B. Tech. Sem – VIII (Biomedical Engg.) (2014 COURSE) (CBCS) :
WINTER - 2018
SUBJECT: Elective-III: BIOLOGICAL MODELING OPTIMIZATION

Date: Thursday **W-2018-2670** Time: 02.30 PM TO 05.30 PM
Day: 15/11/2018 Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.

Q.1 What is the role of sodium, potassium and chloride ions in the body & how these ions are regulated? **(10)**

OR

a) How the body temperature is controlled & regulated? **(05)**
b) Explain with diagram the reflex function of nervous system. **(05)**

Q.2 **a)** Why do we need to do modeling? Give the steps of modeling. **(05)**
b) How the modeling of an artery with blood is done? Explain it with neat diagram. **(05)**

OR

Draw the diagram of distributed parameter model & explain. **(10)**

Q.3 Derive an expression for Goldman equation. Assume all necessary constants. **(10)**

OR

Draw Hodgkin-Huxley model of neurons & explain its physiological significance. **(10)**

Q.4 **a)** Explain the mechanisms of heat production & heat loss in thermoregulatory systems. **(05)**
b) Explain the necessity of human thermoregulatory system with the help of block diagram. **(05)**

OR

Explain the controller action for **(10)**
i) High average skin & brain care temperature.
ii) Low average skin & brain care temperature

Q.5 **a)** Explain transmission and processing of signals in interneuronal pools. **(05)**
b) What is the importance of agonist & antagonist muscles in neuromuscular control system? **(05)**

OR

a) Elaborate the functions of Golgi tendon organ in muscle. **(05)**
b) What are the ways by which experimental validation of muscles is possible? **(05)**

Q.6 **a)** Describe muscular control of eye movement with the help of diagram. **(05)**
b) What is the neurophysiology behind the vision? **(05)**

OR

Describe the reciprocal innervation model of eye movement control system with its all relevant parameters. **(10)**

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