

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)

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

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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