Smart Exam Resources

CAMBRIDGE LOWER SECONDARY CHECKPOINT
PRACTISE QUESTIONS -MARKSCHEMES

Subject:Physics Stage -7

Topic: Sound Set-1

1 Sound travels through the air by a series of compressions and rarefactions.

Describe what this means in terms of air particles.

.....

.....

..... [2]

MARK SCHEME:

compression – region of high pressure/ lots of air particles ;
rarefaction – region of low pressure/ fewer air particles ; [2]

Expert Solution:

This means that the particles in the air travels in regions where there are many particles together and then in regions where there are fewer particles together.
or
This means that the particles in the air travels in through regions of high pressure as compressions and regions of low pressure as rarefactions.

2 Thunder and lightning happen at the same time. An observer sees the flash of lightning before he hears the thunder.

(i) Describe how the sound of the thunder is transmitted to the observer through the air.

.....

..... [1]

(ii) An observer in a space station orbiting in a vacuum sees the lightning but does not hear the thunder.

Explain why.

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..... [1]

MARK SCHEME:

(i) as a series of compressions and rarefactions ;
as longitudinal waves ;
by transfer of vibrations of particles ; [max 1]
(ii)sound cannot travel through a vacuum/ sound requires a, medium/ particles ; [1]

3 When the water starts to boil, the cook knows that the water is bubbling because he can hear the sound of the bubbling.

Sound waves move through the air as a series of compressions and rarefactions.

State the difference between a compression and a rarefaction.

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..... [1]

MARK SCHEME:

compressions are regions where the particles in air are close together/rarefactions are regions where the particles in air are spread out ;
compressions are regions with air at higher pressure than normal/ rarefactions
are regions with air at lower pressure than normal ; [max 1]

4 A battle re-enactment enables observers to see and hear an old cannon being fired.

Fig. 7.1 shows the battle site and the distant cliffs.

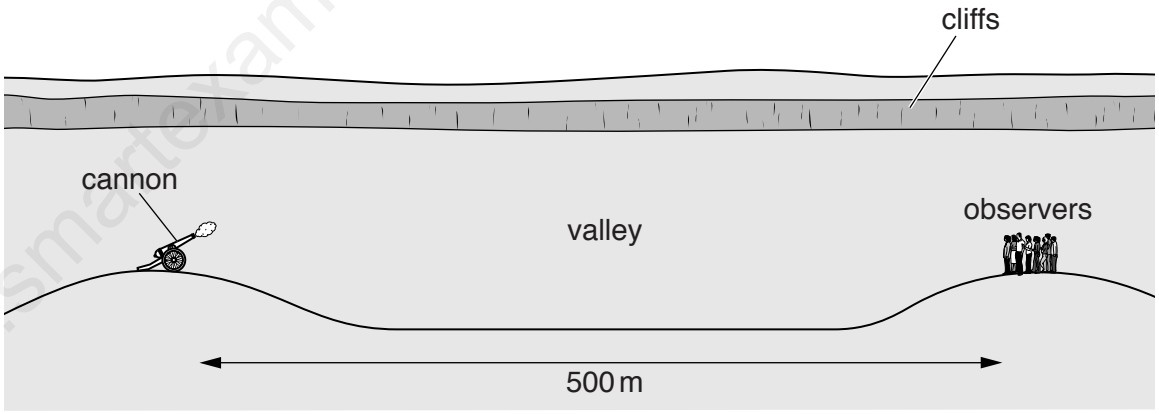

Fig. 7.1 (not to scale)

The cannon is fired. Observers see the smoke and then hear the bang.

(ii) An observer notices that, after the cannon is fired, she hears a loud bang and then a quieter bang a short time later.

Tick one box to identify the reason for the second bang.

- ☐ diffraction of the sound in the valley
- ☐ dispersion of the sound in the valley
- ☐ reflection of the sound from the cliff
- ☐ refraction of the sound from the cliff [1]

MARK SCHEME:

reflection of the sound from the cliff

5 Fig. 8.1 shows a student standing midway between a bell tower and a steep mountainside.

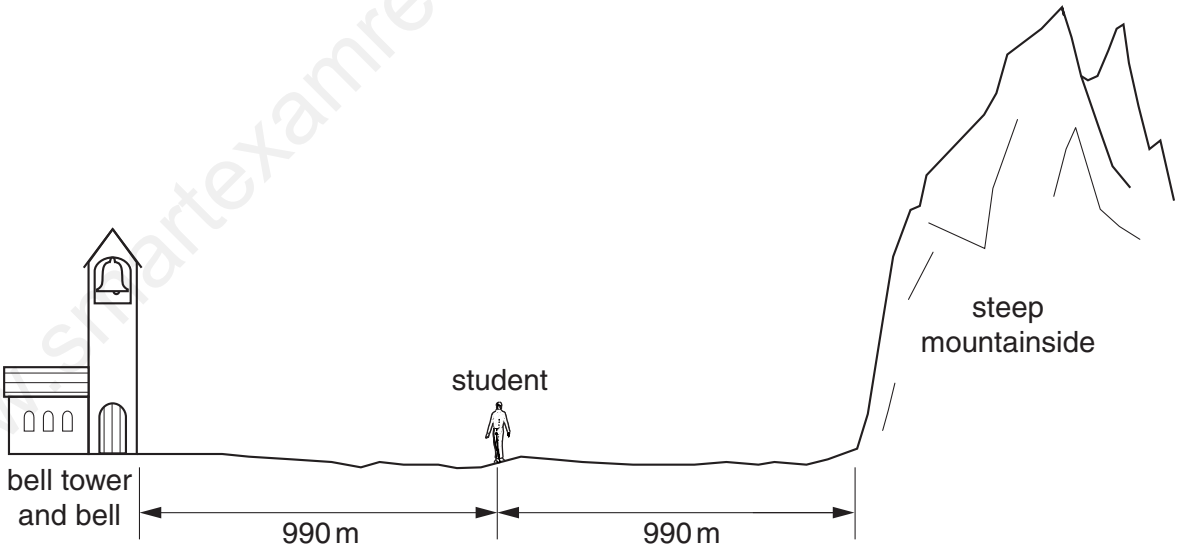

Fig. 8.1

The bell rings once, but the student hears two rings separated by a short time interval.

(a) Explain why the student hears two rings.

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..... [2]

(b) State which of the sounds is loudest, and why.

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..... [2]

MARK SCHEME:

(a) one sound direct B1
one sound after reflection/echo B1 [2]
(b) first
second one suffers absorption,dispersion [2]

6 Fig. 8.1 shows a workman hammering a metal post into the ground. Some distance away is a vertical cliff.

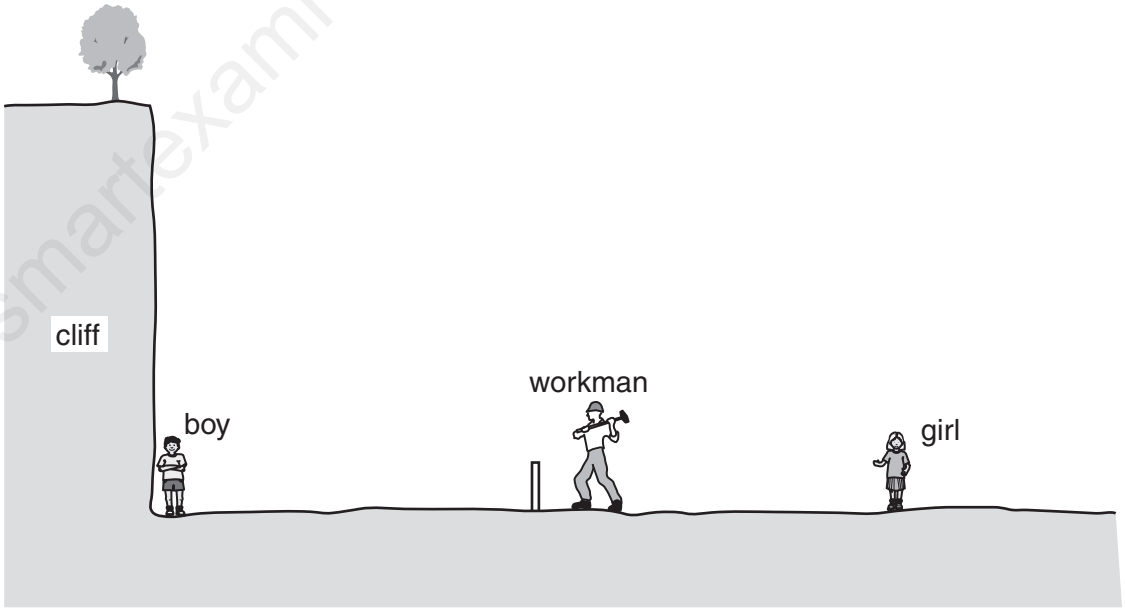

Fig. 8.1

(a) A boy is standing at the foot of the cliff. The speed of sound in air is 330 m / s. It takes 1.5 s for the sound of the hammer hitting the post to reach the boy.

(i) What does the boy hear after he sees each strike of the hammer on the post?

..... [1]

(b) A girl is also watching the workman. She is standing the same distance behind the post as the boy is in front of it. She hears two separate sounds after each strike of the hammer on the post.

(i) Why does she hear **two** sounds?

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..... [2]

MARK SCHEME:

(a) (i) one sound or equivalent (NOT an echo)

(b) (i) idea of one sound direct
and other sound by echo

MARK SCHEME:

(a) (i) vibrations / compressions and rarefactions;
of air molecules; [2]

Expert Solution:

Because sounds travels through compressions and rarefactions of molecules