2025

RANI RASHMONI GREEN UNIVERSITY

ENVIRONMENTAL SCIENCE

SEMESTER-IV

COURSE CODE: GESP-44A

Full Marks: 50

Time: 3 Hours

Group-A

*Perform **all** the prescribed experiments*

1. Explain the principle, instrument required and procedure for Body Mass Index calculation of the given participant record. Calculate and determine the appropriate classifications for the given records. Comment on the obtained result. 6+2+2 = 10
2. Explain the principle, instrument required, reagents and procedure for estimation of Vitamin C (Ascorbic Acid) present in the packed fruit juice consumed by an individual using the redox titration method. Identify the individuals with vitamin C deficiency from the records. Comment on the obtained results. 6+2+2 = 10

Group-B

*Choose **any 2** of the following experiments by **drawing cards***

3. Describe the principle of Polymerase Chain Reaction (PCR), the role of Taq polymerase, and list the components required in the PCR process and their role. What are the primers and steps involved in designing them? 6+4 = 10
4. Describe the principle of plasmid isolation, the instruments required, the role of solution I, solution II, and solution III. Explain the importance of the application of RNase during plasmid isolation.6+4 = 10
5. Describe the steps involved in conducting the Basic Local Alignment Search Tool (BLAST) in Bioinformatics, the types of BLAST and the characteristics of BLAST. List the common applications of BLAST. 8+2 = 10
6. Describe the steps involved in assessing the Kyoto Encyclopedia of Genes and Genomes (KEGG) database, the list of available collections and the importance of KEGG enrichment analysis. Provide the formula for the hypergeometric distribution, including proper annotations. 8+2 = 10
7. Describe the steps involved in the visualisation of protein structures using the RasMol interface, the types of display options available and the colour code for elements in CPK standards. List the colour codes for the protein secondary structures in colour/structure mode. 8+2 = 10
8. Viva voice 6
9. Laboratory Record Book Submission 4