

QUIZ on Lecture P1_Wk4_L3

1. What force is required to displace the end of a microcantilever with a spring constant of 2 N/m through a distance of 5 nm?

- a) 2 nN
- b) 5 nN
- c) 10 nN
- d) 2.5 nN

2. When a tip approaches a substrate during the execution of an AFM approach curve, it passes sequentially through three important regimes called

- a) approach; pull-off; indentation
- b) retraction; jump to contact; indentation
- c) jump to contact; indentation; pull-off
- d) approach; jump to contact; indentation

3. Suppose a particle is confined to move in the x-direction by a potential described by

$$U(x)=2x^3+20x^2,$$

- a) the particle will stably oscillate for all possible values of x
- b) the particle will stably oscillate for $-12 < x < +12$
- c) the particle will stably oscillate as long as $x < 0$
- d) the particle will stably oscillate for $-3 < x < +3$

4. During an AFM approach curve, when the tip is far from the substrate

- a) the tip displacement is generally proportional to the square root of the cantilever displacement
- b) the tip displacement is essentially zero
- c) the tip displacement generally varies quadratically with the cantilever displacement
- d) the tip generally feels a weak repulsive force followed by a stronger attractive one