

Quiz: Lecture 2.5
Principles of Electronic Nanobiosensors
Muhammad A. Alam, nanoHUB-U Fall 2013

Answer the **five questions** below by choosing the **one, best answer**.

- 1) Biobarcode approach beats the diffusion limit, by focusing on the following variable
 - a) The diffusion coefficient.
 - b) The size of the capture molecule.
 - c) The viscosity of the fluid.
 - d) The distance travelled by the biomolecule to reach the sensor surface.

- 2) We made an important assumption in deriving the response time formula for the biobarcode sensor. The assumption is
 - a) The background fluid is not viscous.
 - b) The capture probes are immobile.
 - c) The target molecules are immobile.
 - d) The magnetic interaction between the capture probe and the target particles is weak.

- 3) The approach is named biobarcode because
 - a) It will soon be used as scanners in grocery stores.
 - b) It uses specific patterns of the capture probe to identify the target molecule.
 - c) It uses magnetic fields to collect the captured biomolecules, the same technology used in barcode scanners.
 - d) The approach can identify large number of biomolecules, just as the scanner can identify large number of products.

- 4) Consider two samples with analyte density of 1nM. For the first sample, the density of the capture probe is 1uM and the 2nd sample has a probe density of 10 uM. Which of the following statements is true?
 - a) Both samples will have identical capture or settling time.
 - b) The 2nd sample will capture the analyte faster than the 1st sample.
 - c) The 1st sample will capture the analyte faster than the 2nd sample.
 - d) Sufficient information is not available.

- 5) The approach based on 'local generation and fast diffusion' beats the diffusion limit by reducing
- a) Both the diffusion coefficient and the diffusion distance.
 - b) Only the diffusion coefficient.
 - c) Only the diffusion distance.
 - d) Neither the diffusion coefficient, nor the diffusion distance.