Total No. of printed pages = 6

63/2 (SEM-2) ZOO 204

2022

ZOOLOGY

(Theory Paper)

Paper Code : ZOO 204 (Old&New)

(Bioinformatics and Biostatistics)

Full Marks – 80

Time – Three hours

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

1. Answer the following objective type questions (*all* compulsory) : 1×6=6

   (i) The International Nucleotied Sequence Database Collaboration (INSDC) is a long-standing foundational initiative that operates between

   (a) GenBank, EBI and EMBL

   (b) GenBank, PIR and PDB

   (c) GenBank, EBI and DDBJ

   (d) GenBank, PIR and EBI

[Turn over

(ii) Choose the correct chronological order of protein modeling

(i) Alignment of query and template sequence

(ii) Template selection

(iii) Refining

(iv) Model Evaluations

(v) Model building

Options

(a) i → ii → iii → iv → v

(b) ii → i → v → iv → iii

(c) i → ii → v → iv → iii

(d) ii → i → v → iii → iv

(iii) Which of the following can be used for Phylogenetic tree building ?

(a) GenBank

(b) Clustal-W

(c) BLAST

(d) Protein Data Bank

(iv) All of the followings are important for primer designing, except

(a) Primer length

(b) Primer GC-content

(c) Modified nucleotied sequence

(d) Melting temperature

(v) Suppose in a large aquarium there are 35 individuals of *Channa punctatus*. You have collected 13 fishes and measured the body length, summed up the toal lengths and divided by 13. What will you get after the calculation ?

(a) Average body length of fish

(b) Variance of the length of the body

(c) Mean of the length of the body

(d) Standard deviation of the length of the body

(vi) In a positively skewed distribution the position of Mean, Median and Mode is

(a) Mean = Median = Mode

(b) Mean > Median > Mode

(c) Mean < Median > Mode

(d) Mode > Median > Mean.

2. Answer the following questions (*all* compulsory) : 2×5=10

(a) What is a biological database ? Give one example of protein and nucleic acid sequence database.

(b) What do you mean by protein homology modeling ?

(c) Write two properties of Pearson Correlation Coefficient, r.

(d) Differentiate between Standard deviation and Standard error.

(e) Differentiate between One-way and Two-way Analysis of Variance.

3. Answer any *six* of the following questions : 5×6=30

(a) Write short note on GenBank.

(b) Describe briefly about the sequence alignment and its importance.

(c) Describe the different approaches of finding a core nucleotied sequences.

(d) How do you derive correlation between sequence and biological functions ?

(e) Write short note on Ligplot analysis.

(f) What is kurtosis ? Explain different kurtosis with suitable illustrations. 1+4=5

(g) Differentiate between parametric and non-parametric tests with examples.

(h) Write regression equations of 'x' on 'y' and 'y' on 'x'. State basic differences between correlation and regression analysis. 2+3=5

(i) What is the exceptional rule in comparing the calculated 'U' value with the critical U value for the significant result in case of Mann-Whitney U test ? State the restrictions of applying this test. 2+3=5

4. Answer any *two* of the following questions : 10×2=20

(a) What do you mean by protein structure validation ? How do you validate the correct conformation of a protein structure ? 4+6=10

(b) Describe the structural organization, mission and research activities of NCBI. 3+3+4=10

(c) What is normal distribution curve ? Explain its properties with suitable diagrams. 2+8=10

5. Answer any *one* of the following questions : 14×1=14

(a) What is computer assisted drug designing ? Describe how do you design a drug using bioinformatic tools ? 2+12=14

(b) (i) What is correlation ? Explain different types of correlations with suitable examples and illustrations. 2+6=8

(ii) What are the measures of central tendency ? Explain each of these with suitable examples. 1+5=6