Team #: C66 - Score: (70.00 out of 203.00) - Sounds of Music - Sounds of Music (Note: Some scores might have been adjusted by Grader)

★ full credit, ✯ partial credit, ○ skipped, ✖ Incorrect answer (no credit)

This test is fairly long, so keep track of your time! If you do not know how to answer a question, save some time by moving on then come back to that question later.

We will NOT be testing a device.

Please show all your work the best you can. For subscripts and superscripts, denote with "_" and "^" respectively. Example: if you want to write 10_7^8 write 10_7^8.

If you ever have any questions or concerns during the test, please let me know via the chat available to you.

[missing units or incorrect sigfigs resulted in a 10% penalty]

Good luck!

1. (2.00 pts) What are the 3 main elements of subtractive synthesis?

- A) Filter, echo, keyboard
- (●) B) Oscillator, filter, envelope
- C) Oscillator, amplifier, MIDI output
- D) Waveform generator, graphic equalizer, speaker

☑ Correct answer: B Awarded points: 2.00

2. (2.00 pts) What does an envelope generator do?

- A) Makes a kind of “wawa” sound
- (●) B) Shapes the attack, decay, sustain, and release of a note
- C) Mails a letter to your favorite aunt
- D) Gives the instrument a more transparent, ethereal sound

☑ Correct answer: B Awarded points: 2.00

3. (2.00 pts) What is the standard compound notation for a Aaug/Bm polychord?

- A) BmM7
- B) Gmaj7
- (●) C) Bm9#11
- D) B7add9
- E) B11
- F) Bm7b9#11

☑ Correct answer: C Awarded points: 2.00

4. (2.00 pts) What scale would be associated with a E7 chord?

- A) A Major
- B) A minor
- (●) C) E Major

D) E Mixolydian

E) E locrian

✖ Correct answer: D Awarded points: 0.00

5. (2.00 pts) What chord does a G7 resolve to?

A) Am

B) Cm

C) CM

D) All of the above

✖ Correct answer: D Awarded points: 0.00

6. (2.00 pts) Which of the following is a plagal cadence (when used to end a phrase)?

A) FM-Dm

B) Gm-Em

C) GbM-DbM

D) GM-CM

☑ Correct answer: C Awarded points: 2.00

7. (2.00 pts)
A violin plays a note, and you use an oscilloscope to measure the sound pressure over time. If you want to find out which overtones are the most prominent in the violin's timbre, wha method would you use?

A) Find each peak, and figure out how often it shows up

B) Use a fourier transform to see where the overtones are, and which have the highest peaks

C) Use the Bernoulli equation

D) Ask your friend Richard Feynman

E) Give up

☑ Correct answer: B Awarded points: 2.00

8. (2.00 pts) You have perfect pitch. What might you notice if you travel back in time to the 1600s?

A) The instruments are all tuned to A4 = 415, instead of A = 440

B) The size of a semitone is not always the same, and some keys are more consonant or dissonant because of this

C) Every town has a slightly different tuning standard

D) All of the above

E) Just B and C

F) None of the above

☑ Correct answer: E Awarded points: 2.00

9. (2.00 pts) Which of these instruments is a B flat instrument?

A) Cello

B) Guitar

- (●) C) Tuba
- ( ) D) Piano
- ( ) E) None of the above

✖ Correct answer: E Awarded points: 0.00

10. (2.00 pts) Human perception of loudness _____.

- ( ) A) Is linear (a sound with twice as much energy is twice as loud)
- ( ) B) Is logarithmic
- (●) C) Is subjective. Perception of loudness is different for different frequencies and intensities.
- ( ) D) Is closely modeled by the decibel scale

☑ Correct answer: C Awarded points: 2.00

11. (2.00 pts) Through which of the following mediums will sound travel the fastest?

- ( ) A) Air
- (●) B) Steel
- ( ) C) Water
- ( ) D) Outer space

☑ Correct answer: B Awarded points: 2.00

12. (2.00 pts) If the speed of a fluid increases, then the pressure of the fluid will _____.

- ( ) A) Increase
- (●) B) Decrease
- ( ) C) Either increase or decrease, depending on the properties of the fluid
- ( ) D) Follow the Newton-Euler pressure equation

☑ Correct answer: B Awarded points: 2.00

13. (2.00 pts) A fluid is flowing through a pipe. If the cross sectional area of the pipe decreases, then the velocity of the fluid will _____.

- ( ) A) Decrease
- (●) B) Increase
- ( ) C) Stay the same
- ( ) D) Follow the Newton-Euler pressure equation

☑ Correct answer: B Awarded points: 2.00

14. (2.00 pts)
Air is moving through a pipe horizontal to the ground. At one point, the diameter of the pipe decreases so that the air is flowing at twice its previous velocity. How does this affect the air pressure?

- ( ) A) The pressure doubles
- ( ) B) The pressure halves
- (●) C) Pressure decreases by $3/2\ \rho\ (v^2_1)$
- ( ) D) Pressure increases by $4/3\rho u(v_2/v_1)$

Correct answer: C Awarded points: 2.00

15. (2.00 pts) If the pipe goes up a hill so that its height is doubled, what will happen to the pressure?

- A) The pressure halves
- B) The pressure doubles
- C) The pressure decreases by $\rho g h_1$
- D) Pressure increases by $4/3\rho u(v_2/v_1)$

Correct answer: C Awarded points: 2.00

16. (2.00 pts) Which system of tuning would sound the best in the key of Ab major?

- A) 12 tone equal temperament
- B) Just intonation centered around D
- C) Pythagorean tuning centered around G
- D) 7-TET

✖ Correct answer: A Awarded points: 0.00

17. (2.00 pts) Why do orchestras tune to A4 = 440 Hz?

- A) It is the best sounding note
- B) The International Organization for Standardization arbitrarily chose 440Hz for A4
- C) It is easy to play on every instrument
- D)

Clara Schumann refused to tune to anything but 440Hz since it was the pitch her husband heard ringing in his ears in his last 8 years. This practice was taken up by Johannes Brahms, who taught it to his students, making 440Hz a standard.

Correct answer: B Awarded points: 2.00

18. (2.00 pts) What is a bow wake?

- A) A type of bow stroke commonly used for a goje
- B) V-shaped disturbance created when the wave source moves faster than the wave propagation speed
- C) Actual change in frequency due to relative motion of source and observer
- D) The wave that forms at the bow of a ship when it moves through the water

✖ Correct answer: B Awarded points: 0.00

19. (2.00 pts) The human ear is sensitive to frequencies between

- A) 10 Hz to 10 kHz
- B) 30 Hz to 300 kHz
- C) 20 Hz to 200 kHz
- D) 20 Hz to 20 kHz

Correct answer: D Awarded points: 2.00

20. (2.00 pts) When a sound source moves faster than the speed of sound, what type of wave is produced?

- ○ A) Transverse wave
- ◉ B) Longitudinal wave
- ○ C) Square wave
- ○ D) Sonic wave

✖ Correct answer: D Awarded points: 0.00

21. (2.00 pts) Define “mosso”

- ○ A) Quiet
- ○ B) Loud
- ○ C) Slow
- ◉ D) Fast
- ○ E) A and C
- ○ F) B and D

☑ Correct answer: D Awarded points: 2.00

22. (2.00 pts) Out of the following materials, which has the fastest speed of sound?

- ◉ A) Aluminum
- ○ B) Copper
- ○ C) Iron
- ○ D) Titanium
- ○ E) Brick

✖ Correct answer: B Awarded points: 0.00

23. (7.00 pts) Classify the following instruments using the Hornbostel-Sachs system:

1. Zither
2. Veena
3. Theremin
4. Celesta
5. Trombone
6. Kazoo
7. Spoons

Your Answer:

1. Zither = chordophone
2. Veena = chordophone
3. Theremin = electrophone
4. Celesta = idiophone
5. Trombone = aerophone
6. Kazoo = membranophone
7. Spoons = idiophone

Expected Answer:

1. Chordophone 2. Chordophone 3. Electrophone 4. Idiophone 5. Aerophone 6. Membranophone 7. Idiophone

☑ Awarded points: 7.00

24. (6.00 pts) Write the notes of the following scales:

1. G# major
2. D natural minor
3. F melodic minor
4. E mixolydian
5. Bb locrian
6. Db minor pentatonic

Your Answer:
1.G#,A#,B,C#,D#,F

2.D,Eb,F,G,A,Bb,C

3.F,G,A,B,C,D,E,F

4.E,F#,G#,A,B,C#,D

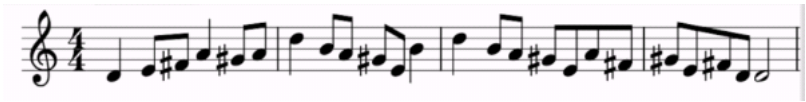
5.A#,B,C#,D#,E,F#,G#

6.Db,Eb,E,F#,G#,A,B

Expected Answer:
1. G#, A#, B#, C#, D#, E#, F##, G# 2. D, E, F, G, A, Bb, C, D 3. F, G, Ab, Bb, C, D, E, F 4. E, F#, G#, A, B, C#, D, E 5. Bb, Cb, Db, Eb, Fb, Gb, Ab, Bb 6. Db, Fb, Gb, Ab, Cb, Db

◑ Awarded points: 1.00

25. (2.00 pts) What is the mode of the following excerpt?



Aeolian

✖ Correct answer: [D Lydian] Awarded points: 0.00

26. (4.00 pts) Write the inversions of these intervals:

1. Minor 6th
2. Double augmented 4th
3. Minor ninth
4. Perfect 5th

Your Answer:
major 6th

double diminished 4th

major ninth

diminished 6th

Expected Answer:
1. Major 3rd 2. Double diminished 5th 3. Major 7th 4. Perfect 4th

✖ Awarded points: 0.00

27. (1.00 pts) Name 2 intervals of equal size to the augmented 4th

Your Answer:
Diminshed fifth, double augmented third

Expected Answer:
Diminished 5th and tritone

Awarded points: 1.00

28. (2.00 pts) Briefly describe the inverse square law

Your Answer:
The inverse square law is a law in physics commonly used to describe relationships where force or energy propagates throughout a specified 2-dimensional interval (line vector in space). In the case of acoustics, this is used to describe the attenuation (transmission loss) of sound as it propagates within a medium, where there is about 6 dB of intensity lost every time that the distance propagated by the sound wave is doubled.

Expected Answer:
A law that describes the dissipation of sound in a free field. Based on the formula for the surface area of a sphere, it measures sound decay as a function of distance from source. The law states that sound intensity is inversely proportional to the radius squared. [please don't directly copy your answer from Wikipedia. It makes it clear that you don't know how to answer the question, and it is plagiarism. You WILL be DISQUALIFIED if you do this at regionals.]

Awarded points: 1.50

29. (4.00 pts)
Describe the history of western tuning and how we developed our current system of equal temperament. Answers will be graded on quality, completeness, and accuracy

Your Answer:
We use 12-TET

Expected Answer:
Essentially, we started out using just intonation, because it is the most purely in tune, but then transitioned to various systems that compromised perfect tuning for practicality. Eventually we developed equal temperament, a system based on the cent, in which all whole tones are the same size interval. Some teams may go more in depth than this. Points will be awarded based on accuracy and depth.

Awarded points: 0.00

30. (3.00 pts) Describe the difference between the decibel, phon, and sone scales

Your Answer:
The decibel scale is used to model sound intensity in a logarithmic scale, and is an objective quantity based on sound intensity, which itself is a function of sound source power and distance from the sound source. The phon scale is modelled off the Fletcher-Munson curve (equal loudness contour) of sound loudness, and is a psychoacoustic scale that describes the subjective "perceived" loudness of a certain-intensity sound depending on its frequency. The sone scale is another description of sound loudness, which this time describes sound pressure and relates to the phon scale and dBA scales.

Expected Answer:
The decibel scale is a logarithmic scale that measures the intensity level of sound. The phon is a scale that equates perceived loudness to decibel level at 1000Hz (so if a sound is 70 phons, that means it is perceived to be as loud as 70dB at 1000Hz). The sone is a subjective scale that converts phons into a linear scale. 40 phons equals 1 sone, 50 2 sones, 60 4 sones, and so on.

Awarded points: 3.00

31. (3.00 pts) An orchestra plays an A440 to tune. A decibel meter measures the sound to be 65 decibels at the source. Estimate the loudness of this sound in sones

Your Answer:
Looking at an equal loudness contour we have in our notes that describes both the phon scale in terms of dB and sones, we can see that with a 440Hz frequency and 65 dB of intensity, the estimated loudness in sones is around 25 sones.

Expected Answer:
About 4 sones

Awarded points: 0.00

32. (4.00 pts) A violin player reads a C8 in his music. From 5 meters away, a decibel meter measures an intensity level of 80 decibels.

1. Estimate the loudness in sones
2. At what dynamic level is the violin player playing

Your Answer:
Expected Answer:
1. About 128 sones 2. Loud fortississimo (fff)

Awarded points: 0.00

33. (8.00 pts) What is the fundamental frequency of a tube open on both ends that is 30.00cm long at each of the following temperatures (in air)

1. 0℃
2. 20℃
3. -50℃
4. 500℃

Your Answer:
2. 20 degrees celsius

Expected Answer:
1. 551.7Hz 2. 571.5Hz 3. 498.6Hz 4. 928.3Hz

Awarded points: 0.00

34. (4.00 pts) You are standing 20.0 meters away from a 200.0 watt speaker. What is the intensity level, in decibels, that you hear?

Your Answer:
Expected Answer:
The intensity level is 106dB

Awarded points: 0.00

35. (6.00 pts) A sound with a sound pressure level (SPL) of 90.0dB is recorded at a distance of 12.0m from a point source

1. What is the SPL at 6.00m?
2. What is the SPL at 50.0m?

Your Answer:
10^db/10 * 10^-12 = .001 W/m^2 intensity

P/(4pi*r^2) = intensity, so at 6 m, intensity = ,004 w/m^2 and at 50 m it's 5.76*10^-5 w/m^2. Converting this to logarithmic scale via 10*log(I/10^-12), we get the SPL levels below:

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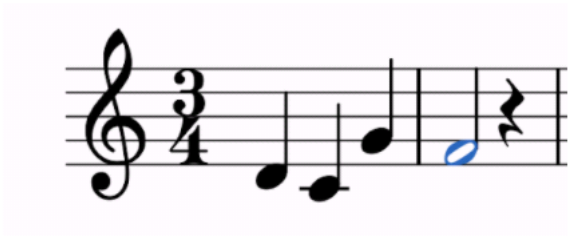
1. 96.0 dB

2. 77.6 dB

Expected Answer:
1. SPL = 96.0dB 2. SPL = 77.6dB

Awarded points: 6.00

36. (9.00 pts)
Two singers record themselves singing Happy birthday in the key of F (shown here without the pickup measure). One has perfect pitch, and sings in Equal temperament with perfect intonation. The other does not have perfect pitch, and instead sings naturally in just intonation (relative to F)



1. Calculate the number of cents between each note [should have said singer, sorry] in the first measure of happy birthday
2. Calculate the beat frequency heard for each of the notes in the first measure

Your Answer:
Expected Answer:
1. First note: 15.6 cents; Second note: 1.95 cents; Third note: 3.91 cents 2. First note: 2.64Hz; Second note: 0.295Hz; Third note: 0.887Hz

☐ Awarded points: 0.00

37. (2.00 pts) Calculate the number of cents between a 440Hz tone and a 600Hz tone

Your Answer:
There are approximately 536.95 cents of difference between 440 hz and 600 hz.

Expected Answer:
537 cents

☑ Awarded points: 2.00

38. (2.00 pts) Calculate the combination tones for a 1200Hz tone and a 660Hz tone

Your Answer:
The Tartini tones sounded when a 1200 Hz and a 660 Hz tone are sounded at the same time are:

for a sum tone = f2 + f1 = 1860 Hz

for a difference tone = f2 - f1 = 540 Hz

Expected Answer:
540Hz and 1860Hz

☑ Awarded points: 2.00

39. (4.00 pts)
You are standing in a 6.0 x 8.0 x 3.0 meter room, with walls and floors all made of a material with an absorption coefficient of 0.40. You clap, and it makes an 80dB sound. Calculate how long will take for the sound to decay to 20dB

Your Answer:
Expected Answer:
0.32 seconds

☐ Awarded points: 0.00

40. (7.00 pts)
An ambulance is traveling toward you at 10.0 meters per second. The siren cycles between Bb5, which is 932.328Hz, and E5, which is 659.255Hz, with a full cycle being 3 seconds. When you first notice the siren, it is just starting a cycle on the Bb4. Assume the speed of sound is 343m/s

1. Determine the pitch you will hear after 5 seconds if you are standing still
2. After 7 seconds, you run towards the ambulance to get a closer look. You now hear a 976.5Hz tone. At what speed are you running?

Your Answer:
Expected Answer:
1. 679Hz 2. 5.78m/s

Awarded points: 0.00

41. (5.00 pts) A fighter jet flies at a speed of 572 m/s in air at 20℃

1. What is the angle of the shockwave?
2. If the jet is 12 meters long and flying at an altitude of 7000 meters, what is the time between the two sonic booms heard by an observer on the ground?
3. A second jet comes in at a speed of Mach 5.00. What is the angle of this jet's shockwave?

Your Answer:
Expected Answer:
1. 36.8 degrees 2. 0.021 seconds 3. 11.5 degrees

Awarded points: 0.00

42. (7.00 pts)
Water is flowing through a pipe at 10.0 meters per second with a pressure of 100,000.0 Pascals. The diameter of the pipe is 4.00 centimeters, and it is 6 meters off the ground. The density of water is 1000kg/m^3

1. The diameter increases to 10.0 centimeters. Find the new pressure
2. The diameter goes back to 4.00 centimeters, but now the pipe goes down to a third of its previous height, find the new pressure

Your Answer:
Expected Answer:
1. New pressure: 148,720 Pascals 2. New pressure: 139,200 Pascals

Awarded points: 0.00

43. (6.00 pts) Explain how sound waves travel from your ears to the brain. You must use proper anatomical language when stating what part of the ear is being used

Your Answer:
Sound waves first enter your ear through the outer ear and travel through your external auditory canal. They resonate your tympanic membrane through forced vibration, which propagates the three ossicles (malleus, incus, and stapes) in your middle ear which transfer the sound energy into your cochlea via the round window. Fluid in the cochlea then vibrate tiny hair cells along the basilar membrane of your cochlea, which create neural impulses that travel through cranial nerves into your brain.

Expected Answer:
Sound waves are collected in your pinna. The waves travel down the auditory canal until they reach the tympanic membrane. The tympanic membrane connects with the malleus, which is connected to the incus, which connects to the stapes. The vibration of the tympanic membrane is transmitted by these three bones to the oval window which is attached to the cochlea. As the oval window vibrates, the fluid in the cochlea moves. The floor of the cochlea is the basilar membrane. It is lined with hair cells connected to the organ of Corti, which are neurons activated by movement of the hair cells. When the fluid moves, the hair cells move and transduction occurs. The organ of Corti fires, and these impulses are transmitted to the brain via the auditory nerve.

Awarded points: 6.00

44. (4.00 pts)
What is the length of a tube that has a fundamental frequency of 143 Hz and a first overtone of 456 Hz if the speed of sound is 343 m/s? Assume the tube is open at both ends

Your Answer:
F = v/(2L) for an open pipe, so L = V/(2F) = 343/(2*143) = 1.20 meters

Expected Answer:
L= 0.548 m

Awarded points: 2.00

45. (3.00 pts)

Bats use sound waves to catch insects. Bats can detect frequencies up to 100 kHz. If the sound waves travel through air at a speed of v = 343m/s, what is the wavelength of the sound waves?

Your Answer:
F = velocity/wavelength, so where 100 kHz = 343/wavelength, wavelength = 3.43 millimeters
Expected Answer:
0.00343m

◑ Awarded points: 0.50

46. (3.00 pts) Dolphins make sounds in air and water. What is the ratio of the wavelength of a sound in air to its wavelength in seawater? Assume air temperature is 63.0°C.

Your Answer:
Expected Answer:
367.21 m/s

☐ Awarded points: 0.00

47. (3.00 pts) What is the difference between place theory and frequency theory?

Your Answer:
Place theory states that the perception of different frequencies in the human mind arises from the place of vibration in the ear's basilar membrane, where different regions are attunec to differing frequencies from 20 Hz to 20 kHz and that the brain can detect the input of neural impulses from different regions; while frequency theory states that different-frequency sound waves vibrate the hair cells on the basilar membrane at different rates, so the rate of neural impulse in the brain is what leads to the perception of sound.

Expected Answer:
Place theory suggests that we sense pitch because the hair cells move in different places in the cochlea. Frequency theory suggests we sense pitch because the hair cells fire at different rates (frequencies) in the cochlea.

☑ Awarded points: 3.00

48. (5.00 pts)
Students in a physics lab are asked to find the length of an air column in a tube closed at one end that has a fundamental frequency of 135 Hz. They hold the tube vertically and fill it with water to the top, then lower the water while a 135-Hz tuning fork is rung and listen for the first resonance.

1. What is the air temperature if the resonance occurs for a length of 0.794 m?
2. At what length will they observe the second resonance?

Your Answer:
Expected Answer:
1. T = 185.01℃ 2. L3 = 2.38 m

☐ Awarded points: 0.00

49. (2.00 pts) What is the difference between sound and hearing?

Your Answer:
Sound is defined as the acoustic/mechanical vibrations that propagate energy across a particle medium, while hearing is the psychological perception of sound.

Expected Answer:
Sound is a disturbance of matter that is transmitted from its source outward. Hearing is the perception of sound

☑ Awarded points: 2.00

50. (3.00 pts) When sound passes from one medium to another where its propagation speed is different, does its frequency or wavelength change?

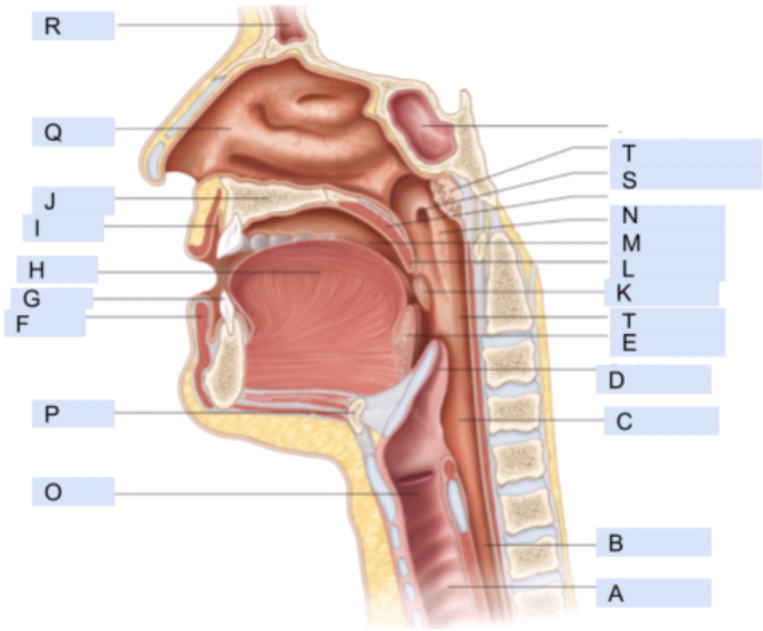
Your Answer:

Its wavelength changes; f = v/wavelength, and when sound travels between two media, it is refracted -- however, its frequency must stay the same, so its wavelength will change by the opposite rate that its velocity changes.

Expected Answer:
The frequency does not change as the sound wave moves from one medium to another. Since the speed changes and the frequency does not, the wavelength must change.

Awarded points: 3.00

Use the following diagram for Questions 51-53



51. (3.00 pts) Where is the uvula located in the diagram above? How does removing the uvula affect a person's voice?

Your Answer:
Expected Answer:
L- increase of nasal resonance & alteration of voice timbre due to enlargement of vocal tract

Awarded points: 0.00

52. (2.00 pts) What is the difference between the palatine tonsil and pharyngeal tonsil?

Your Answer:
Expected Answer:
The pharyngeal tonsils are located near the opening of the nasal cavity into the pharynx. The palatine tonsils are the ones that are located near the opening of the oral cavity into the pharynx.

Awarded points: 0.00

53. (3.00 pts) What does O represent in the diagram above and explain its role in sound production

Your Answer:
it resonates the sound wave to help it last longer

Expected Answer:
Larynx- highly specialized structure atop the windpipe responsible for sound production- During sound production, the vocal cords close together and vibrate as air expelled from the lungs passes between them.

✖ Awarded points: 0.00

54. (3.00 pts) What 3 mechanisms are involved in producing sound?

Your Answer:
energy input

Expected Answer:
Sound source due to air displaced by vocal fold vibration Sound source due to force of the vocal cords on the airflow Sound source due to turbulence at the glottal exit

✖ Awarded points: 0.00

55. (4.00 pts)
The music box was one of the many toys from the 18th to 19th century. However, the design for it remains to be very sophisticated. Describe what it does in order to emit sound.

Your Answer:
Expected Answer:
Key points: Complex series of gears which rotate (1 pt) Rotating metal cylinder with protruding pins (1 pt) Pins pluck individual prongs of a steel comb (can be referred to as teeth) (2 pt)

O Awarded points: 0.00

56. (8.00 pts)
A string on the violin has a length of 36.75 cm and a mass of 0.500 grams. The tension in the string 723.23 N. The temperature in the room is 32.0°C. The string is plucked and oscillates in the n = 7 mode.

1. What is the speed of the wave on the string? Round to the nearest hundredths.
2. What is the wavelength of the sounding wave produced? Round to the nearest thousandths.
3. What is the frequency of the oscillating string?
4. What is the frequency of the sound produced?

Your Answer:
Expected Answer:
1. 729.09 m/s 2. 0.103 m 3. 7088.39 or 7.088 x 10^-3 4. 7088.39 or 7.088 x 10^-3 (frequency of the oscillating string is the frequency of the sound produced)

O Awarded points: 0.00

57. (6.00 pts)
Dina runs after Abby. Dina carries a tuning fork ringing at 2310 Hz, and Abby carries a tuning fork ringing at 1094 Hz. Dina is running at a speed of v_d = 4.32 m/s and Abby is running at v_a = 8.94 m/s. What is the beat frequency heard by each student? The speed of sound is v = 343.0 m/s.

Your Answer:
Expected Answer:
Dina: 4.36 Hz Abby: 31.51 Hz

O Awarded points: 0.00

58. (3.00 pts)
There are 2 woodwind instruments of the same length in front of you. One instrument is open at both ends while the other has one closed end. Which produces the higher frequency? Explain.

Your Answer:
REEEEEEEEEeeeeee

Expected Answer:
Assuming the speed of sound is the same in both tubes, the fundamental wavelength of a tube open at each end is 2L, where the wavelength of a tube open at one end and closed a

one end is 4L. The tube open at both ends has the higher fundamental frequency

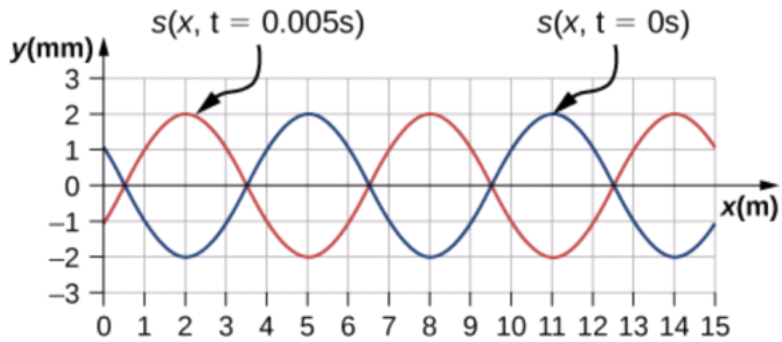
✖ Awarded points: 0.00

59. (4.00 pts)
Two sound speakers are separated by a distance d, each sounding a frequency f. An observer stands at one speaker and walks in a straight line a distance x, perpendicular to the th two speakers, until he comes to the first maximum intensity of sound. The speed of sound is v. How far is he from the speaker? (Hint: your answer may not be numerical)

Your Answer:
Expected Answer:
x = d^2-(v/f)^2 / 2(v/f)

☐ Awarded points: 0.00

60. (4.00 pts)
Consider the graph shown below of a compression wave. Shown are snapshots of the wave function for t = 0.000s and t = 0.005s. What are the wavelength, maximum displacement velocity, and period of the compression wave?



Your Answer:
Expected Answer:
Wavelength: 6.00m Max. displacement: 2.00 mm Velocity: 600 m/s Period: 0.01 s

☐ Awarded points: 0.00

Congratulations! You have completed this Sounds of Music exam. Thank you for attending the Fairfax HS SO Invitational!