BMS (Sem- VI) (Reg) Biomedical (80)

F.H.1

Con. 4880-12. (REVISED COURSE) GN-9713

(3 Hours) [Total Marks : 100

N.B (1) Question No. **1** is **Compulsory**.
(2) Attempt any **four** questions out of remaining **six**.
(3) Figures on the right indicate full marks.
(4) Assume data wherever necessary.
(5) Draw diagrams / sketches wherever necessary.
(6) Use legible handwritting. Use blue / black ink only.

Q.1. (a) Differentiate between Golgi Tendon and Spindle receptors. [05]
(b) Which are different steps of modelling. [05]
(c) Explain the aim and assumptions of Hodgkin – Huxley model? [05]
(d) What is the difference between active state tension and muscle tension? [05]

Q.2. (a) Define different biophysics tools and Nernst Potential? State the terms with the equation. [10]
(b) Explain using suitable diagram plant model of thermoregulatory system. [10]

Q.3. (a) A membrane has an active Ca^{2+} pump. Assume that the membrane is permeable to both Ca^{2+} and Cl^- ions and the Ca^{2+} pump flow is Jp. The width of the membrane is w. Find the pump flow as a function of concentration of calcium ions. [10]
(b) Explain the closed loop neuromuscular control system showing anatomical connections between physiological components that participate in stretch reflex. [10]

Q.4. (a) Derive the expression for maximum displacement of the eye for Westheimer's model. What values were suggested by Westheimer's for ω_n and ζ? Find the maximum value of displacement using these values. [16]
(b) With reference to eye model explain length-tension diagram. [04]

Q.5. (a) Draw the electrical model of a membrane and explain the physiological significance of each element. [10]
(b) Derive the expression for a conduction of a voltage through a passive axon. Define length constant and state its significance. [10]

Q.6. (a) Explain sensitivity analysis of a eye model. [08]
(b) Explain with a neat block diagram immune response model [12]

Q.7. Write short notes on, (any four) [20]
(a) Respiratory system model
(b) Insulin-Glucose feedback system
(c) Microelectrode model
(d) Parkinson's syndrome
(e) Rigor mortis.