

# Question Paper

Exam Date & Time: 07-May-2018 (02:00 PM - 05:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

### MANIPAL COLLEGE OF PHARMACEUTICAL SCIENCES

#### END SEMESTER THEORY EXAMINATIONS- MAY 2018

#### PROGRAM: MPHARM SEMESTER 2 (PHARMACEUTICAL BIOTECHNOLOGY)

DATE: 07/05/2018

TIME: 2:00 PM - 5:00 PM

#### Bioinformatics and Computational Biotechnology [PBT-MPB203T]

Marks: 50

Duration: 180 mins.

a

**Answer all the questions.**

**Answer the following (5 marks x 8 = 40 marks)**

- 1) List out the differences between GenBank and FASTA format of a sequence? Which format is preferred by most of the bioinformatics tools? Why? (5)
- 2) Discuss in detail the steps involved in progressive alignment method. What are its advantages over other methods? (5)
- 3) What are the different types of gap penalties? Which one do you prefer to align sequences? Why? (5)
- 4) Discuss in detail the different protein secondary structure prediction methods. (5)
- 5) What is homology modeling? Discuss in detail the steps involved in this process. (5)
- 6) Mr. X has given you a nucleotide sequence and requested to find if it contains any genes. What are the different approaches and tools that you would use for this purpose? (5)
- 7) Describe the following terms: (5)  
Guide tree and phylogenetic tree.  
Bifurcating tree and multifurcating tree.  
Phylogram and cladogram.  
What is an outgroup? Which sequence do you consider as outgroup during phylogenetic analysis?
- 8) (5)

Mr. Y has a protein whose structure is not known. He would like to identify small molecule inhibitors against this protein through in silico methods. You have been assigned to help him in this regard. Describe the steps that you might follow in detail.

**b**

**Answer all the questions.**

**Answer the following with specific answers (2 marks x 5 = 10 marks)**

- 9) What are primary and secondary sequence databases? Give examples. (2)
- A)
- B) Which PAM and BLOSUM matrices would you opt for comparing closely related sequences? Justify. (2)
- C) Which representation of the protein would you choose to visualize the secondary structures? Why? (2)
- D) What are bootstrapping and Jackknifing? What is their significance? (2)
- E) Why Lipinski's rules are known as rule of five? What is their significance? (2)

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