

Lecture 3.10 Quiz
Principles of Electronic Nanobiosensors
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Answer the **five questions** below by choosing the **one, best answer**.

- 1) The displacement of a cantilever-based sensor can be measured by:
 - a) Bouncing a laser beam on the tip of the cantilever.
 - b) Observing the change in the resistance of a piezoelectric layer.
 - c) Measuring the capacitance between the cantilever and an electrode underneath.
 - d) **All of the above.**

- 2) The moment of inertia of a suspended beam depends on the:
 - a) **Cross-sectional geometry of the beam**
 - b) Material density of the beam
 - c) Young's modulus of the beam.
 - d) Type of end-support of the beam.

- 3) The typical frequency of oscillation of a nanoscale cantilever (tens of nm thick, and a few microns in length and width) is approximately
 - a) ~Hz
 - b) **~MHz.**
 - c) ~GHz.
 - d) ~THz.

- 4) Increase in the spring constant (with other parameters remaining the same)
 - a) **Increases the frequency of oscillation.**
 - b) Decreases the frequency of oscillation.
 - c) Keeps the frequency of oscillation unchanged.
 - d) Depends on the damping constant.

- 5) For a nanoscale biosensor, the frequency of oscillation will:
 - a) **Increase or decrease depending on the amount of biomolecules collected.**
 - b) Always increase regardless of the sensor details.
 - c) Always decrease regardless of the sensor details.
 - d) Depends on the length of the cantilever beam.

End of quiz. This quiz contains 5 questions.