## Acoustics and Psychoacoustics

## Multiple choice test - EXAMPLES

## Note: take the speed of sound in air at $20^{\circ} \mathrm{C}$ as $344 \mathrm{~ms}{ }^{-1}$

1. The musical interval between the fourth and sixth harmonics is:
a) a perfect fifth
b) a minor third
c) a major third
2. The upper to lower note frequency ratio of an equal tempered minor third is:
a) $5: 1$
b) $2^{(1 / 4)}$
c) $5 / 4$
3. A sound with a wavelength of 34.4 m has a frequency of:
a) 100 Hz
b) 1184 Hz
c) 10 Hz
4. When two violinists play together, both at 59 dB , the total sound level is:
a) 118 dB
b) 62 dB
c) 65 dB
5. The Pythagorean comma has a frequency ratio of:
a) $\left(2^{12}\right) /\left[\frac{3}{2}\right]^{7}$
b) $\left[\frac{3}{2}\right]^{12} /\left(2^{7}\right)$
c) $\left(2^{7}\right) /\left[\frac{3}{2}\right]^{12}$
6. The wavelength of sound as 20 Hz in air at $20^{\circ} \mathrm{C}$ is:
a) 1.72 m
b) 17.2 m
c) 172 m
7. Standing wave modes in a room that involve reflections from four surfaces are:
a) oblique
b) tangential
c) axial
8. An omnidirectional loudspeaker radiates 100 mW . The sound intensity level at a distance of 2 m from the loudspeaker is:
a) 93 dB SIL
b) 96 dB SIL
c) 92 dB SIL
9. The fourth standing wave displacement mode in a pipe closed at one end has:
a) 3 nodes and 4 antinodes
b) 4 nodes and 3 antinodes
c) 4 nodes and 4 antinodes
10. The footage of the organ stop that reinforces the natural third harmonic of the $8^{\prime}$ harmonic series is:
a) $3 / 2$
b) $8 / 3$
c) $3 / 8$
11. The sone scale is a scale of:
a) loudness
b) equal loudness
c) intensity
12. The place theory of pitch perception depends on:
a) the presence of the fundamental frequency
b) beats in the basilar membrane output waveforms
c) the location of maxima on the basilar membrane
13. The critical bandwidth is:
a) the total human hearing range
b) the effective bandwidth of an auditory filter
c) the distance between the $5^{\text {th }}$ and $7^{\text {th }}$ harmonics
14. A doubling in loudness is achieved on average by raising the sound intensity by:
a) 3 dB
b) 6 dB
c) 10 dB
15. Equal loudness contours define the:
a) phon scale
b) sone scale
c) ERB scale
16. The frequency range of human hearing is usually quoted as:
a) 0 Hz to 20 kHz
b) 20 Hz to 20 kHz
c) 20 Hz to 200 Hz
17. Select the TRUE statement:
a) Timbre depends on fundamental frequency
b) A change in timbre change can affect pitch
c) Timbre depends on duration
18. The 'early sound' is:
a) The first thing heard on any day
b) The start of a musical note
c) The first set of reflections following the direct sound
