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3 (Sem-5/CBCS) ZOO HE 1

2022

ZOOLOGY

(Honours Elective)

Paper : ZOO-HE-5016

(DSE(H)-1)

(Computational Biology and Biostatistics)

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Fill in the blanks : **(any seven)** $1 \times 7 = 7$

(a) SWISPROT protein sequence database began in the year _____ .

(b) Bioinformatics database was first created by _____ .

(c) The human genome contains approximately _____ base pairs.

Contd.

- (d) COPIA is used for identification of _____.
- (e) STAG is maintained by _____.
- (f) The information retrieval tool of NCBI Gene Bank is _____.
- (g) Proteomics refers to the study of _____.
- (h) EMBL is a _____ sequence database.
- (i) Phylogenetic relation can be shown by _____.
- (j) The first molecular biology server expasy was used in the year _____.
- (k) _____ is the first completed and published gene sequence.
- (l) The identification of drugs through the genome study is called _____.

2. Answer the following : **(any four)** $2 \times 4 = 8$

- (a) EMBL
- (b) Global alignment
- (c) Standard error

- (d) Phylogram

- (e) DNA database of Japan

- (f) Goodness-of-fit

- (g) OMIM

- (h) Genetic Code

3. Answer the following questions : **(any three)** $5 \times 3 = 15$

- (a) Explain the hierarchical method of multiple sequence alignment.
- (b) Discuss the database that contain the information of protein sequences.
- (c) Explain the secondary database.
- (d) What is dendrogram ?
- (e) What are biological databases based on data type and database design ?
- (f) Explain co-efficient of variance and its importance.
- (g) How standard deviation is differed from standard error ?
- (h) Application of Chi-square tests.

4. Answer the following questions : **(any three)**
10×3=30

- (a) What is phylogeny? Discuss the various method for phylogenetic analysis.
- (b) Elaborate different file formats in biological resources with the help of an arbitrary example each.
- (c) Give various types of BLAST. Explain briefly the algorithm of BLAST.
- (d) Discuss STRING database. Describe its various features.
- (e) How can you predict the structure of a protein sequence? Explain in detail one of the knowledge-based method to predict the protein structure.
- (f) Explain the various apparatus used in pairwise sequence alignment.
- (g) What is Biostatistics? How biostatistics help in biological sequence analysis?
- (h) Calculate the standard deviation from the following data :

X :	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Y :	30	58	62	85	112	70	57	26