

**M. Sc. Bioinformatics Sem.-III (2013 Course) (Choice Based Credit
Systems) : WINTER - 2018
SUBJECT : SYSTEMS BIOLOGY**

Day : Monday Time : 02.00 PM TO 05.00 PM
Date : 29/10/2018 **W-2018-1262** Max. Marks : 60

N. B. :

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Answers to both the sections should be written in **SEPARATE** answer books.
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SECTION – I

- Q. 1** Explain briefly : (10)
- a) Biological systems
 - b) Modeling types
 - c) Model constraints
 - d) Logistic model
 - e) Stoichiometry
- Q. 2** Answer the following: (10)
- a) Give an overview on qualitative modeling.
 - b) Give an overview on physical process modeling.
- Q. 3** Write short notes on: (10)
- a) Linear and non-linear models
 - b) Predator-prey models
- Q. 4** Explain in detail numerical integration, stability and stillness. (10)

OR

Explain in detail differentiation, ODEs and PDEs.

SECTION – II

- Q. 5** Explain briefly : (10)
- a) Model validation
 - b) Models in real space
- Q. 6** Answer the following: (10)
- a) What are discrimination models?
 - b) What are dynamic validations techniques? Explain.
- Q. 7** Write short notes on: (10)
- a) Complexity and robustness analysis
 - b) Modularity based studies
- Q. 8** Write in detail on machine-learning based modeling techniques. (10)

OR

How to utilize non-linear equations in systems biology?

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