

Sub: Biological Modeling and

Simulation

22/5/15

Bm/VI/CBS/BMS

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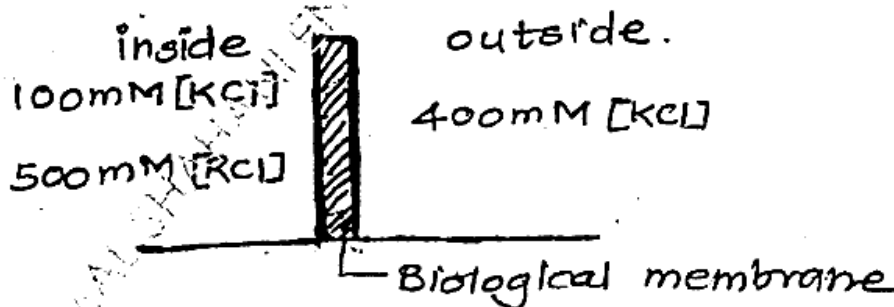
QP Code : 5097

(3 Hours)

[Total Marks : 80]

- N.B.: (1) Question No. 1 is compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) Figures to the right indicate full marks.
 (4) Assume data wherever necessary.

1. (a) Explain electrical model of a biological cell membrane. 5
 (b) Giving suitable example describe different eye movements. 5
 (c) Explain different heat generation and heat transfer mechanisms of human body. 5
 (d) Differentiate between Golgi tendon and spindle receptors. muADDA.com 5
2. (a) With the use of biophysics tools derive Nernst's Equation for any bivalent ion. 10
 (b) With the help of neat diagram explain voltage-clamp experiment along with its results. 10
3. (a) Explain with a neat diagram linearized model of immune response. 10
 (b) Differentiate with suitable example :— 10
 (i) Compartmental and Non-compartmental modeling.
 (ii) Lumped parameter and distributed parameter models.
4. (a) With the help of block diagram explain human thermoregulatory system. 10
 (b) A membrane is permeable to K^+ and Cl^- but not to large cation R^+ . Find the steady state equilibrium concentrations for the following initial conditions. Calculate, Nernst Potential for K^+ and Cl^- . muADDA.com 10



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(2)

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5. (a) Explain with a neat block diagram role of a Golgi Tendon in Neuromuscular system. 10
(b) For Weisthiemer's eye model derive expression for displacement and velocity 10
6. Write short notes on (any four) :— 20
- (a) Model of respiratory system
 - (b) Active state tension generator
 - (c) Stretch reflex and reflex arc
 - (d) Physiology of insulin-glucose feedback system
 - (e) Rigor Mortis.
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