

Concern Over Hearing Loss from Personal Music Players



Professor Peter Rabinowitz from Yale University School of Medicine says that personal music devices such as MP3 players can generate levels of sound at the ear in excess of 120 decibels, similar in intensity to a jet engine, especially when used with earphones that insert into the ear canal.

The use of these devices is high in young people -- more than 90% in surveys from Europe and the United States -- and "has grown faster than our ability to assess their potential health consequences," he writes.

However, evidence that music players are causing hearing loss in young people is mixed, suggesting that the true population effects may only now be starting to be detectable, says the author.

Other health effects may also need to be considered. For example, some studies have shown that use of personal music players can interfere with concentration and performance when driving, in a similar way to mobile phones.

Although evidence based guidance is lacking, Rabinowitz believes that the importance of hearing loss as a public health problem makes it reasonable to encourage patients of all ages to promote "hearing health" through avoidance of excessive noise exposure.

He also suggests it would be prudent to remove earphones while driving and performing other safety sensitive tasks, and calls for more comprehensive and ongoing surveys of the hearing health of young people.

"Personal music players provide a reminder that our hunger for new technology should be accompanied by equally vigorous efforts to understand and manage the health consequences of changing lifestyles," he concludes.

PART 1

You have to present why listening to music with earphones may be harmful to our health. You can use your knowledge and information given in this text.

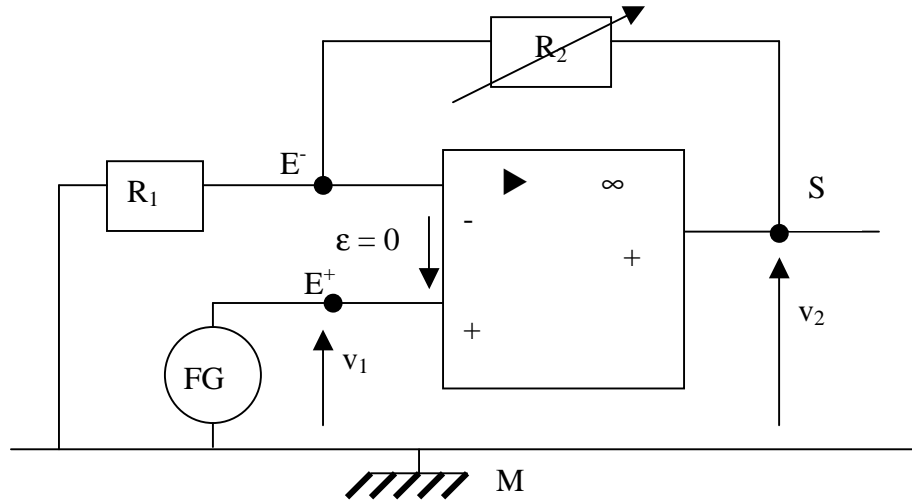
You can use the questions below to organize or support your presentation, but feel free to use them in any order you like.

- What electronic device some earphones may contain to increase the level of music ?
- Why listening to your MP3 players may be dangerous ?
- Listening to music while driving can also be dangerous. Discuss.
- New technology can produce more performing earphones. What can be done to warn people that listening to music can be harmful for our health ?

PART 2

Some earphones may contain amplifiers.

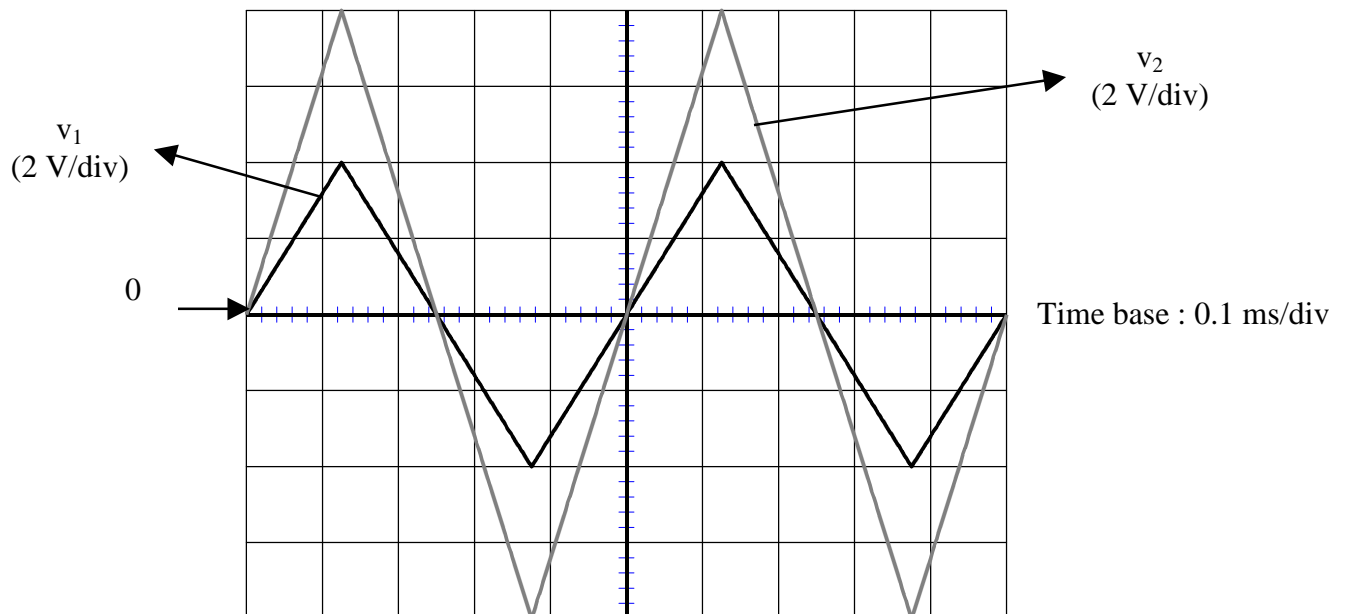
The following circuit can be used as a voltage amplifier.



FG is a function generator giving input voltage v_1 .

The op amp is supposed to be ideal, $+V_{CC} = 15\text{ V}$ and $-V_{CC} = -15\text{ V}$, $R_1 = 1\text{ k}\Omega$ and R_2 is a variable resistance.

The input and output voltages are observed on a cathode ray oscilloscope.



- Give the name of the IC used in the amplifier circuit.
- What does it need to function?
- Describe voltage v_1 .
- Give the peak value, the period T and the frequency of voltage v_1 .
- Give the peak value of voltage v_2 and hence give the voltage gain of the amplifier.
- The amplifier is a non-inverting one. Justify your answer.