RS-8A 9/13/2010

Engineering is Elementary

My initials:

FIRST	MIDDLE	LAST
Ⓐ	Ⓐ	Ⓐ
Ⓑ	Ⓑ	Ⓑ
Ⓒ	Ⓒ	Ⓒ
Ⓓ	Ⓓ	Ⓓ
Ⓔ	Ⓔ	Ⓔ
Ⓕ	Ⓕ	Ⓕ
Ⓖ	Ⓖ	Ⓖ
Ⓗ	Ⓗ	Ⓗ
Ⓘ	Ⓘ	Ⓘ
Ⓙ	Ⓙ	Ⓙ
Ⓚ	Ⓚ	Ⓚ
Ⓛ	Ⓛ	Ⓛ
Ⓜ	Ⓜ	Ⓜ
Ⓝ	Ⓝ	Ⓝ
Ⓞ	Ⓞ	Ⓞ
Ⓟ	Ⓟ	Ⓟ
Ⓠ	Ⓠ	Ⓠ
Ⓡ	Ⓡ	Ⓡ
Ⓢ	Ⓢ	Ⓢ
Ⓣ	Ⓣ	Ⓣ
Ⓤ	Ⓤ	Ⓤ
Ⓥ	Ⓥ	Ⓥ
Ⓦ	Ⓦ	Ⓦ
Ⓧ	Ⓧ	Ⓧ
Ⓨ	Ⓨ	Ⓨ
Ⓩ	Ⓩ	Ⓩ

I am a:

- ○ Girl
- ○ Boy

I was born in:

MONTH BORN
○ January
○ February
○ March
○ April
○ May
○ June
○ July
○ August
○ September
○ October
○ November
○ December

Today the date is:

MONTH	DAY		YEAR
○ January			○ 2010
○ February			○ 2011
○ March	⓪	⓪	○ 2012
○ April	①	①	○ 2013
○ May	②	②	○ 2014
○ June	③	③	○ 2015
○ July		④	○ 2016
○ August		⑤	○ 2017
○ September		⑥	○ 2018
○ October		⑦	○ 2019
○ November		⑧	○ 2020
○ December		⑨	

Marking Instructions

- Use a No. 2 pencil or a blue or black ink pen only.
- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the response completely.
- Make no stray marks on this form.

CORRECT: ●

INCORRECT: ⊘ ⊗ ◒ ◔

For each question, fill in the bubble for the **BEST** answer.

1. What is sound?

Ⓐ Vibrations

Ⓑ A form of energy

Ⓒ Something that can travel through any kind of stuff

● All of the above

2. The volume of a sound describes:

● how loud it is.

Ⓑ how long it lasts.

Ⓒ how much it echoes.

Ⓓ how high-pitched it is.

3. An acoustical engineer might design:

Ⓐ a computer.

Ⓑ a hat with ear flaps.

● scientific instruments to record animal sounds.

Ⓓ an acoustical engineer would not design any of these.

4. The pitch of a sound is:

Ⓐ how loud the sound is.

● how high the sound is.

Ⓒ how long the sound lasts.

Ⓓ all of the above.

5. Covering your ears with your hands will probably _____ sounds.

● damp

Ⓒ increase

Ⓑ vibrate

Ⓓ not affect

6. Acoustical engineers are helping to design a concert hall. What are they MOST likely to work on?

Ⓐ The lights that shine on the stage

Ⓑ The musical instruments the musicians play

Ⓒ The machines to open and close the curtains

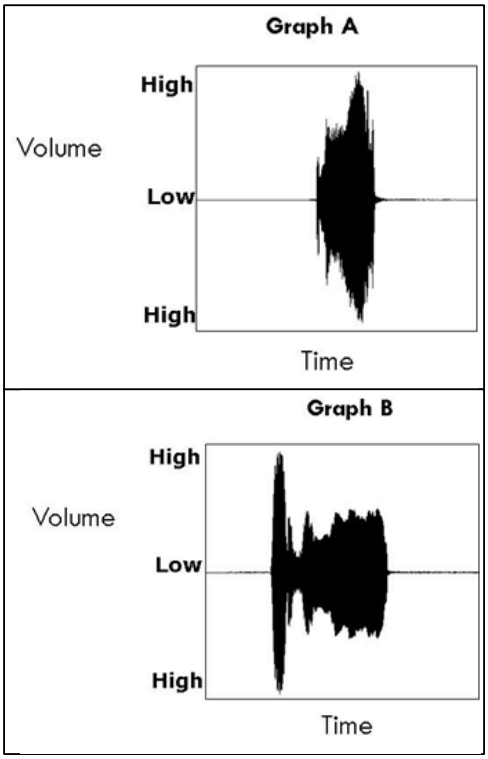
● The material covering the walls to stop echoes

PLEASE DO NOT WRITE IN THIS AREA

[SERIAL]

53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Graph A and Graph B show diagrams of two different sounds. Use the diagrams to answer questions 7 to 10.



7. What property of sound do both of these graphs show?

Ⓐ Pitch
● Volume
Ⓑ Music
Ⓓ All of the above

8. Which sound reaches a higher pitch?

Ⓐ The sound shown by Graph A.
Ⓑ The sound shown by Graph B.
Ⓒ Both sounds reach the same pitch.
● These graphs do not show pitch.

9. Which sound reaches the highest volume?

Ⓐ The sound shown by Graph A.
Ⓑ The sound shown by Graph B.
● Both sounds reach the same volume.
Ⓓ These graphs do not show volume.

10. Which sound has a higher volume when it starts?

Ⓐ The sound shown by Graph A.
● The sound shown by Graph B.
Ⓒ Both sounds start with the same volume.
Ⓓ These graphs do not show volume.

11. The duration of a sound is:

Ⓐ how high the sound is.
Ⓑ how loud the sound is.
● how long the sound lasts.
Ⓓ where the sound comes from.

12. What can sound travel through?

Ⓐ air
Ⓒ the ground
Ⓑ walls
● all of the above

13. When a sound has a short duration it means that:

Ⓐ the pitch of the sound is low.
● the sound does not last long.
Ⓒ the sound does not have much energy.
Ⓓ the vibrations making the sound are fast.

14. What does it mean when a sound has a high volume?

● The sound has a pitch.
Ⓒ The sound has lots of energy.
Ⓑ The sound lasts a long time.
Ⓓ All of the above.

15. The picture shows a guitar. How could you make one of the strings on the guitar have a higher pitch?

Ⓐ Loosen the string

● Tighten the string.

Ⓒ Play the guitar louder.

Ⓓ Replace it with a thicker string.

16. What happens when you make a string on the guitar have a higher pitch?

Ⓐ The string gets longer.

Ⓑ The string gets louder.

● The string vibrates faster.

Ⓓ The string vibrates more slowly.

17. Which string on the guitar will have the lowest pitch?

● The thickest string

Ⓑ The thinnest string

Ⓒ The shortest string

Ⓓ The most stretched string

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18. A student is playing a violin. She plays a note that lasts 5 seconds. She then plays the same note for 2 seconds. What is different about the two notes?

Ⓐ Pitch

Ⓑ Volume

● Duration

Ⓓ The notes are the same

19. A tuning fork makes a loud sound if you strike it against a table. What could you do to make the sound quieter?

Ⓐ Put the tuning fork into water.

Ⓑ Wrap the tuning fork with cloth.

Ⓒ Put clay on the ends of the tuning fork.

● All of the above.

20. If you hear a very loud sound outside, can you completely stop the sound from coming into your house?

Ⓐ Yes, by playing music very loudly.

Ⓑ Yes, by closing all windows and doors very tightly.

● No, you can only make the sound quieter.

Ⓓ No, the sound will find a crack where the air comes in.

21. Which of the following is a way to damp sounds from a radio?

Ⓐ Put the radio under a blanket

Ⓑ Turn down the volume control

Ⓒ Cover your ears with your hands

● All of the above

22. How are higher-pitched sounds different from lower-pitched sounds? Higher-pitched sounds:

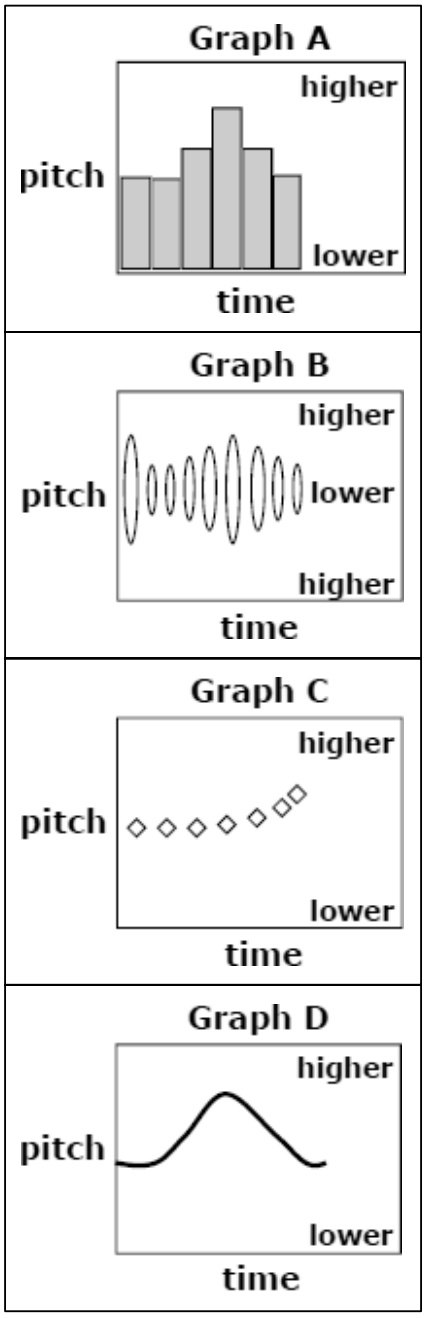
Ⓐ are louder.

Ⓑ last for a longer time.

● are made by faster vibrations.

Ⓓ all of the above.

A scientist is studying bird songs.
Observers sent him these four graphs.
Use the graphs to answer questions 23 to 26.



23. Which of these graphs show a pitch decreasing at least once?

Ⓐ Graphs A and D
Ⓒ All of the graphs
● Graphs A, B, and D
Ⓓ None of the graphs

24. Which of these graphs could represent the same bird song?

Ⓐ Graphs A and B
● Graphs A and D
Ⓑ Graphs B and C
Ⓓ None of the graphs

25. Which graph shows a sound where the beginning pitch is higher than the ending pitch?

Ⓐ Graph A
Ⓒ Graph C
● Graph B
Ⓓ Graph D

26. Which graph shows a sound where the beginning pitch is lower than the ending pitch?

Ⓐ Graph A
● Graph C
Ⓑ Graph B
Ⓓ Graph D

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27. A man is designing a system to represent whale sounds. What are some things he should think about?

Ⓐ What properties of the whale sounds are important to represent.
Ⓑ What kinds of systems other people have designed to represent sounds.
Ⓒ How to make the system for representing sounds easy for others to understand.
● All of the above.

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[SERIAL]