

**B. TECH. (CBCS - 2014 COURSE) SEM – VIII (BIOMEDICAL
ENGG.) : SUMMER - 2018**

SUBJECT-Elective-III: BIOLOGICAL MODELING OPTIMIZATION

Date: **Thursday**
Day: **07/06/2018**

S-2018-4715

Time: **02.30 PM TO 05.30 PM**
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.

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- Q.1** a) What is the importance of blood glucose regulation? How it is regulated? (05)
b) Define blood volume. Explain regulation of blood volume. (05)
OR
a) Explain defenses against the changes in hydrogen ion concentration. (05)
b) Explain the stages of differentiation of red blood cells. (05)
- Q.2** a) Explain the model of local tissue region with help of neat diagram. (05)
b) Draw and explain respiratory system model. (05)
OR
Write short note on: (10)
i) Distributed parameter Vs lumped parameter model
ii) Electrical model of cell membrane
- Q.3** Derive an expression for calculating the steady state concentration difference created by electrogenic pump. (10)
OR
a) Discuss the sliding filament theory. (05)
b) Derive an expression for equilibrium in one-ion system. (05)
- Q.4** Draw and explain the diagram of regulatory plant with all the values of M_o , E_v and thermal resistors. (10)
OR
Why the controller model is used? Explain it with suitable diagram. (10)
- Q.5** Define the following terms with suitable diagram: (10)
i) Series Elasticity
ii) Forced Velocity relationship
iii) Passive Elasticity
iv) Length-Tension diagram
OR
a) Discuss experimental validation of neuromuscular system. (05)
b) List the muscle receptors and their functions in order to control neuromuscular system. (05)
- Q.6** a) What are the techniques of validating eye model? (05)
b) Explain the glissades in eye movements with suitable diagram (05)
OR
Derive the expression for maximum peak velocity and peak time for Weisthemer's model. (10)