MCQs of BioMathematics

1. Fick's Law of Diffusion describes the rate of diffusion and is given by the equation:
   - ◯ $-D \cdot A \left(\frac{dC}{dt}\right)$
   - √ $-D \cdot A \left(\frac{dC}{dx}\right)$
   - ◯ $D \cdot A \left(\frac{dC}{dx}\right)$
   - ◯ $D \cdot A \left(\frac{dC}{dt}\right)$
2. The diffusion equation for an artificial kidney is a:
   - ◯ Linear equation
   - √ **Partial differential equation**
   - ◯ Quintic equation
   - ◯ Ordinary differential equation
3. Which type of hemodialyzer is designed to enhance the removal of larger molecules?
   - ◯ Cellulose-based hemodialyzer
   - ◯ Synthetic membrane hemodialyzer
   - ◯ Low-flux hemodialyzer
   - √ **High-flux hemodialyzer**
4. Which of the following is an example of diffusion in an artificial kidney(hemodialyzer)?
   - ◯ Movement of red blood cells through capillaries
   - ◯ Passage of water molecules through a semipermeable membrane
   - √ **Clearance of waste products from the blood using dialysis**
   - ◯ Filtration of blood in the glomerulus of the kidney
5. The solution to the diffusion equation for a one-dimensional system is given by:
   - ◯ $C = C_0 e^{Dt}$
   - √ $C = C_0 e^{-Dt}$
   - ◯ $C = C_0 e^{Dx}$
   - ◯ $C = C_0 e^{-Dx}$

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