M. SC. BIOINFORMATICS SEM.-III (2013 COURSE)
(CHOICE BASED CREDIT SYSTEMS) : WINTER - 2017
SUBJECT: SYSTEMS BIOLOGY

Day: **Wednesday**
Date: **01/11/2017**

Time: **02.00 PM TO 05.00 PM**
Max. Marks: 60

W-2017-1018

N.B.:

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Attempt any **TWO** questions from the remaining questions from each sections.
2) Answers to two section should be written in **SEPARATE** answer books.
3) Figures to the **RIGHT** indicate full marks.
4) Draw neat labelled diagrams **WHEREVER** necessary.

SECTION-I

Q.1 Answer any **FIVE** of the following: **(10)**

a) What are the different types of modelling?

b) What are forrester diagrams?

c) Explain non-linear model.

d) What are stoichiometry matrices?

e) Which are the different techniques used in analyzing bio- models?

f) Explain – instability.

Q.2 Answer any **TWO** of the following: **(10)**

a) What is System Biology? Describe its features in brief.

b) What are the principles of Qualitative Formulation?

c) Describe the non-classical view approach.

Q.3 What is the approach and goal of systems biology? What is the difference between system biology and bioinformatics? **(10)**

OR

Explain Classical View Approach.

Q.4 Explain the predator-prey model. **(10)**

OR

What is the purpose of qualitative modelling? List down all the components that lie inside and outside of forrester diagram.

P. T. O.

SECTION-II

Q.5 Answer any **FIVE** of the following: **(10)**

a) Which are the dynamic quantities of forrester diagram?

b) Explain Simulation.

c) Explain the terminology dynamic model.

d) What is model validation?

e) What are complexity analysis?

f) What do you understand by real space?

Q.6 Write a Runge –Kutta script for: **(10)**

$\frac{dy}{dx} = x + y$, find $y(0.2), y_0 = 1, x_0 = 0.$

OR

What is Modularization?

Q.7 **a)** Which are Machine-based learning modeling techniques. **(10)**

OR

b) Short note- robustness.

Q.8 Answer any **TWO** of the following: **(10)**

a) What is system –level validation?

b) Solve the following Simpson equations:

X =	0.0	0.25	0.50	0.75	1.00
Y =	0.0	0.06	0.20	0.36	0.50

c) Explain the types of modelling.

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