Reg. No. ☐☐☐☐☐☐☐☐☐

BCS 555

IV Semester M.Sc. Examination, September/October 2022
BIOCHEMISTRY
Bioinformatics, Biostatistics and Nanobiotechnology

Time : 3 Hours   Max. Marks : 70

Answer **any ten** of the following :   **(10×2=20)**

1. a) Define data bases with an example.

   b) What is FASTA ? Give its significance.

   c) Expand PDB. State any two of its applications.

   d) Define mean. How it represent central tendency ?

   e) Justify the origin and applications of NCBI.

   f) Define nanoscale. How it relates to Nanomaterials ?

   g) What are plant extracts ?

   h) How nanotechnology helps to design biosensors ?

   i) Differentiate pie chart and histogram.

   j) What is the measure of data variance ? Give its importance.

   k) State any two applications of genome mapping.

   l) Define bionanomagnetism.

Answer **any five** of the following :   **(5×10=50)**

2. a) Explain the scope, tasks and applications of bioinformatics in biological research.

   b) Discuss on the types and formats of databases. Explain the characteristics and operation mechanism of database management system.   **(5+5)**

3. a) What is central tendency measurement ? Determine and state the importance of mean, median and mode for the given data. 10, 12, 15, 17, 12, 15, 13, 18, 15, 20 in gm.

   b) Discuss the types of graphical representation of data. Explain its significance in statistical interpretations. **(5+5)**

4. a) Explain the classification of nanomaterials. Discuss on the methods for synthesis and characterization of nanomaterials.

   b) What are carbon-based nonmaterials ? How they differ from metal based nonmaterials ? Detail on the potential applications in nanobiotechnology. **(5+5)**

5. a) Discuss the parameters to retrieve and analysis of nucleic acid and protein sequences from NCBI data base. How BLAST is helpful for sequence identification ?

   b) What are sequence alignment tools ? How pair-wise and multiple sequence alignment predict sequence similarity and identify scores ? **(5+5)**

6. a) Calculate the standard deviation and coefficient of variance for the given data set.
   43, 66, 61, 64, 65, 38, 59, 57, 57, 50.

   b) What is Chi-square test ? How this test is used to determine the statistical significance among the data variants ? **(5+5)**

7. a) What are bioactive nanomaterials ? How the plant extracts are used to synthesis biofunctionalized nanomaterials ? Justify their advantages over metal nanoparticles.

   b) Discuss the applications of nanotechnology in biomedical and pharmaceutical research to design nanomedicines. **(5+5)**

8. Write a note on the following :

   a) Standard Deviation (SD) and Standard Error of Mean (SEM).

   b) Human genome project. **(5+5)**

_____