

Section 10.3: Acoustics

Section 10.3 Questions, page 463

1. The sound drops by 60 dB after the reverberation time.

$$82 \text{ dB} - 60 \text{ dB} = 22 \text{ dB}$$

The sound level will drop to 22 dB.

2. (a) The sound is at 70 dB when it is turned off, and it drops by 60 dB to 10 dB in 2 s. The reverberation time is 2 s.

(b) Answers may vary. Sample answer:

To decrease the reverberation time, you could install objects in the theatre that absorb sound better.

(c) Answers may vary. Sample answer:

To increase the reverberation time, you could remove objects that are currently absorbing sound or redesign the theatre to increase echoes.

3. Answers may vary. Sample answer:

(a) When empty, the cloth-covered seats in Auditorium B will absorb a lot more sound than the wooden seats in Auditorium A.

(b) When full, the sound absorption of the seats in Auditorium B will not affect the acoustical properties of the theatre because there will be people in the seats.

4. Answers may vary. Sample answer:

Reverberation times should be much shorter for speaking performances than for choral music performances. By removing objects from the theatre that absorb sound, the theatre staff are making the reverberation times longer, which should improve the acoustics of the theatre for a choral music performance.

5. Answers may vary. Sample answer:

Echoes during speech interfere with the speaker. Echoes during music sound pleasant and appealing to the audience.

6. Answers may vary. Sample answer:

A parabolic surface with the source at its centre would provide a good design for an outdoor concert venue.

7. Answers may vary. Sample answer:

Yes, closing the curtains would help. Glass reflects more sound than cloth. Closing the curtains will absorb more sound and reduce the echoes.

8. Answers may vary. Students should explain the primary purpose of their chosen room and list its acoustical design features.

9. Answers may vary. Sample answer:

Few acoustical design features are used in classrooms because the room is small enough that everyone can hear speakers clearly.