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B. Tech. EXAMINATION, May 2018

(Sixth Semester)

(B. Scheme) (Main & Re-appear)

(BME)

BME304B

MODELLING AND SIMULATION

Time : 3 *Hours*]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Define and discuss the following in brief : **3×5**

(a) Biomechanics

(b) Inverse Kinematics

(c) Forward Dynamics

(d) System-line Modelling

(e) Simulation.

2. Describe the computational modeling, geometry, analysis and methods for musculoskeletal modeling. Explain with the help of suitable example. **15**

Unit II

3. Explain the mathematical modeling and computational simulation for the following : **7½×2**

(a) Transport Phenomenon

(b) Cardiac Output.

4. Discuss the advantages and limitations of the following using suitable examples : **15**

(a) Process Control

(b) Finite Difference Method.

Unit III

5. Write technical notes on the following : **5×3**

(a) Continuous distribution

(b) Data manipulation

(c) Poisson Process.

6. Explain the behaviour of various Markovian models for physiological systems. **15**

Unit IV

7. Explain the kinetic theory of active particles with linear and non-linear interactions in a complex living system. **15**

8. Write short notes on the following : **5×3**

(a) Pharmacokinetic model

(b) Cardiovascular System Simulation

(c) Process flow models.