2122

M.Sc. (Bio-Informatics) Third Semester
MBIN-8012: Elements of System Biology

Time allowed: 3 Hours

Max. Marks: 60

NOTE: Attempt _five_ questions in all, including Question No. I which is compulsory and selecting atleast one question from each Unit.

x-x-x

**1 All parts are compulsory.**
1. What is the function of SBML toolbox.
2. Write a short note on Gepasi modelling tools.
3. What is the advantage of modular design in model assignments.
4. What is a toggle switch in lambda phage life cycle.
5. Which promoter module initiates the Endo-16 gene expression in sea urchin.
6. What is the advantage of computational simulation of the cells.
7. What is human erythrocyte model system.
8. Write a short note on STOCKS2 modelling tool. (8x1.5)

## Unit –I

2 a) Write a short note on modular designs of biological models.
   b) Discuss the steady states of system and add a note on variables and parameters influencing the system. (4+8)

3 a) Write briefly how does systems biology assist in understanding biological systems.
   b) Discuss briefly the properties of biological system with models and their suitable examples. (8+4)

## Unit –II

4 Write short notes on features and applications of following model exchange languages
   a) Systems biology Mark Up language   b) Math Mark Up Language (6+6)

5 Discuss the following modelling and visualization tools.
   a) E-cell      b) J Designer    c) PetriNets (3x4)

## Unit –III

6 a) Elaborate on stimulatory modules of Endo-16 gene expression.
   b) Give a diagrammatic layout of lambda phage lytic life cycle. (6+6)

7 a) Briefly describe the Mycoplasm genitalium as a model cell for simulation studies.
   b) Give a diagrammatic layout of Endo 16 cis-regulatory elements. (4+8)

x-x-x