Test Code: DUAT05

Programme: MSc Data Science and BioAI

Question type	Syllabus
General Aptitude 20 Marks	**Verbal Aptitude-**Basic English grammar: Tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech. Basic vocabulary: Words, idioms, and phrases in context. Narrative sequencing. **Quantitative Aptitude-**Data interpretation: Data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables. Numerical computation and estimation: Ratios, percentages, powers, exponents and logarithms, permutations and combinations, summations and series, Mensuration and Geometry **Analytical Aptitude-** Logic: Deduction and induction, analogy, numerical relations, and reasoning **Spatial Aptitude-**Transformation of shapes: Translation, rotation, scaling, mirroring, assembling, grouping, paper folding, cutting, and patterns in 2 and 3 dimensions.
Basic Mathematics 10 Marks	**Set Theory**: Concept of sets – Union, Intersection, Cardinality, Elementary counting; permutations and combinations. **Probability and Statistics**: Basic concepts of probability theory, Averages, Dependent and independent events, frequency distributions, measures of central tendencies and dispersions.

BSc level questions 20 Marks	**Biochemistry/Biotechnology** • Nucleic Acids: Structure and functions of DNA and RNA; DNA replication, transcription, and translation. • Proteins: Structure, folding, stability, and interactions. • Enzymes: Mechanisms of enzyme action, enzyme kinetics (Michaelis-Menten equation), enzyme inhibition, and regulation. • Human Genome Project: Key achievements and significance. • Genome Sequencing: Fundamentals and applications of sequencing technologies. • Genomic Integrity: Mutations and DNA repair mechanisms. • Production of therapeutic proteins and vaccines. • CRISPR Technology: Principles and applications **Chemistry** • Atomic Structure: Overview of atomic models, concepts of atom, orbit, orbital, and electronic configuration. • Periodic Properties: Trends in atomic size, electronegativity, and electron affinity. • Chemical Bonding and Molecular Structure: Hybridization, VSEPR theory, valence bond theory, molecular orbital theory, and intermolecular forces. • Chemical Kinetics: Basics of reaction rates, mechanisms, and activation energy. • Stereochemistry: Configuration and conformational isomerism, with emphasis on chirality. • Organic Chemistry: Fundamentals, including reaction mechanisms. • Medicinal Chemistry: Drug classification, properties, an overview of drug-receptor interactions, ADMET properties, and pharmacokinetics. • Computational Chemistry: Basics of molecular mechanics and quantum mechanics.
BSc level questions 10 Marks	**Computer Basics**: Organization of a computer, Central Processing Unit (CPU), structure of instructions in CPU, input/output devices, computer memory, and back-up devices. **Data Representation**: Representation of characters, integers and fractions, binary and hexadecimal representations, binary arithmetic: addition, subtraction, multiplication, division, simple arithmetic and two's complement arithmetic, floating-point representation of numbers, Boolean algebra, truth tables, Venn diagrams.