

**C - Sounds of Music - December 19 SO Practice - 12-19-2020**

Welcome, Students!

This test is a precursor to the official Science Olympiad Sounds of Music test. It consists of music theory, physics of sound, and general instrument sound production concepts.

If there are any questions that you cannot answer, fill out an answer anyways.

Please complete the written test before recording the device test. Be sure to upload the device test video within 30 minutes after the end of your scheduled test block.

Best of luck!

**1. (1.00 pts)** The codeword for the device testing video is:

RHAPSODY.

**Expected Answer:**

**2. (1.00 pts)** The flute and piccolo are both examples of a non-free aerophone.

☐ True ☒ False

**3. (1.00 pts)** The Doppler Effect can be observed in which of the following examples?

- ☐ A) Two instruments playing out of tune and creating waves in the sound
- ☒ B) An ambulance's siren decreasing in pitch as the ambulance drives further away from the listener
- ☐ C) Cold weather causes an instrument's pitch to lower
- ☐ D) A drumstick striking a drumhead and producing sound

**4. (1.00 pts)** Brass instrumentalists create higher or lower pitches primarily by blowing a greater or lesser volume of air.

☐ True ☒ False

**5. (1.00 pts)** The term A=440 refers to all of the following situations EXCEPT:

- ☐ A) Orchestras tune to A-natural because it is a common open-string note among all string instruments.
- ☒ B) The pitch A4 on a piano keyboard is observed at 440 hz. A3, the pitch one octave below A4, is observed at 330 hz.
- ☐ C) The pitch A4 on a piano keyboard is observed at 440 hz. A3, the pitch one octave below A4, is observed at 220 hz.
- ☐ D) Orchestras tune to A-natural because the oboe can comfortably play A-440 as a reference pitch.

**6. (1.00 pts)** The fundamental frequency is not always the lowest pitch that a given instrument can play.

☒ True ☐ False

**7. (1.00 pts)** Which of the following musical intervals can be designated "perfect?"

(Mark **ALL** correct answers)

- ☐ A) 2nd
- ☒ B) 4th
- ☐ C) 6th
- ☐ D) 3rd
- ☐ E) 7th
- ☒ F) 5th

**8. (1.00 pts)** When two or more instruments play in tune, their resulting volume is louder. This is due to:

- ☐ A) Compounding interference
- ☒ B) Constructive interference
- ☐ C) Congruent interference
- ☐ D) Complex interference

**9. (1.00 pts)** A wave that propagates through a physical material has a wavelength, amplitude and speed.

- ☐ True
- ☒ False

**10. (1.00 pts)** Reed instruments, such as the clarinet or saxophone, produce sound through the following process:

- ☐ A) Air passing by the reed makes it vibrate against the player's lips.
- ☐ B) When the player blows air, the reed opens up and allows the air into the instrument.
- ☒ C) Air passing by the reed makes it vibrate the air column in the instrument.
- ☐ D) The player hums, and the reed helps produce the characteristic sound for that given instrument.

**11. (1.00 pts)** The time signature Common Time refers to:

- ☐ A) 2/2 time
- ☐ B) 3/4 time
- ☒ C) 4/4 time
- ☐ D) 4/2 time

**12. (1.00 pts)** The sound produced by a drum comes from the resonance of the drumstick itself.

- ☐ True
- ☒ False

**13. (3.00 pts)** Select all of the following terms that refer to tempo:

(Mark **ALL** correct answers)

- ☒ A) Larghissimo
- ☒ B) Langsam
- ☐ C) Pesto

- ☐ D) Leggiero
- ☒ E) Stringendo
- ☐ F) Risotto

**14. (13.00 pts)**

**AURAL EXAM PORTION:**

Complete the following questions using the attached audio file, found via the listed Google Drive link. In the space below, please list "Number \_\_ example \_\_ ANSWER" for each question.

[https://drive.google.com/file/d/1ILjv2Wnl9gK36uf0lrLNBpvy9Dh0Gz\\_n/view?usp=sharing](https://drive.google.com/file/d/1ILjv2Wnl9gK36uf0lrLNBpvy9Dh0Gz_n/view?usp=sharing) ([https://drive.google.com/file/d/1ILjv2Wnl9gK36uf0lrLNBpvy9Dh0Gz\\_n/view?usp=sharing](https://drive.google.com/file/d/1ILjv2Wnl9gK36uf0lrLNBpvy9Dh0Gz_n/view?usp=sharing))

Number 1 example 1: major or minor?

Number 1 example 2: major or minor?

Number 2: mordent or turn?

Number 3: major or minor?

Number 4 example 1: major 2nd or perfect 5th?

Number 4 example 2: major 3rd or major 7th?

Number 5 example 1: major or harmonic minor?

Number 5 example 2: major or harmonic minor?

Number 6 example 1: 2/4 or 3/4 time?

Number 6 example 2: 3/4 or 4/4 time?

Number 7: tranquillo or animato?

Number 8: major or minor?

Number 9: authentic or half cadence?

**Expected Answer:** Number 1 example 1: major or minor? ANSWER - MAJOR Number 1 example 2: major or minor? ANSWER - MAJOR Number 2: mordent or turn? ANSWER - MORDENT Number 3: major or minor? ANSWER - MAJOR Number 4 example 1: major 2nd or perfect 5th? ANSWER - PERFECT 5TH Number 4 example 2: major 3rd or major 7th? ANSWER - MAJOR 3RD Number 5 example 1: major or harmonic minor? ANSWER - MAJOR Number 5 example 2: major or harmonic minor? ANSWER - HARMONIC MINOR Number 6 example 1: 2/4 or 3/4 time? ANSWER - 2/4 TIME Number 6 example 2: 3/4 or 4/4 time? ANSWER - 3/4 TIME Number 7: tranquillo or animato? ANSWER - ANIMATO Number 8: major or minor? ANSWER - MINOR Number 9: authentic or half cadence? ANSWER - AUTHENTIC

**15. (4.00 pts)** Sonar is a system most commonly used by boats, ships and submarines.

1. What is its purpose?
2. What scientific processes allow sonar to fulfill its purpose?

**Expected Answer:** 1. Sonar is a system used to detect objects underwater and/or map the topography of the ocean floor. 2. Sonar operates when a boat/ship/submarine emits sound waves. As sound waves travel at a certain speed through water, the delay in the sound waves' return to the vessel is used to compute the vessel's distance from the object(s) reflecting the sound waves.

**16. (2.00 pts)** Select all of the following answers that are true:

(Mark **ALL** correct answers)

- ☐ A) 20 Hz is the highest frequency that babies can hear.
- ☐ B) C4 sounds at 400 Hz.
- ☒ C) The piano is typically categorized as a percussion instrument and not a string instrument.
- ☒ D) The frequency of a given pitch is double that of the octave below.
- ☐ E) An object at rest will stay at rest unless acted upon by an equal and opposite reaction.
- ☐ F) The amplitude of a given pitch is half that of the octave below.

**17. (1.00 pts)** Dissonance occurs when two pitches sound at the same time with different amplitudes.

- ☐ True ☒ False

**18. (1.00 pts)** Constructive interference is observable in which aspect of a musical performance?

- ☐ A) Volume
- ☐ B) Tone quality
- ☒ C) Intonation
- ☐ D) Temperament
- ☐ E) Tempo

Congratulations for finishing this test! Hopefully you are better prepared for the subject areas and questions that will appear on the official event test. Happy studying, and good luck!