CLASS 11 PHYSICS EXTRA QUESTIONS

Class 11 Physics Chapter 14 Waves – Extra Questions with Answers

Extra practice questions for Class 11 Physics Chapter 14 (Waves), beyond the textbook. These Class 11 Physics Chapter 14 important questions are handy for last-minute exam practice.

Contents

Extra practice questions for Class 11 Physics Chapter 14 (Waves), beyond the textbook. These Class 11 Physics Chapter 14 important questions are handy for last-minute exam practice.

Very Short Answer Questions (1 mark)

Q1. Give an example of a longitudinal wave.
Ans: Sound wave.

Q2. Write the relation between wave speed, frequency, and wavelength.
Ans: $v=f\lambda$.

Q3. What are nodes and antinodes?
Ans: Nodes are points of zero displacement; antinodes are points of maximum displacement in a standing wave.

Q4. Write the formula for beat frequency.
Ans: $f_{beat}=|f1-f2|$.

Q5. What is the formula for speed of a transverse wave on a stretched string?
Ans: $v=\sqrt{(T/\mu)}$.

Short Answer Questions (2–3 marks)

Q6. A wave has frequency 50 Hz and wavelength 4 m. Find its speed.
Ans: $v=f\lambda=50(4)=200$ m/s.

Q7. A string of mass per unit length 0.02 kg/m is under tension 80 N. Find the wave speed.
Ans: $v=\sqrt{(T/\mu)}=\sqrt{(80/0.02)}=\sqrt{4000}\approx63.2$ m/s.

Q8. Two tuning forks of frequency 256 Hz and 260 Hz are sounded together. Find the beat frequency.
Ans: $f_{beat}=|260-256|=4$ Hz.

Higher-Order Thinking / Application Questions

Q9. A string fixed at both ends has length 1 m and the wave speed on it is 200 m/s. Calculate the fundamental frequency and the frequency of the first overtone, explaining the standing wave pattern in each case.
Ans: Fundamental frequency (n=1): $f1=v/2L=200/(2\times1)=100$ Hz. This has one antinode at the centre and nodes only at the two fixed ends. First overtone (n=2): $f2=2v/2L=2(100)=200$ Hz. This standing wave pattern has an additional node at the midpoint, dividing the string into two equal segments, each vibrating like a smaller fundamental mode, with a total of 3 nodes (two ends + middle) and 2 antinodes.

Q10. Explain, using the principle of superposition, why beats are heard as a periodic rising and falling of loudness when two sound waves of close but different frequencies are played together, rather than as two separate constant tones.
Ans: When two sound waves of close but slightly different frequencies (f1 and f2) overlap at a point in space, the principle of superposition states that the resultant displacement is the sum of the two individual wave displacements at every instant. Because the two frequencies are close but not identical, the two waves periodically go in and out of phase with each other: at times they add constructively (in phase, producing a louder resultant amplitude) and at other times they add destructively (out of phase, producing a

much smaller resultant amplitude). This periodic constructive-destructive alternation happens at a rate equal to the difference in the two frequencies, |f1−f2|, which is perceived by the human ear as a periodic rising and falling of loudness (beats), rather than as two separate distinguishable constant tones, because the beat frequency is typically too slow to be perceived as a separate pitch but fast enough to be heard as throbbing loudness variations.

Class 11 Physics Chapter 14 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 11 Physics Chapter 14 Solutions and Class 11 Physics Chapter 14 Revision Notes.

See also: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9 | Chapter 10 | Chapter 11 | Chapter 12 | Chapter 13 | Chapter 14

Practice more: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9 | Chapter 10 | Chapter 11 | Chapter 12 | Chapter 13

Quick revision: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9 | Chapter 10 | Chapter 11 | Chapter 12 | Chapter 13