1. Derive classical wave equation for the transverse waves on a string. What are the assumptions being made to set up this equation? Show the various forces acting on hte string using aproper schematic.

2. What happens to a wave when it encounters a boundary separating two media if impedance of the second medium is infinite? Arrive on the wave function of a standing wave and hence derive an expression for the eigen frequencies of standing waves on a string by using boundary conditions, Plot the first three harmonics.

3. (a) Classify the waves based on the motion of the particles o f the medium. Express a progressive wave using mathematical expression. State what each term specifies.
(b) Transverse wave travels on a string of linear mass density 0.2 g/cm. If hte velocity of hte wave is 20 m/s, then compute the change in tension on the string, when the velocity increases to 30 m/s.

4. Show using a schematic how does an electromagnetic (EM) wave propagate in free space? Write mathematical expressions for both electric and magnetic fields of such a wave. Starting from Maxwell's equations, derive the wave equation for both E and B fields for this wave.