

Sl. No	Questions	Max Marks
1	<p>Derive the wave equation for a transverse wave on a stretched string of uniform linear density assuming that the amplitude of oscillations remains small enough so that the string tension can be taken constant throughout.</p> <p>Key:</p> <ul style="list-style-type: none"> i) Diagram and assumptions used in derivation : 4 marks ii) Derivation of the wave equations : 4 marks iii) Identification of $\sqrt{T/\mu}$ as the speed of the wave : 2 marks 	10
2	<p>What are standing waves? Derive the equation for a standing wave on a stretched string of length L fixed at its both ends. Also, find its eigen-frequencies and draw the standing wave pattern for the first four harmonics.</p> <p>Key:</p> <ul style="list-style-type: none"> i) Definition of standing waves : 2 marks ii) Derivation of the standing wave equation : 4 marks iii) Mathematical expressions for the first 4 eigen-frequencies : 2 marks iv) Diagram of the first 4 eigen-frequencies : 2 marks 	10
3	<p>(a) Write the expressions for reflection and transmission coefficients of amplitude for a transverse wave on a string when there is a sudden change in the impedance at a boundary. Discuss the scenario when the wave encounters a medium with impedance (i) $Z_2 \rightarrow 0$ & (ii) $Z_2 \rightarrow \infty$.</p>	5