

Sl. No	Questions	Max Marks
1	Derive the expression for the wave equation of a 1D mechanical wave propagating on a string and show that the wave velocity is inversely proportional to the square root of liner density of string.	10
2	Write the reflection and transmission coefficients of waves at the boundary of two strings. Discuss the role of reflection and transmission coefficients if i) $\rho_1 = \rho_2$ ii) $\rho_1 < \rho_2$ ii) $\rho_1 > \rho_2$ iii) $\rho_2 \rightarrow \infty$	10
3	a) Consider a string in a guitar whose length is 80 cm and a mass of 0.32 g with tension 80 N is plucked. Compute the linear mass density, velocity of the wave and first three lowest frequencies produced when it is plucked.	5
	b) Distinguish between transverse and longitudinal waves	5
4	Write the Maxwell equations for free space. Derive wave equations for electric and magnetic field components of the electromagnetic wave in the same medium. Show that the velocity of the wave is equal to velocity of light in same medium.	10
5	a) Write the integral form of Maxwell equations and discuss their physical significances.	5
	b) Compute curl of a vector $\vec{F} = 6x \hat{i} + (2y - y^2) \hat{j} + (6z - x^3) \hat{k}$. What is your comment from this result.	5