

RAJIV GANDHI UNIVERSITY

B.Sc. Zoology, Semester-I

Paper: Zoo/T1/101: Invertebrate Biosystematics and type specimen studies

Time: 3 hrs

Full Marks – 80+20

Pass Marks – 40%

ESE=80

IA=20

**Unit – 1**

Principle and type of classification with special emphasis on five kingdom classification.

International Code of Nomenclature, Binomial nomenclature.

Definition and concept of species and types (holotype, neotype and lectotype)

**Unit – 2**

Salient feature and classification of Protozoa up to order, Life cycle of *Plasmodium vivax*. Salient feature and classification of Porifera up to order, organization of the canal system in Sycon.

**Unit - 3**

Salient feature and classification of Coelenterata up to order, Polymorphism in coelenterates, Structure and organization of obelia. Salient feature and classification of platyhelminthes and nemathelminthes, structure and life cycle of *Taenia solium* and *Ascaris*.

**Unit -4**

Salient feature and classification of Annelida and Arthropoda up to order. General organization of *Pheretima* with emphasis on the reproductive organs.

Nervous system of Prawn. Beneficial and harmful insects.

**Unit -5**

Salient feature and classification of Mollusks and Echinodermata up to order, Digestive system of pila, torsion in gastropods and water vascular system in Starfish.

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RAJIV GANDHI UNIVERSITY  
B.Sc. Zoology, Semester-III  
Paper: Zoo/T3/303 – Cell Biology, Biochemistry and Genetics

Full marks – 60  
Pass marks – 40%

Time: 3 hrs

ESE=50

IA=10

**Unit – 1**

Cell as basic unit of life- Cell theories. Plasma membrane structure and function, Structural and functional features of mitochondria, Golgi complex, ribosomes, Endoplasmic reticulum, lysosomes

**Unit – 2**

Nucleus, Chromatin – Euchromatin and heterochromatin; chemical composition of nucleosome; Types of chromosome; Giant chromosome – Polytene & lampbrush  
Cell division – Mitosis and meiosis, Cell cycle – phases and regulation;

**Unit – 3**

Chemical bonds and biomolecules  
Classification and structure of carbohydrates, Proteins and lipids  
Glycolysis and TCA cycle, Electron transport chain and Oxidative phosphorylation

**Unit – 4**

Enzyme – classification and nomenclature; properties.  
Mechanism of Enzyme action, Michaelis-Menten equation, determination of  $K_m$  and its significance; Vitamins and coenzymes

**Unit – 5**

Mendel's experiments and laws of inheritance; test cross and back cross, Codominance, incomplete dominance.  
Mechanism of linkage and crossing over. Sex determination and sex linked inheritance; Multiple allele: Genetic basis of blood groups, Eugenics and genetic counseling

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**RAJIV GANDHI UNIVERSITY**  
**B.Sc. Zoology, Semester-III**  
**Paper: Zoo/P3/303 (Practical)**

Time: 3 hrs

Full marks – 30+10  
 Pass marks – 40%

**ESE=30**

**IA=10**

1. Preparation and study of mitosis in tadpole tail/onion root tip
2. Preparation and study of meiosis in grasshopper testes
3. Preparation and study of polytene chromosome in *Drosophila/chironomus* larvae.
4. Sex determination from buccal epithelial cells.
5. Detection of carbohydrates, proteins and lipids by biochemical test
6. Detection of amylase activity
7. Estimation of proteins
8. Estimation of carbohydrates (glucose and glycogen)
9. Practical record 3
10. Viva-voce 5

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RAJIV GANDHI UNIVERSITY  
B.Sc. Zoology, Semester-III  
SKILL BASED PAPER  
SBST-2303 (Optional-I) : Apiculture & Sericulture

Full Marks =80+20

Time 3 hrs.

ESE=80  
IA=20

**UNIT-1**

Identification of honey bee species, morphological characteristics  
Method of collection of honey bee from natural habitat  
structure and composition of hive, rearing method  
Structure of bee hive box and maintenance of the colony

**UNIT-2**

Selection of honey bee species for colony development.  
Identification of flowering plants and maintaining of gardens for honey bee  
Collection of honey and bee hive.  
Medicinal properties and commercial value of honey and bee hive

**UNIT-3**

Species identification of silk moth available in north east India  
Method of indoor and outdoor rearing. Study of life cycle, determination of different larval instars, diseases of silkworm and its prevention

**UNIT-4**

Preparation of cocoons for silk reeling, method of reeling, advance apparatus of silk reeling.  
Determination of quality of silk, Spinning techniques of silk  
Tensile strength of silk thread, prospective use for clothing and other purpose  
Commercialization of silk thread and silk products

**UNIT-5**

Food plants of silkworms & maintenance of food plant gardens,  
Predators of silkworm  
Advance techniques for increase silk production.  
Biotechnological approach for producing disease resistant variety of silk moth  
Identification of wild silk moth and crossing in between wild and normal species

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RAJIV GANDHI UNIVERSITY  
 B.Sc. Zoology, Semester-V  
 Paper: Zoo/T5/505 – Ecology, Ethology and Biostatistics

Full marks – 80+20  
 Pass marks – 40%

Time: 3 hrs

ESE=80  
 IA=20

**Unit - 1**

Concept and type of ecosystem: Structure (Abiotic and biotic components, food chain) and Functions (energy flow and biogeochemical cycles),  
 Liebig's law of minimum and Shelford's law of tolerance  
 Ecosystem types – Terrestrial and Aquatic

**Unit - 2**

Population: characteristic (mortality, natality and density), Growth curves, Community: structure and species richness and species diversity

**Unit - 3**

Concept of Ethology, Types of behaviour: innate and acquired  
 Altruism: reciprocal altruism, Communication: sonar, infrasound, echolocation and dancing in bees, Social organization in animals (parental care, competition and territoriality)

**Unit - 4**

Concept of Biostatistics and its application in biological sciences  
 Methods of presentation of statistical data  
 Measurement of central tendencies (Mean, Median, Mode)

**Unit - 5**

Measurement of dispersion – Standard deviation & standard error, coefficient of variation; Test of significance – T test,  $\chi^2$  Test, Correlation and regression, Analysis of variance: ANOVA.

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RAJIV GANDHI UNIVERSITY  
B.Sc. Zoology, Semester-V

Paper: Zoo/T5/506 – Histology, Biochemistry and Biochemical Techniques

Time: 3 hrs

Full marks – 80+20

Pass marks – 40%

ESE=80

IA=20

**Unit-1**

Types of tissues: Structure and function of epithelial, connective and nervous tissues  
Histological Structure of liver, pancreas, stomach, intestine, ovary, testis and bone

**Unit-2**

Chemical composition of carbohydrates  
Chemical Structure, properties and functions of amino acids and peptides  
Synthesis and beta oxidation of fatty acids

**Unit -3**

pH and Buffer: types of buffers and role of buffer in biological system  
Biological oxidations, glycolysis, glycogenesis, glycogenolysis and gluconeogenesis

**Unit-4**

Histochemical techniques: fixatives, stains and their types.  
Preparation of tissues for histological study: Fixation, dehydration, embedding, sectioning, staining and mounting  
Histochemical techniques for detection of DNA and RNA in tissue sections.  
Principle of microscopy and types of light microscope

**Unit-5**

Biochemical techniques: Preparation of buffers, molar and normal solutions  
Principle, procedure and biological application of spectrophotometer and electrophoresis.

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RAJIV GANDHI UNIVERSITY  
 B.Sc. Zoology, Semester-V  
 Paper: Zoo/T5/507 - Cytogenetics and Bioinformatics

Full marks - 80 +20  
 Pass marks - 40%

Time: 3 hrs

ESE =80  
 IA=20

**Unit 1**

Molecular structure of nucleic acids (DNA and RNA). Circular DNA and plasmids in bacteria. Chromosomal aberrations.  
 Genetic disorders: Down's syndrom, klenfilter's syndrom, Turner's syndrom, phenyle ketoneuria and sickle cell anemia

**Unit 2**

Cytoplasmic inheritance. Mutations and mutagens - definition, types, causes and mechanism of mutation  
 DNA damage and repair

**Unit 3**

Karyotyping and banding pattern, procedure and applications.  
 Principle, procedure and application of Flurosent in situ hybridization (FISH)  
 Flurosent Acitvated cell sorter (FACS) and applications

**Unit 4**

Historical background of bioinformatics: Basic operating systems, internet for biologists, databases and information retrieval system

**Unit 5**

Scope of bioinformatics, Elementary knowledge on gene library  
 Genome and proteome databases: NCBI, BLAST and EMBL, internet tools

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**RAJIV GANDHI UNIVERSITY**  
**B.Sc. Zoology, Semester-V**  
**Paper: Zoo/P5/508 (Practical)**

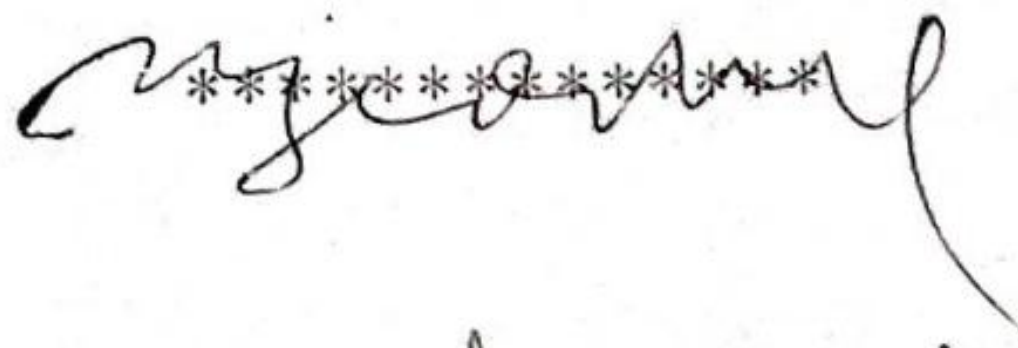
Time: 3 hrs

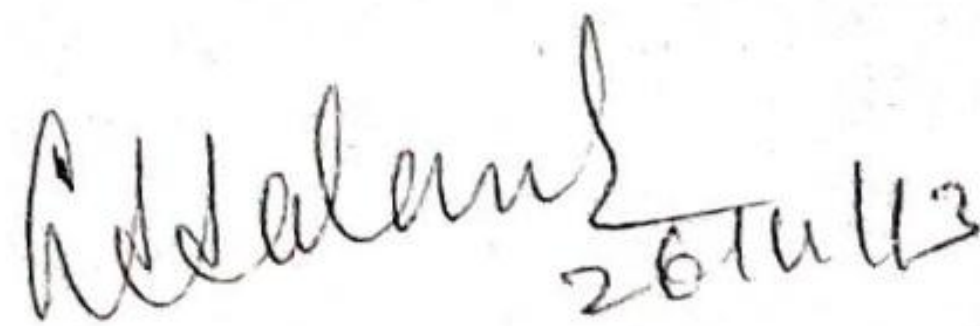
Full marks – 80 + 20  
 Pass marks – 40%

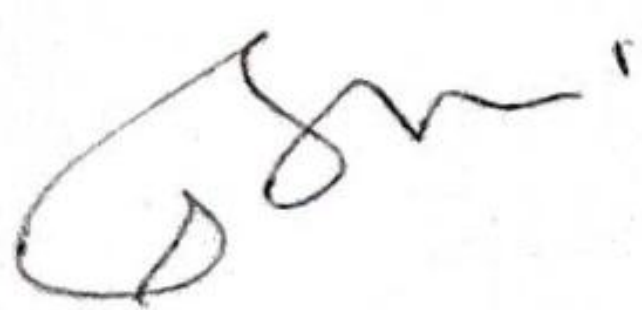
**ESE = 80**

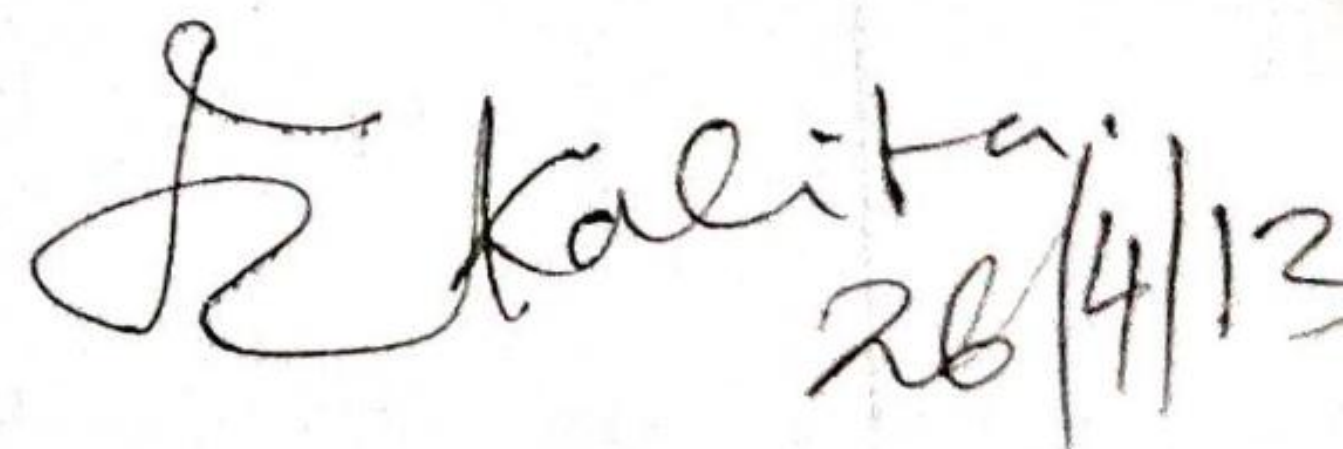
**IA=20**

1. Population study by quadrat method
2. Study of qualitative analysis of Zooplankton in the water sample
3. Determination of dissolve oxygen, carbon dioxide, alkalinity and hardness of water.
4. Statistical analysis of population data
5. Preparation and identification of histological slide of liver, testis, ovary.
6. Detection of glycogen, DNA and RNA by histochemical method in buccal epithelial cells/tissue sections.
7. Preparation of metaphase chromosome.
8. Preparation of karyotype from a given set of chromosome
9. Preparation of c-banding metaphase chromosome.
10. Practical record book 3
11. Viva voce 5

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