

Lecture 4.5
Principles of Electronic Nanobiosensors
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Answer the **six questions** below by choosing the **one, best answer**.

- 1) A key challenge for the emulsion PCR is
 - a) It takes a continuous supply of oil to perform the process.
 - b) Some of the beads may contain more than one DNA fragment.**
 - c) Amplification of multiple DNA cannot be done in parallel.
 - d) None of the above.

- 2) The DNA-to-bead ratio must not exceed the following quantity so as to ensure that no more than 5% of the beads have more than 1 DNA segment.
 - a) 0%
 - b) 25%**
 - c) 50%
 - d) 75%

- 3) What does it mean to have a homopolymer sequencing problem?
 - a) Inability to differentiate two DNA molecules having the same sequence.
 - b) Inability to read DNA molecules that are hydrophobic.
 - c) Inability to read genome of homo sapiens.
 - d) Inability to read a sequence of same bases embedded within a DNA polymer.**

- 4) A reference well is necessary because
 - a) It holds the local potential to a fixed value.
 - b) Reduces the noise associated with the channel of the transistor.
 - c) The arrival of biomolecules in each well is random, therefore, the reference well acts like a local clock for signal initiation.**
 - d) It acts like a local reference electrode.

- 5) If the areas of the well and the sensor transistor are both scaled by a factor of 2, then
 - a) Both the signal and the noise increase by a factor of 2.
 - b) Signal increase by a factor of 2, but noise does not change.
 - c) Signal remains unchanged, but the noise increases by a factor of 2.**
 - d) Signal and noise both remain unchanged.

- 6) The technology approach discussed solves the reliability problem associated with salt diffusion into the oxide by:
 - a) Using a new type of high-k dielectric immune to salt diffusion.
 - b) Using a different type of salt that does not diffuse.
 - c) Decreasing the concentration of salt.
 - d) Isolating the well from the sensor by a wire, so that the oxide never comes in contact with salt solution.**

End of quiz. This quiz contains 6 questions.