No. of Printed Pages : 3 **MBOI-003**

M.S. IN BIOTECHNOLOGY (MSBOBI/MSBOCC/MSBOMM)

Term-End Examination

00327

December, 2014

MBOI-003 : INTRODUCTION TO SYSTEMS BIOLOGY

Time : 3 hours *Maximum Marks : 100*

Note :

(i) *Section I is* ***compulsory****.*

(ii) *In Section II, question no.* ***2*** *is* ***compulsory****. Answer any* ***four*** *questions from 3 to 8.*

(iii) *Assume suitable data wherever required.*

(iv) *Draw suitable sketches wherever required.*

(v) *Italicized figures to the right indicate maximum marks.*

SECTION I

1. Answer the following :

(a) Write a note on EcoCyc database. Describe its features in detail. *10*

(b) Describe the two systems biology approaches used for studying any given biological system. *10*

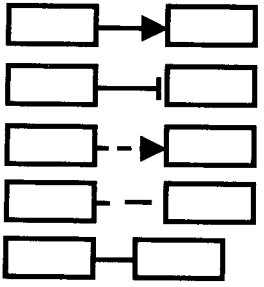
(c) What is the application of graph theory in studying biological networks ? Give the differences between undirected acyclic and directed cyclic graphs. *10*

SECTION II

Question no. **2** *is* ***compulsory****. Answer any* ***four*** *questions from 3 to 8.*

2. Describe the various computational methods for predicting protein-protein interaction studies. Explain any two methods in detail. *5+9*

3. Write a note on KEGG ***Brite*** and explain the given symbols represented in the KEGG graph given below. *7+7*



4. Comment on the role of phosphorylation in signal transduction. *14*

5. Describe gluconeogenesis pathway. Explain how glycolysis and gluconeogenesis is reciprocally regulated. *6+8*

6. What is a biological network ? Describe the different types of biological networks studied. *3+11*

7. What is systems biology ? Write a note on its role in today's biological sciences. Describe two approaches used for studying any given biological system. *3+5+6*

8. Calculate the following and write a note on centrality of nodes in a network.

(a) Degree of node 'd'. *2*

(b) Distance between node 'l' and node 'a'. *3*

(c) Distance between node 'f' and node 'k'. *3*

(d) Clustering coefficient of the network. *4*

(e) Average degree of the network. *2*