



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

GENERAL ZOOLOGY

Unit-I

Biosystematics and Biodiversity: Pre-classification groupings. Taxonomic Procedure: ALPHA, BETA and GAMA stages. Kinds of classification. Taxonomic characters: A) selection of characters B) Kinds of characters. Methods of taxonomic collection – Example – Insect collection. Describing new taxa. Theories of biological classification, Landscape Ecology and Biogeography. Distribution pattern of Animals on Earth. Types of diversity. Species diversity according to geographical scale. Methods of measuring biological diversity. Methods of sampling animals. Methods of determining population characteristics. Methods of determining biological function and ecological function of animals. Indian case studies on conservation, management strategy (Project Tiger, Biosphere reserves). Genetic, Species and ecosystem diversity, IUCN Red list categories, Biodiversity hotspots, Conservation of biodiversity National and international efforts in biodiversity conservation (UNEP, IUCN, WWF); UNESCO, CITES, Convention on Biological Diversity (CBD), World heritage mission, Earth Summit, Rio+20, Environmental Protection laws and Acts.

Unit -II

Mammalian Endocrinology and Animal behaviour: . Mechanism of hormone action; Protein hormones; Membrane receptors; G-proteins; Cyclic AMP signaling cascade; PKC signaling pathway; Steroid hormones (genomic and nongenomic pathways). Hypothalamo-hypophysial System; General organization; Neurohypophysial octapeptides (oxytocin and vasopressin); Hypophysiotropic hormones: chemistry, localization and actions; Adenohypophysial hormones: chemistry and physiological roles. Somatotropin and prolactin ; Glycoprotein hormones (FSH, LH and TSH); Pro-opiomelanocortin (ACTH, MSH, β -LPH and β -endorphin); Neural control of adenohypophysis. Social organization: Why animals live in a group? Evolution of colonial behaviour. Cost & benefits. Prey – predator relationships: Antipredator behaviour. Ecology & evolution of antipredator behaviour. Importance of territoriality. Male-female reproductive tactics. Nature's architects: spider-web, bird's nest, mouse holes. Modes of communication. Specific patterns of

communication; Bee dance, echolocation in bat and electro-communication in fish. Crypsis & communication. Development of Singing in birds

Unit-III

Environmental Biology: its multidisciplinary nature and scope Components of Environment: Atmosphere, lithosphere, hydrosphere, biosphere, technosphere and noosphere Climate (micro, regional and global) Natural Resources: Human impact on natural resources and their management, Renewable and nonrenewable resources. Climate change, Greenhouse effect, Ozone layer depletion, Acid Rain, Deforestation, Desertification, Marine Pollution Pollutants and their control with respect to air, water and noise. Air Quality Standards, Water Quality Standards. Waste water treatment, Ganga Action Plan, Integrated solid waste management.

Unit-IV

Biostatistics and Bioinformatics: Sampling, Normal distribution. Probability. Test of hypothesis: Non-parametric (Mann-Whitney test, Kruskal Wallis test); Parametric test (ANOVA and MANOVA). Post-hoc test (LSD, Tukeys, Newman-Keul's, Duncan's New Multiple Range and Dunn's Test). Softwares related to statistical data analysis.

Introduction to Bioinformatics. Biological databases, pairwise sequence alignments: Sequence homology versus sequence similarity, Sequence similarity versus sequence identity, Methods, Scoring matrix and significance, BLAST, FASTA, Protein motif and domain prediction. Molecular phylogenetics, Protein structure databases and Universal repository Servers (EMBL, UniProt, ExPasy etc.).

Unit-V

Microscopy, staining and Analytical techniques: Bright field; fluorescence; confocal; Image acquisition and analysis, SEM and TEM; Histological and histochemical techniques, Spectrophotometry; Preparative Centrifugation, Chromatography; GC; FPLC; HPLC; Electrophoresis; MALDI-TOF; LCMS (Mass spectrometry); Immunological techniques, FACS, ELISA, IHC



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PRE – Ph.D. EXAMINATION – 2023 PAPER I - GENERAL ZOOLOGY Model Question Paper

Time: 3 hours

Max Marks: 100

Answer any five questions.
All questions carry equal marks.

Section – I

1. What is biodiversity? Describe the methods of biological diversity measurement?
(Or)
2. Write an essay on wild life conservation methods

Section – II

3. Write an essay on the biological actions of the hormones secreted from adenoypophysis
(or)
4. Describe the communication patterns in animals

Section – III

5. Describe the deleterious effects of climate change on biota
(or)
6. What are indicator species? write an essay on heavy metals pollution in marine ecosystem

Section – IV

7. Describe the construction of phylogenetic tree by using the bioinformatics tools
(or)
8. Find the probability distribution for X if the random variable X is defined to be the number of Ds in an outcome from the following table. Suppose an experiment has eight possible outcomes, each denoted by a sequence of three letters, each an N or a D

Outcome	NNN	NND	NDN	DNN	ADD	DND	DDN	DDD
Probability	0.336	0.224	0.144	0.084	0.096	0.056	0.036	0.024

Section – V

9. Define magnification and resolving power? . Describe the principle and working mechanism of Scanning electron microscope?
(or)
10. Describe different chromatographic techniques used in the separation of biological samples.