**Assignement-2**

1. The equation of a plane wave given in equation no.-1. In what direction does this wave travel? Determine the wave numbers



1. Draw the equivalent electrical circuit for the following mechanical system and find the mechanical impedance with its corresponding unit, where *Rm=1.4 kg/s, s1=30 N/m*, s2=70 N/m and F=2cos8t

S1

F

Rm

S2

1. A mass of ***0.5 kg*** hangs on a spring. The stiffness of the spring is ***100 N/m*** and the mechanical resistance is ***1.4 kg/s.*** The force driving the system is ***f=2 cos 5t***.
2. Calculate the maximum steady-state displacement, average power dissipation, phase angle between speed and force and the resonance frequency
3. What is the ***Q*** value of the system and over what range of frequencies will the power loss be at least ***50%*** of its resonance value.

1. Show that for any plane waves traveling in +x direction, the specific acoustic impedance is ρ0c. Where ρ0is the equilibrium density and c is the velocity of sound.
2. A piano string is 1.10 m long and has a mass of 9.00 g. (a) How much tension must the string be under if it is to vibrate at a fundamental frequency of 130 Hz? (b) What are the frequencies of the first four harmonics?