

## Lecture 8.

**Lecture objectives.**

- To be able to derive the relation for average power of a forced oscillator.
- To understand that (and why) maximum power is transferred to an oscillating system at the velocity resonance.
- To understand the concept and relation of the Q-value of a forced system.

**Post-lecture tasks.**

1. Derive, without using your notes, an expression for the average power dissipated in a forced oscillator.
2. Explain the significance of the power factor,  $\cos \phi$ , in this average power formula.
3. Derive, for your notes, the relation for the Q-factor for this power resonance, using Pain p.65.
4. Make sure your notes for section II of the syllabus are complete and up to date. [**Key words** for forced oscillations: equation of motion and its solution, displacement and velocity (together with their phases), resonance of displacement and velocity, average power in forced oscillations, Q-value].