

COURSE CODE: 14B1WBI732

MAX. MARKS: 35

COURSE NAME: Computational Systems Biology

COURSE CREDITS: 3

MAX. TIME: 2 hours

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- Q1.** Discuss the following models of TRN with suitable example: (2x3 = 6 Marks)
- a) Boolean Model b) Continuous Model c) Single molecule model
- Q2.** Explain the following with a reference points towards any real biological system: (2x3 = 6 Marks)
- a) Biological toggle switches b) Reverse engineering
- c) Temporal expression in network motifs
- Q3.** Discuss system and its basic properties. How a biological system evolve? Explain your views with the justification of network based computations and parameters. (3 Marks)
- Q4.** Explain the G protein life cycle and describe the ODEs for the same. (2 Marks)
- Q5.** What is a phosphorelay system and what is the difference between this and phosphorylation system? (2 Marks)
- Q6.** What are the three levels of abstraction in metabolic networks? (2 Marks)
- Q7.** Compare and contrast metabolic network with signal transduction. (2 Marks)
- Q8.** Define stoichiometric coefficients with example. (2 Marks)
- Q9.** How many vectors and matrices are involved in describing a metabolic network mathematically? (2 Marks)
- Q10.** What are the different layers of information required in a genome scale metabolic network reconstruction? (2 Marks)
- Q11.** What is the problem with carbon chemistry and metabolic network reconstruction? (2 Marks)
- Q12.** What are the assumptions of Flux Balance Analysis? (2 Marks)
- Q13.** Define the following: (0.5x4=2 Marks)
- a) Flux cone b) Objective Function
- c) Constraint based modeling d) Lower and upper bounds of flux