

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT

MID SEMESTER EXAMINATION-2015

B.Tech VIII SEMESTER

COURSE CODE: 15B1WBI834

MAX MARKS: 30

COURSE NAME: Computational Molecular Evolution

MAX TIME: 2 hrs

COURSE CREDITS: 3

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**Note: All questions are compulsory**

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**Section A**

**[Marks: 6]**

**Q1.** Answer each of the following in brief with a supporting example if required: [1 X 6= 6]

- i. How you compute the evolutionary rate at molecular level?
- ii. Discuss the evolution of genetic code system.
- iii. Differentiate between divergent and convergent evolution.
- iv. What are overlapping genes? How these are linked with nested genes?
- v. What are various kinds of selections? How selection is different from mutations?
- vi. Differentiate between homology and homoplasy evolutionary events.

**Section B**

**[Marks: 9]**

**Q1.** Give computations for Codon adaptive index through RSCU. How it is associated with the biased usage of codons in genomic sequences? [3]

**Q2.** How the discovery of introns change the gene definition? Discuss two important theories for the evolution of introns with their taxonomic references. [3]

**Q3.** Describe the process of retrosequence creation. How evolution of retroelements happened, explain with an example. [3]

**Section C**

**[Marks: 15]**

**Q1.** Describe the event of non-functionalization for two given species. Describe the method to estimate non-functionalization time through divergence and speciation events for pseudo-gene. [5]

**Q2.** Write your views about various theories of evolution with example evidence in support of your views. Explain the event of Moth and Industrial revolution through evolution. [5]

**Q3.** Explain the process of gene duplications and its dating. Discuss all parameters and substitution comparisons for this event. Discuss the case of protein coding genes for gene duplication event and its dating procedure. [5]