3 (Sem–5/CBCS) ZOO HE 1

2025

ZOOLOGY

(Honours Elective)

Paper : ZOO–HE–5016

(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 : 1×7=7

   (a) Standard deviation is the square root of _____.

   (b) The fundamental statistical indicators are _____.

   (c) _____ is a database for domains and protein families.

   (d) DDBJ is maintained by _____.

(e) Exon contains a part of the _____ that codes for a specific sequence.

(f) FASTA format is also termed as _____ format.

(g) Multiple sequence alignment is an extension of _____ alignment.

2. Answer the following questions : ***(any four)*** 2×4=8

(a) What is standard error ?

(b) What is biostatistics ?

(c) What is e-value of alignment scores ?

(d) What are primary databases ?

(e) What is the difference between structural and functional genomics ?

(f) Write the salient features of Genetic Code.

(g) List *any two* protein databases.

(h) State the differences between global and local alignment.

3. Answer the following questions : ***(any three)*** 5×3=15

(a) Define Chi-square test for goodness-of-fit. Mention the criteria for which Chi-square goodness-of-fit test is appropriate.

(b) What is PIR ? Describe various resources and databases of PIR.

(c) Illustrate global alignment with suitable example.

(d) What do you mean by secondary database ? What are the major secondary databases ?

(e) Compare PAM and BLOSUM matrices.

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

(a) What is *t*-test ? How does one-sample *t*-test differ from two-sample *t*-test ?

(b) What is Entrez ? Systematically represent the architecture of Entrez system, briefly explaining each of them.

(c) Classify biological databases based on data type, maintainer status, data access, data source, database design and organism. Explain with proper examples.

(d) What is bioinformatics ? What are the branches, scope and aim of bioinformatics ?

(e) The following table shows the distribution of the number of hours worked each month (on average) for a sample of 500 community college students.

Hours worked per month	Number of students
20 – 30	30
30 – 40	58
40 – 50	62
50 – 60	85
60 – 70	112
70 – 80	70
80 – 90	57
90 – 100	26

Find out the standard deviation.
