Quiz: Week 1 Lecture 5
Principles of Electronic Nanobiosensors
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Answer the **six questions** below by choosing the **one, best answer**.

1) The settling time of a nanobiosensor is given by $\rho_0 \sim N_s \times t_s^{-(3-D_F)/2}$. Which of these terms depend on the transduction mechanism of the sensor?

a) ρ_0
b) N_s
c) t_s
d) D_F

2) The formula $\rho_0 \sim N_s \times t_s^{-(3-D_F)/2}$ applies to all sensors with the following fractal dimension

a) $0 < D_F < 1$
b) $0 < D_F < 2$
c) $0 < D_F < 3$
d) $1 < D_F < 2$

3) The integrated density of biomolecules captured over a period of time can be used to see if the sensor response is diffusion limited or not. What time exponent would one expect for diffusion limited system?

a) 1/4
b) 1/2
c) 3/4
d) 1

4) What is the unit of the 'diffusion equivalent capacitance'

a) Farads/cm^2
b) cm^2/sec
c) cm^3/sec
d) cm^4/sec

(continued on next page)
Quiz: Week 1 Lecture 5 (continued)

5) We have used a phrase "geometry of diffusion" to interpret sensor response. The geometry we are referring to is related to

a) The Surface to volume ratio of the sensor.
b) The fractal geometry of the sensor surface.
c) The geometry of the biomolecules.
d) All of the above.

6) In the plot of the performance limit of nanobiosensors, the response time reduces inversely with the density of the biomolecules. For very high densities,

a) All sensors will respond instantaneously, regardless the type of sensor.
b) The response time will still be defined by diffusion.
c) The response time will be defined by the rate of capture/release of the biomolecules.
d) The response time will be defined by the method of transduction associated with the sensor.

End of quiz. This quiz contains 6 questions.