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Quiz: Lecture 3.3
Principles of Electronic Nanobiosensors
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Answer the **five questions** below by choosing the **one, best answer**.

1) At high salt concentrations, the screening of NW sensors is similar to that of a planar sensor. This is because …

   a) The screening distance is very short, almost conformal to the sensor surface.
   b) Most NW sensors are very large, almost as big as planar sensors.
   c) Salt penetrates through oxides in both cases; therefore the response cannot be different.
   d) None of the above.

2) The time-dependence of potentiometric response of a nanobiosensor is given by

   a) t
   b) $\sqrt{t}$
   c) $\log(t)$
   d) $\exp(t)$

3) The distance between successive bases of a DNA polymer is 0.34 nm, and the Debye length at 10 mM Salt concentration is 3nm. For a 50 base pair long DNA that is attached vertically to the sensor surface, how many (approximately) base-pair would be visible to the sensor

   a) 1
   b) 3
   c) 10
   d) 50

4) Although DNA attaches as localized charge on a sensor surface, the assumption of distribution charge is justified. This is because

   a) Water dissolves the DNA and spreads it out on the sensor surface.
   b) Water has high dielectric constant; the field lines prefer to stay in water.
   c) The number of molecules captured can be large; therefore a continuum assumption is justified for all physical situations.
   d) The molecules diffuse on the sensor surface; the time averaged signal can be described by a continuum model.

5) A **non**-faradic electrode has the following characteristics.

   a) Allows easy passage of charges to and from the electrode.
   b) Is needed for proper functioning of the potentiometric sensors.
   c) Can be used to define the fluid potential unambiguously.
   d) None of the above.

End of quiz. This quiz contains 5 questions.