

PAPER-I BIOSYSTEMATICS, TAXONOMY AND QUANTITATIVE BIOLOGY

(Questions, will be set from each unit)

UNIT- I BIOSYSTEMATICS AND TAXONOMY - I

1. History of classification, 2. Theories of classification, 3. Mechanism of Speciation, 4. Taxonomic procedures - Collections, Preservations Curing Process of identification, 5. International code of Zoological Nomenclature, 6. Taxonomic categories, 7. Evaluation of biodiversity indices :
A. Shannon - Weinner index, Dominance index, B. Similarity and dissimilarity index, C. Association index.

UNIT-II BIOSYSTEMATICS AND TAXONOMY-II

1. Importance and applications of biosystematics in biology.
2. Trends in biosystematics -
A. Chemotaxonomy B. Cytotaxonomy C. Molecular Taxonomy.
3. Molecular Perspective on the conservation of diversity - Diversity and eco-system process - Theory, achievements and future directions.
4. Wild life and its conservation, 5. National parks and sanctuaries of India, 6. Geological and Zoogeographical distribution of animals, 7. Fossils and Palaeozoology.

UNIT - III BIOSTATISTICS

1. General concept and Significance of Biostatistics to Bioscience.
2. Probability Distributions and their properties. 3. Probability theory.
4. Regression. 5. Experimental designing and sampling theory. 6. Correlation
7. Uses and applications of chi square test, 't' test, and 't' test.

UNIT-IV BASIC MATHEMATICS AND MATHEMATICAL MODELING

1. Matrices and Vectors. 2. Exponential Functions. 3. Periodic functions.
4. Differential equations. 5. Integration. 6. Laws of Thermodynamics and its application in biological systems.
7. **Mathematical Modelling - Detailed treatment of selected specific models from different areas of biology -**
A. Cycling of nutrients in an ecosystem/eutrophication model.
B. Optimal clutch size in birds. C. Morphogenesis.
D. Genetic drift.