{-1}$.

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4. A narrow sound pulse (for example, a short pip by a whistle) is sent across a medium (i) Does the pulse have a definite (a) frequency , (b) wevelength , (M69) speed of propagation? (ii) If the pulse rate is 1 after every 20s , (that is the whistle is blown for a split of second after every 20 s) , is the frequency of the note produced by the whistle equal to 1/20 or 0.05 Hz ?

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5. A stationary sound source S of frequency 334 Hz and a stationary observer O are placed near a reflecting surface moving away from the source with velocity $2m \cdot s^{-1}$ as shown in Fig. If the velocity of the sound waves in air is $V = 330ms^{-1}$ then calculate apparent frequency of the echo .

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6. two trains run at same speed $= 90kmh^{-1}$ along a straight track one after another with a seperation d = 2 km . At the istant when they are located

smymetrically relative to the point A at a distance b = 1 km from the track , both emit ' a brief signal of frequency n = 500 Hz . what will be the nature of sound at A ? Speed of sound V = 350 m s^{-1} .

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7. A whistle emitting a sound of frequency 440 Hz is tied to a string of 1.5 m length and ratated with an angular velocity of 20 rad . s^{-1} in the horizontal plane . Find the range of frequencies heard by an observer stationed at a large distance from the whistle . Speed of sound V = 350 m . s^(-1) `,

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8. A bat is flitting a cave, navigating via ultrasonic beeps . Assume that the sound emission frequency of the bat is 40 kHz . During one faxt swoop directly towerd a flat wall surface, the bat is moving at 0.03 times the speed of sound in air . What frequency does the bat hear reflected off the wall?

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Entrance Corner Assertion Reason Type

1. Statement I : Intersity of sound wave change when the listener moves towerds or away from the stationary source .

Statement II : The motion of listener causes the apparent change in wavelength.

A. Statement I is true , statement II is true , statement II is a correct explanation for statement I

B. Statement I is true , statement II is true , statement II is not a correct explanation

for statement I .

C. Statement I is true, statement II is false

D. Statement I is false , statement II is true .

Answer: c

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2. Statement I : When there is no relative velocity between source and observer, then observed frequency is the same as emitted

Statement II : Velocity of sound when there is

no relative velocity between source and observer is zero .

A. Statement I is true , statement II is true , statement II is a correct explanation for statement I

B. Statement I is true , statement II is true , statement II is not a correct explanation for statement I .

C. Statement I is true, statement II is false

D. Statement I is false , statement II is true .

Answer: c

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Multiple Correct Answers Type

1. State in which of the following cases, an observer will not see any Doppler effect ?

A. Both the source and abserver remain stationary but a wind blows .

B. The observer remains stationary but the source moves in the same directrion and with the same speed as the wind

C. The source remains stationary but the observer and the wind have the same speed away the sourch .

D. The source and the observer move directly against the wind but both with the same speed .

Answer: A::D

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2. Consider a source of sound S and an observer P. The sound source is of frequency n_0 . The frequency observed by P is found to be n_1 if P approaches S at speed v and S is stationary , n_2 if S approaches P at a speed v and P is stationary and n_3 if each of P and S has speed $\frac{v}{2}$ towerds one another. Which of the following conclusion are correct ?

A. $n_1 = n_2 = n_3$

B. $n_1 < n_2$

C. $n_3 > n_0$

D. n_3 lies between n_1 and n_2

Answer: B::C::D

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3. An observer A is moving directly towards a stationary sound source while another observer B is moviing away from the source with the

same velocity . Which of the following conclusions are correct ?

A. Average of frequencies recorded by A and B is equal to natural frequency of the source .

B. Wavelength of wave received by A is less than that of wave received by B .

C. Wavelength of waves received by two observers will be same .

D. Both the observers will observe the wave traelling with same speed .

Answer: A::C

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4. Two cars, each moving with speed u on the same horizontal straight road , are approaching each other

Wind blows along the road with velocity w . One of these cars blows a whistle of frequency f_1 .

An observer in the other car hears the frequency of the whistle to be f_2 . The speed of sound in still air is v. Correct statement (s) is / are :

A. If wind blows from observer to the source , $f_2 > f_1$

B. If the wind blows from the source to observer $f_2 > f_1$

C. If the wind blows from observer to the source $f_2 < f_1$

D. If the wind blows from the source to the observer $f_2 < f_1$

Answer: A::B

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Compreshension Type

1. A source S of acoustic wave of frequency $v_0 = 1700$ Hz and a recelver R are located at the same point . At the instant t = 0 , the source

starts from rest to move away from the receiver with a constant acceleration ω . The velocity of sound in air is v = 340 m s^{-1} .

If $\omega = 10m \cdot s^{-2}$, the apparcent frequency that will be recorded by the stationary receiver at t = 10 s will be

A. 1700 Hz

B. 1.35 Hz

C. 850 Hz

D. 1.27 Hz

Answer: b.c.d

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Matrix Match Type

1. A source S of acoustic wave of frequency $v_0 = 1700$ Hz and a recelver R are located at the same point . At the instant t = 0 , the source starts from rest to move away from the receiver with a constant acceleration ω . The velocity of sound in air is v = 340 m s^{-1} .

If $\omega = 0$ for $t > 10s$, the apparent frequency recorded by receiver at t = 15 s will be

A. 1700 Hz

B. 1310 Hx

C. 850 Hz

D. 1.23 kHz

Answer: b.c.d

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2. A source S of acoustic wave of frequency $v_0 = 1700$ Hz and a recelver R are located at the same point . At the instant t = 0 , the source

starts from rest to move away from the receiver with a constant acceleration ω . The velocity of sound in air is v = 340 m s^{-1} .

If $\omega = 10m \cdot s^{-2}$, the apparent frequency that will be recorded by the stationary receiver just at the Instant when the source is exactly 1 km away from the receiver will be .

A. 1700 Hz

B. 1310 Hz

C. 850 Hz

D. 1.26 kHz

Answer: d

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3. A small source of sound vibrating at frequenc 500 Hz is rotated in a circle of radius $(100/\pi)$ cm at a constant angular speed of 5.0 revolutions per second . The speed of sound in air is 330 m . s^{-1} . An observer (A) is situated at a great distance on a straight line perpendicular to the plane of the circle , through its centre . Another observer (B) is at

rest at a great distance from the centre of the circle byt nearly in the same plane . After something the source of sound comes to rest after reaching the centre of the circle . At that time , another observer (C) moves towards the source with a constant speed of 20 m . s^{-1} , along the radial line to the centre

The apparent frequency of the source heard by A will be

A. greater then 500 Hz

B. smaller then 500 Hz

C. always 500 Hz

D. greater for half the circle and smaller during the other half

Answer: c

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4. A small source of sound vibrating at frequenc 500 Hz is rotated in a circle of radius $(100/\pi)$ cm at a constant angular speed of 5.0 revolutions per second . The speed of sound in air is 330 m . s^{-1} . An observer (A) is situated at

a great distance on a straight line perpendicular to the plane of the circle , through its centre . Another observer (B) is at rest at a great distance from the centre of the circle byt nearly in the same plane . After something the source of sound comes to rest after reaching the centre of the circle . At that time , another observer (C) moves towards the source with a constant speed of 20 m . s^{-1} , along the radial line to the centre

The mininum and the maximum values of the apparent frequency heard by B will be

A. 455 Hz and 535 Hz

B. 485 Hz and 515 Hz

C. 485 Hz and 500 Hz

D. 500 Hz and 515 hz

Answer: b.c.d

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5. A small source of sound vibrating at frequenc 500 Hz is rotated in a circle of radius $(100/\pi)$ cm at a constant angular speed of 5.0

revolutions per second . The speed of sound in air is 330 m . s^{-1} . An observer (A) is situated at a great distance on a straight line perpendicular to the plane of the circle , through its centre . Another observer (B) is at rest at a great distance from the centre of the circle byt nearly in the same plane . After something the source of sound comes to rest after reaching the centre of the circle . At that time , another observer (C) moves towards the source with a constant speed of 20 m . s^{-1} , along the radial line to the centre

The change in the frequency of the source heard by C will be

A. 0.06

B. 0.03

C. 0.02

D. 0.09

Answer: a

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Integer Answer Type

1. The frequency of the sound of a car horn as perceived by an observer towards whom the car is moving differs from the fre-quency of the horn by 2.5% . Assuming that the velocity of sound in air is 320 m . s^{-1} , find the velocity (in m . s^{-1}) of the car .

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2. A man is watching two trains , one leaving and the other coming in with equal speed of 4m . s^{-1} . If they sound their whistles , each of

frequency 240 Hz , find the number of beats heard by the man (velocity of sound in air = 320 m s^{-1}).

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3. The difference between the apparent frequency of a source of sound as perceived by an observer during its spproach and recession is 2% of the natural frequency of the source . If the velocity of sound in air is 300 m . s^{-1} , find the velocity (in m . s^{-1}) of the source .

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4. A stationary source is emitting sound at a fixed frequency f_0 which is reflected by two cars approaching the source . The difference between the frequencies of sound reflected from the cars is 1.2% of f_0 . What is the differernce in the speeds of the cars (in km per hour) to nearest interger ? The cars are moving at constant speeds much smaller then the speed of sound which is 330 m s^{-1} .

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1. Show that, the change in frequency of sound during the motion of the source towards audience is more than that when audience moves towards source with same velocity.

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1. A car is moving with a speed of 72 km . h^{-1} towards a roadside source that emits sound at a frequency of 850 Hz. The car driver listens to the sound while approaching the source and again while moving away from the source after crossing it. If the velocity of sound is 340 m . s^{-1}, the difference of the two frequencies, the driver hears is

A. 50 Hz

B. 85 Hz

C. 100 Hz

D. 150 Hz

Answer: C

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2. A train is moving with a unifrom speed of 33 m/ s and an observer is approaching the train with the same speed. If the train blows a whistle of frequency 1000 Hz and the velocity of sound is 333 m/s, then the apparent frequency of the sound that the observer hear is

A. 1220 Hz

B. 1099 Hz

C. 1110 Hz

D. 1200 Hz

Answer: A

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Examination Archive With Solutions Jee Main

1. A train is moving on a straight track with speed $20m \cdot s^{-1}$, It is blowing its whistle at the frequency of 1000 Hz. The percentage change in the frequency heard by a person standing near the track as the train passes him is (speed of sound = 320 m $\cdot s^{-1}$) close to

A. $6\ \%$

B. $12\ \%$

C. $18\ \%$

D. $24\ \%$

Answer: B

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2. An observer is moving with half the speed of light towards a stationary microwave source emitting waves at frequency 10 GHz. What is the frequency of the microwave measured by the observer? (speed of light $= 3 \times 10^8 m \cdot s^{-1}$)

A. 10.1 GHz

B. 12.1 GHz

C. 17.3 GHz

D. 15.3 GHz

Answer: C

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1. A speeding motorcyclist sees traffic jam ahead of him. He slows down to 36 km $\cdot H^{-1}$. He finds that traffic has eased and a car moving

ahead of him at $18km \cdot h^{-1}$ is honking at a frequency of 1392 Hz. If the speed of sound is 343 $m \cdot s^{-1}$, the frequency of the honk as heard by him will be

A. 1332 Hz

B. 1372 Hz

C. 1412 Hz

D. 1454 Hz

Answer: C

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Examination Archive With Solutions Neet

1. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of $15m \cdot s^{-1}$. Then the frequency of sound that the observer hears in the echo reflected from the cliff is (take velocity of sound in air = 330 m $\cdot s^{-1}$)

A. 800 Hz

B. 838 Hz

C. 885 Hz

D. 765 Hz

Answer: B

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2. Due to Doppler effect, the shift in wavelength observed is `0.1 Å, for a star producing a wavelength 6000 Å. The velocity of recession of the star will be

A. 20 km $\cdot s^{-1}$

B. 2.5 km $\cdot s^{-1}$

C. 10 km $\cdot s^{-1}$

D. 5 km $\cdot s^{-1}$

Answer: D

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Cbse Scanner

1. A train standing at the outer singal of a railway station blows a whistle of frequency 400 Hz in still air. (i) What is frequency of the whistle

for a platform observer when the train (a) approaches the platform with a speed of 10 m/s, (b) recedes from the platform with a speed of 10 m/s. (ii) What is the speed of sound in each case if the speed of sound in still air is 340 m/s.

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2. Once Amit was going to his house. He was listening music on mobile with earphone while crossing the railway line and he did not hear the sound of approaching train though the

train was blowing horn. A person nearby ran towards him and push away just as the train reached there. amit realised his mistake and thanked the person.

(a) Describe the value possessed by the person.

(b) Name the phenomenon of change in frequency of sound when there is relative motion between the observer and source of sound.

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