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Roll No. ....

**F-52**

**B. Tech. EXAMINATION, May 2017**

(Sixth Semester)

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

(BME)

BME-304-B

MODELLING AND SIMULATION

*Time : 3 Hours]*

*[Maximum Marks : 75*

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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.

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

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**P.T.O.**

### Unit I

1. Define and discuss the following in brief :
  - (a) Biomechanics
  - (b) Kinematics
  - (c) Dynamics
  - (d) Modeling
  - (e) Simulation. **3×5**
2. Describe the computational modeling, brief experimental procedures, segmentation and methods for patient-specific modelling. Explain with the help of suitable example. **15**

### Unit II

3. Explain the mathematical modeling and computational simulation for the following :
  - (a) Medical Imaging
  - (b) Cardiac Output. **7½×2**
4. Discuss the advantages and limitations of the following using suitable examples : **15**
  - (a) Process Control
  - (b) Finite Element Method.

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### Unit III

5. Write technical notes on the following : **5×3**
  - (a) Discrete distribution
  - (b) Empirical distribution
  - (c) Poisson process.
6. Explain the queuing system for physiological systems. Discuss the significance of lead time demand and modelling requirements for the same. **15**

### Unit IV

7. Explain the pharmacokinetic model for drug delivery. Discuss its significance, theory of acceptance, advantages and limitations. **15**
8. Write short notes on the following : **5×3**
  - (a) Kinetic theory of active particles
  - (b) Features of complex living systems
  - (c) Process flow models.

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**50**