A rigid mass is falling from the height $H$ on the tip of a cantilever beam. Discuss the way of finding the maximum tip dynamic deflection under the following three assumptions.

(i) The beam is massless.
(ii) The beam mass is lumped at the tip.
(iii) Actual distributed mass

Hint: $w = \frac{Pl^3}{3EI}$
where $w$ is deflection at the tip end
$P$ is a concentrated load
$EI$ is beam rigidity
DYNAMICS ORAL WARMUP QUESTION

In one room of a biotech firm a pump with a rotating imbalance at 1200 rpm applies a vertical force to the floor. In a nearby room a microscope sitting on a table has unacceptable vertical vibration, probably due to the pump.

1. Come up with a systematic plan for reducing the vibration of the microscope. For example, what additional information do you need, what tests might you perform and what vibration reduction strategies might you consider.

2. To reduce vibration of the microscope due to the excitation from the pump, what sequence of engineering improvements could you take to reduce the vibration by factors of approximately 10, 100 or even 1000?