

**Subject: ZOOLOGY**

**V-SEMESTER**

(45 hours-3 Hours of Teaching per Week) Course Code: (Zool.Core: -5.1)

**MOLECULAR BIOLOGY, IMMUNOLOGY, BIOTECHNOLOGY  
AND WILDLIFE BIOLOGY**

**Module-1: MOLECULAR BIOLOGY**

(13 Hours)

Experiments to Show DNA and RNA as Genetic Material; Structure and Functions of DNA and RNAs(3); Other Forms of DNA (Non-coding, A,B, Z); Ribozymes; DNA replication, Enzymes in DNA Replication; DNA Repair Mechanism; Recombination in Prokaryotes; Protein Biosynthesis - Transcription (Post-transcription modification of RNA), Translation in Prokaryotes and Eukaryotes; Gene Action and its Expression; Genetic code : Components and Mechanism, Properties

**Module-2: IMMUNOLOGY**

(8 Hours)

Primary and Secondary Lymphoid Organs- Bone Marrow, Thymus; Bursa Fabricus; Peyer's Patches; T & B Cell immunity; Antigens and Antigenicity; Antibody- Types, Structure of IgG. Cytokines; Hypersensitivity - Allergy to Different Agents; Immunological Tolerance & Anti-immunity; and Immunization; Vaccines – types, DNA vaccine ; and detailed account on AIDS

**Module-3: BIO-TECHNOLOGY**

(12 Hours)

Scope and Basic Concept in Genetic Engineering; important enzymes used in biotechnology; Cloning Vehicles : Plasmids, Cosmids; Introducing Cloned Genes into the Host Cells: Transformation, Transduction, Particle Gun; Electroporation; Liposome Mediated Cultivation; FISH; RAPD, RFLP; A Brief Account of Southern Blotting; PCR; DNA Finger Printing; Monoclonal Antibodies; Genome Library; Introduction to Animal Tissue Culture Technique; A brief account of Transgenic Animals

**Module-4: WILDLIFE BIOLOGY**

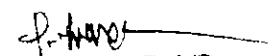
(12 Hours)

Distribution of wild life in India : the Himalayan ranges; the peninsular India sub region; Deccan Plateau; the Western Ghats; Eastern hill chain; Aravali ranges; the Indian desert; tropical rain forest; wild life in Andaman and Nicobar Islands

Animal Relationships: Mutualism; Commensalisms; Parasitism; Ammensalism; Predation and Competition with relevant examples

Wildlife Problems: Hunting; Over Harvesting; Habitat Destruction due to Over Population; Degradation; Habitat Shrinkage; Possibilities of Climatic Changes; Transgenic Changes; a Brief Account of Exotic/ Invasive sps.

Wild Life Conservation: Need; Agencies – Govt. and NGO's - CITES; INECE; TRAFFIC; IUCN; WWF; BIP; CBD; Red Data Book; Ramsar Convention; Kokkarebelluru; Salumarada Thimmakka; Methods of Conservation (*in situ* and *ex situ* Conservation); project Tiger, lion, elephant and crocodile; National Parks and Sanctuaries of Karnataka and its Importance, Location, Species Conserved; Endangered Fauna and Flora of India; Status of Wildlife in India; Wildlife Protection act 1972.

  
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**Subject: ZOOLOGY**

**V-SEMESTER**

*(3 Hours of Teaching per Week-15 practicals)* Course Code: (Zool.Pr: V-5.1)

**PRACTICALS – 5/5.1**

**MOLECULAR BIOLOGY, IMMUNOLOGY, BIOTECHNOLOGY  
AND WILDLIFE BIOLOGY**

1. Isolation and Estimation of DNA 2Prt
2. Types of DNA (A,B,Z) and RNA(t,r,m) Model or Photos 1Prt
3. Electrophoresis - Types, Technique and its Applications; Gel Electrophoresis Protocol 2Prt
4. FISH; RAPD,RFLP Techniques 2Prt
5. Study of DNA Finger Printing; PCR, 2Prt
6. Study of Plasmids, Cosmids (4 examples for each) 1Prt
7. Endangered Species (by Models/Pictures) – Slender Loris; Pangolin; Great Indian Bustard; Grey Hornbill; Green Sea Turtle; Musk Deer, Gharial, Varanus; Indian Rock Python 1Prt
8. Visit to Nearby Game Sanctuary/ Bird Sanctuary / National Parks to Study Wild Life (Catalogue of Animals Observed to be Submitted); Zoological provinces of India with figures /wild life distribution/Biodiversity hotspots to be marked in the India map. 2Prt
9. Study of Animal Relationship : Mutualism, Ammensalism, Commensalism, Predation, Competition, Parasitism with relevant examples 2Prt

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**Practical. 5.1**  
**SCHEME OF PRACTICAL EXAMINATION**

Time : 3 hrs.

Max. Marks : 50

- Q I Isolation of DNA /Electrophoresis /FISH/ RAPD/ RFLP Techniques Protocol10  
( Requirements 2 marks+ Procedure 3 marks + Conduct 5 marks)
- Q II Identify and comment on A&B (Types of DNA/RNA.)  
(Identification 1 mark; fig 1mark comment 2 mark) 2\*4=08
- Q III IdentifyComment on C & D( Pasmid and Cosmid )  
(Identification 1 mark; fig 1mark comment 2 mark) 2\*4=08
- Q IV Identify and comment on E &F(from endangered sps.)  
(Identification 1 mark; comment 2 mark) 2\*3=06
- Q V Comment on G& H (from animal relationship)  
(Diagram 1mark; description 3 marks) 2\*4=08
- Q VI Internal Assessment (Viva + Record) 10
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## V-SEMESTER- ELECTIVES

(45 hours-3 Hours of Teaching per Week) Course Code: (Zool. Elective:5.2A)

### 5.2A -ECONOMIC ZOOLOGY

#### Module-1: Poultry

(09 Hours)

History, Aim and scope of poultry; Poultry Breeds – classes of fowls; native and exotic breeds; Poultry Farm Management; Rearing House Equipment; Poultry Feed (starter & finisher) and its Composition; Broilers and Layers Rearing; Nutritive Value of Eggs and Meat; a note on Poultry Diseases and their Control- (viral, bacterial, protozoan, helminthes, genetic, ecto and endo parasites, nutritional deficiency diseases)

#### Module-2: Dairy Farming

(09 Hours)

History, Importance and scope; Management of Dairy Farm Animals; Breeds of Cows and Buffaloes; Housing and Hygiene of Dairy Animals; nutritional requirements(food computation), Processing, Preservation and Marketing of Milk; Milk and Milk Byproducts; Management of Calf, Heifer, Pregnant Cow and Bull, upgrading of local breeds and breeding programme, breeding technique and Artificial Insemination.Diseases and their Control- (viral, bacterial, protozoan, helminthes, genetic, ecto and endo parasites, nutritional deficiency diseases)

#### Module-3: Sericulture

(09 Hours)

History, Importance and scope; Components of sericulture : Moriculture - a Brief Account of cultivation, Life Cycle and Morphology of *Bombyx Mori*; Environmental Conditions Needed for Rearing; Rearing Equipments& housing; different races in practice; Grainage Activities; Silkworm Rearing; post harvest technology; Chawki& later Worm Rearing Methods; Non-mulberry Silkworms; Silkworm Pest and Predators; a note on Silkworm Diseases –Pebrine, Muscardine, Flacherie and Glacherie

#### Module-4: Aquaculture

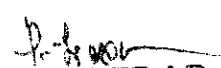
(09 Hours)

History, Importance and Principle; economically important aquatic organisms; Brief Account on Culturing of Indian Major Exotic Corps; Induced Breeding of Major Carps and Seed Fish; Types of Rearing Ponds; Endocrine Regulation of Fish Reproduction; a note on Fish by -products and Fish Diseases. Ornamental fish culture; Aquarium, common aquarium fishes and management of aquarium. Brief Account on Culturing of Frog, Pearl and fresh water Prawn,

#### Module-5: Apiculture

(09 Hours)

History, Importance and scope; Different Species and Races; honey bee Morphology; Mouth Parts and Sting Apparatus; Social Life& Life cycle; Duties of worker bee; Management of Bee Keeping (Modern Methods); Equipments Used; Economic Importance of Honey, Wax, Pollen, royal jelly, Venom and Bee Pollination; production, Properties and Chemical Composition of Honey; Pest and Predators of apiculture. a note on Poultry Diseases and their Control- (viral, bacterial, protozoan,)

  
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**V-SEMESTER - PRACTICALS – 5.2A**

(3 Hours of Teaching per Week) Course Code: (Zool.Pr: 5.2A)

**PRACTICALS – 5.2A**

**ECONOMIC ZOOLOGY**

1. Breeds of Fowls 1 Prt
2. Estimation of Protein in albumen and yolk 2 Prt
3. Breeds of Cows and Buffaloes 1 Prt
4. Estimation of Protein in Milk 1 Prt
5. Life Cycle and Morphology of *Bombyx Mori* 1 Prt
6. Study of Digestive system, Silk gland and Nervous system of *B.mori* (Dissection) 2 Prt
7. Silk worm Diseases - Pebrine, Muscardine, Flacherie and Grasserie; 1 Prt
8. Life Cycle, Morphology, caste Mouth Parts and mounting of Sting Apparatus of *Honey Bee*. 1 Prt
9. Study of digestive system of *Honey Bee* (Dissection) 1 Prt
10. Bee Keeping Equipments 1 Prt
11. Food Fishes : Catla; Anabas; Labeo; Channa; Shark; Mackerel; Sardine; Wallagoattu 1 Prt
12. Estimation of Protein in fish 1 Prt
13. Byproducts of Aquaculture, Poultry Dairy Apiculture and Sericulture – Fish Oil; Milk Powder; Egg Powder; Fowl Excreta; Bee wax, Pollen, Bee venom, Dry Cocoons and Silk Worm Excreta 1 Prt

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**Practical. 5.2A Elective Paper**  
**ECONOMIC ZOOLOGY**

**SCHEME OF PRACTICAL EXAMINATION**

Time : 3 hrs.

Max. Marks : 50

- Q I Dissect and display Nervous system of silk worm / Digestive system of honey bee (Dissection and correct display without damage 10 marks) 10
- Q II Estimate the Protein in Albumen/Yolk/Milk/Fish (Requirements 2 marks+ procedure 3 marks+ conduction 4marks + report 1mark) 10
- Q I Dissect and display Digestive system of silk worm / Mount sting organ of honey bee (Dissection/mounting and correct display without damage 5 marks) 05
- Q III Identify and comment on **A, B, C, D & E**  
(From Apiculture/Aquaculture/Dairy/Poultry/Sericulture.)  
(Identification 1 mark; comment 2 mark) 5\*3=15
- Q IV Internal Assessment (Viva + Record) 10
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## V-SEMESTER- ELECTIVES

(45 hours-3 Hours of Teaching per Week) Course Code: (Zool.Elective -5.2B)

### 5.2B - APPLIED ZOOLOGY

#### Module-1: Insect pests and management 18Hrs

General Features of Insects, Morphological features, Adaptations of Legs. Head – Eyes, Types of Mouth, antennae. Detailed account of diseases caused, characters, treatment and control measures of some Insects - Cockroach, House fly, Mosquitoes – (Anopheles, Culex, Aedes), Sand fly, Human louse, Bed bug, Fleas. Study of insects damaging crops and food products : (*Pest of Sugarcane (Leafhopper, Shoot borer, Root borer), Paddy (Rice bug, Hieroglyphus, Gall midge, Haworth) Rice weevil, Rice moth, Wheat weevil, Pulse beetle, Potato tuber moth, Black ants, )* Insect Pest management: Natural control- Climate, Topographic factors and Natural enemies. Applied Control- Mechanical methods, Physical control, Cultural control, Legal control, Chemical control, Biological control, Hormonal control, pheromonal control and Chemosterilization. Integrated Pest Management (IPM)- Necessity of IPM, Ecological basis. Components, stability, complexity, limits and pest kinds of Agro-ecosystem. Management of pest population, Economic injury levels, Biological control and IPM. Selective insecticides and IPM. Resistant varieties of plants and IPM.

#### Module-2: Toxicology

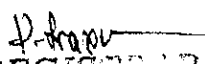
14Hrs

Area, scope and application of Toxicology. Classification of toxicants in detail with examples Food Toxicants: Constituents of Food toxins, food contaminants and types, Algal bloom and toxin, shellfish poisoning, Cosmetic toxicity: Cosmetic products, uses, types, chemistry and regulation of cosmetics. Pesticides :Uses Types and Classification, Modes of entry, Effects, Toxicity. Bio pesticides:Uses Types and Classification. Heavy metals: Sources, entry routes, toxicity symptoms and mode of action. Lead, Mercury, Cadmium and Arsenic poisoning. Detailed account on Bio accumulation Bio magnification, Biotransformation, Detoxification, Biomonitoring and Bio assay of toxicants

#### Module-3: Animal Cell and Tissue Culture

13Hrs

History, requirements for cell culture laboratory, Culture media- types. Maintenance of aseptic condition, Isolation and culture of explants, Cell culture technique, cell type selection, cell lines, maintenance and large scale culture of cell lines. stem cells characters and maintenance. Embryonic stem culture. Application of stem cells. Organ culture and methods. Raft and Grid culture. Advantages and application of organ culture. Tissue engineering. Limitations of organ culture. Somatic animal cell fusion. Somatic embryogenesis. Somatic hybridization

  
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**V-SEMESTER - PRACTICALS – 6/5.2B**

(3 Hours of Teaching per Week) Course Code: (Zool.Pr:5.2B)

**PRACTICALS – 5.2B**

**APPLIED ZOOLOGY**

1. Study of lifecycle, morphology, adaptaions and mounting of mouth parts of *Pediculus humanus corporis*, *Anopheles*, *Culex*, *Aedes*, *Xenopsyllacheopsis*  
**3prt.**
  2. Study of lifecycle, morphology and adaptaions in Pest of Sugarcane : Leafhopper, Shoot borer, Root borer  
**1prt.**
  3. Study of lifecycle, morphology and adaptaions in Pest of Paddy : Rice bug, Hieroglyphus, Gall midge, Haworth  
**1prt.**
  4. Study of lifecycle, morphology and adaptaions of Wheat weevil, Pulse beetle, Potato tuber moth, Black ants  
**1prt.**
  5. Determination of LC 50 and plotting dose response curve using available test systems.**2prt.**
  6. Determination of LD 50 and plotting dose response curve using available test systems.**2prt.**
  7. Study of Laminar Flow Hood (Picture/Fig/Diagram can be used) **1Prt.**
  8. Isolation and collection of Embryonic stem cells (Picture/Fig/Diagram can be used) **1prt**
  9. Somatic cell fusion Technique (Picture/Fig/Diagram can be used) **1Prt.**
  10. Raft and Grid culture. Techniques (Picture/Fig/Diagram can be used) **2Prt.**
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**Practical. 5.2B Elective Paper**

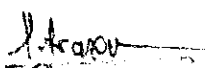
**APPLIED ZOOLOGY**

**SCHEME OF PRACTICAL EXAMINATION**

Time : 3 hrs.

Max. Marks : 50

- Q I Isolation and collection of Embryonic stem cells/ Somatic cell fusion Technique (Protocols) 10
- Q II Raft / Grid culture. Technique (Protocols) 05
- Q III Mount the moth parts of given insect and comment on adaptations/  
Determine LC 50 /LD 50 and plot dose response curve (Protocols) 05
- Q IV Identify and comment on A,B,C, D& E  
(Mouth parts/Pests of crops/laminar hood.)  
(Identification 1 mark; Fig 1mark Comment 2 mark) 5\*4=20
- Q V Internal Assessment (Viva + Record) 10

  
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**Subject: ZOOLOGY**

**VI-SEMESTER**

(45 hours-3 Hours of Teaching per Week) Course Code: (Zool.Core: 6.1)

**CELL BIOLOGY, CANCER BIOLOGY AND DEVELOPMENTAL BIOLOGY**

**Module-1: CELL BIOLOGY**

(20Hours)

Introduction : History, Tools and Techniques in brief and Subdivisions of Cell Biology  
Chromosome: Number; Size of Genome; C- value paradox, Morphology; Heterochromatin and Euchromatin; Fine Structure Chromosome – Nucleosome Model; Polytene and Lampbrush Chromosomes; Karyotyping and Ideogram, Study of human karyotype.  
Nucleic Acid: RNA Processing , gene switch off and on; Exons and Introns  
Mitosis: Introduction; Cell Cycle, Centriole Cycle; Mitotic Apparatus; Chemical Events During Prophase; Cytokinesis, Role of Mitotic Apparatus in Chromosome Movement; Significance  
Meiosis, significance; Phases; Interkinesis; Synaptonemal Complex, Holiday junction and Recombination; Mechanism, theories of Crossing Over and its Significance.

**Module-2:(7 Hours)**

Cell Lineage; Cell-to Cell Interaction; Cell-to Cell Adhesion; Cell Fusion; Genetic and Induced Teratogenesis; Paedogenesis and Neoteny; Programmed Cell Death-apoptosis; Aging and its Theories; Stem Cells: Sources, Types and their Use in Human Welfare  
Sex Determination: Types with Examples; Chromosomal and Genic Balance Theory; Human Chromosomal Abnormalities(Numerical & Structural) - Diff. Syndromes, Gynandromorphs, Intersex, Environmental and Hormonal Effects; Sex Limited & Influenced Characters.

**Module-3: CANCER BIOLOGY**

(3Hours)

Concept; Types; Characteristics; HeLa cells; Oncogenes; Immune System and Cancer; Tumor; Carcinogenic Agents (Physical, Chemical and Biological); Mitotic Inhibitors; Causes of Human Cancer; Different types of Therapy – Immunotherapy, Interferon.

**Module-4: DEVELOPMENTAL BIOLOGY**

(15Hours)

Cleavage and Blastula: Types of eggs; Types planes and patterns of Cleavage with Examples; Effect of Yolk on Cleavage in Frog and Chick; Types of Blastula with Examples  
Organizer Phenomenon: Definition; Potencies of the Dorsal Lip of the Blastopore of Amphibian Gastrula; Experiment of Spemann and Mangold; Induction; Chemical Nature, Types and Theories of Organizer, Competence; Morphogenic Gradients; Totipotency and Pluripotency; Fate Map of Frog Blastula; Role of Thyroxine in Control of Metamorphosis in Amphibia  
Chick Embryology: Structure of Hen's Egg; Cleavage; Blastula; Gastrulation; Origin and Structure of Primitive Streak; Structure of 18, 24, 48 Hour Chick Embryos; Extra Embryonic Membranes of Chick – Development; Structure and Function of Foetal Membranes  
Placenta: Structure and Functions of Placenta; Morphological and Histological Classification of Placenta with examples; development of human fetus  
Cloning in Animals – Polly, Dolly; Twins and Multiple Births  
Estrous and menstrual Cycle; Menopause in Human, amniocentesis and Embryo Sexing, IVF & ET, Cryopreservation of Gametes/Embryos  
Fertilization: External and Internal; Mechanism, Biochemistry of Fertilization, Time and Significance; fertility and infertility; Immune-contraception; contraceptives and types; Parthenogenesis: Types with Examples; Artificial Parthenogenesis; Significance

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**Subject: ZOOLOGY**

**VI-SEMESTER**

*(3 Hours of Teaching per Week-15 practicals)* Course Code: (Zool.Pr:6.1)

**PRACTICALS – 7/6.1**

**CELLBIOLOGY, CANCER BIOLOGY AND DEVELOPMENTAL BIOLOGY**

**I. Cell Biology :**

1. Study of Permanent Slides of Mitosis and Meiosis Different Stages 1 prt.
2. Preparation of Onion Root Tip Squash and Observation of Stages 1prts.
3. Preparation of Grass Hopper Testis Squash and Observation of Stages 2 prts.
4. Study of Cancer Cell; Carcinogenic Agents – Tobacco, Cigarette, Pesticides, Perfumes 1 prt.
5. Karyotype preparation of Man, Women, Down, Turner and Klinefelter 3prt.
6. Syndromes person Photos of Man and its Karyotypes (3 Numerical+3Structural) 1 prt.
7. Twins, Siamese and Multiple Births, Neoteny, Cell Cloning Tech. and Dolly - Photos 1 prt.

**II. Developmental Biology**

1. Frog Embryology: Egg structure, planes and pattern of cleavage V.S of Cleavage; Blastula; Gastrula; Neurula 1 prt.
2. Chick Embryology: Study of Egg of Chick and Whole Mount of 18 hrs., 24 hrs., and 48 hrs., embryos; T S of 18 hrs & 24 hrs. embryos 1 prt.
3. Window Preparation of Hen's Egg 1 prt
4. Structure of Mature Sperm and Graffian Follicle of Human 1 prt.
5. Contraceptive devices and use : oral and virginal pills, Norplant; IUDs, (vaginal rings, cu T), condoms, spermicides, femidem; 1 prt.

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**Practicals 7/6.1**  
**SCHEME OF PRACTICAL EXAMINATION**

Time : 3 hrs.

Max. Marks : 50

- Q I Make squash preparation of Onion root tip / Grass hopper testis/human karyotyping 10  
(procedure 3 marks; preparation 5 marks; report 2 mark)
- Q II Identify A (*from Mitosis*), B (*from Meiosis*) & C (*carcinogens / cancer slides*) 3x4=12  
(Identification 1 mark; Fig 1 mark Comment 2 mark)
- Q III Identify the slides/photos D (*human karyotype/abnormal human syndrome photo*),  
E (*frog embryology*), F (*chick embryology*), & G (*human twins*) 4x3=12  
(Identification 1 mark; Fig 1 mark Comment 1 mark)
- Q IV identify and comment on H & I (contraceptives) 2\*3=06  
(Identification 1 mark; Fig 1 mark Comment 1 mark)
- Q IV Internal Assessment (Viva + Record) 10

  
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**Subject: ZOOLOGY**

**VI-SEMESTER**

(45 hours-3 Hours of Teaching per Week) Course Code: (Zool.Core: 6.2 )

**GENETICS, EVOLUTION AND PALEONTOLOGY**

**Module-1: GENETICS -1**

(12 Hours)

Mendelian Genetics: Work of Mendel; Mono and Dihybrid Cross; Study of Mendel's Laws; using *Drosophila*, Mice and Guinea pigs. Incomplete Dominance in Chick.

Interaction of Genes and their biochemical basis:

- Supplementary Factor 9:3:3:1 – Comb Pattern in Fowl
- Dominant Epistasis 13:3 – Plumage Color in Leghorn
- Recessive Epistasis 9:3:4 – Coat Color in Rodents
- Complementary Factor 9:7- Deaf mutism in man
- Polygenic Inheritance – Skin Color in Man
- Lethal Genes – Coat Color in Yellow Mice

Linkage and Crossing Over: Types, Theories of Linkage Linkage in *Drosophila*, Crossing Over, Three Point Test Cross; Kinds mechanism and theories of crossing over.

Nature and Nurture: Definition; Experiment on *Potentilla Glandulosa*; Himalayan Albino Rabbit and Human Twins; Norm of Reaction; Homeostasis; Phenocopy; Pleiotropism; Penetrance and Expressivity with Examples

**Module-2: GENETICS – 2**

(9 Hours)

Multiple Alleles - Inheritance of Coat Color in Rabbit; ABO Blood Groups in Man; Rh Factor Self sterility alleles

Sex Linked Inheritance: White Eye in *Drosophila* and Haemophilia and Color Blindness in Man; Y-linked Genes; eugenics and pedigree with examples

Gene Concept : Gene Definition; Size; Cistron, Muton; Recon; Operon concept – lac operon; Transposable Elements; Split Genes; Hox Genes; Extra Chromosomal Inheritance

Gene Mutation: Types and significance of Mutations, Molecular Mechanism of Mutation; Rate of Mutation, Detection of Mutation by CIB Technique; Directed Mutagenesis; Protein engineering

**Module-3: EVOLUTION**

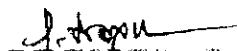
(18Hours)

Theories of Organic Evolution: Lamarckism and Neo-Lamarckism, Weisman's Theory, Darwin-Wallace Theory of Natural Selection (briefly explain founders principle, hybridization, recombination, natural selection, genetic drift-SW effect, variation, Darwinian finches)-Synthetic Theory of Evolution; De Veris Theory of Mutation; Gene frequency, Gene flow and types; Mendelian population. Hardy-Weinberg's Equilibrium with equation and factors affecting equilibrium. Meiotic Drive, Molecular Clock, y-chromosome Adam and Mitochondrial Eve, Haplogroups; Micro and Macro Evolution; Non-Darwinism-Neutral Hypothesis; Molecular Evolution

Evidences of Organic Evolution: Evidences from Comparative Morphology, Anatomy, Biochemistry and Embryology

Speciation: Concept of Species, types of Speciation; Isolatory Mechanism (Pre and Post Zygotic); Polymorphism: Transient and Balanced with examples.

Adaptations in Animals: Aquatic (pri & sec), Volant (pri & sec), Arborial, Fossorial and Cursorial habit

  
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**Module-4: PALEONTOLOGY**

(6 Hours)

An Account of Fossils- types, formation, Dating of Fossils, Preservation of Fossils  
Paleontology and geological time scale of Dinosaurs: Tyrannosaurus, Brontosaurus, Pterosaurs,  
Ichthyosaurus and Archaeopteryx; Geological Time Scale.  
Origin and Evolution of Horse and Man; An Account of Connecting Links.

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**Subject: ZOOLOGY**

**VI-SEMESTER**

(3 Hours of Teaching per Week-15 practicals) Course Code: (Zool.Pr: 6.2)  
**PRACTICALS – 6.2**

**GENETICS, EVOLUTION AND PALEONTOLOGY**

**I. GENETIC PROBLEMS :**

- i) Monohybrid ratio (4 animal examples)
- ii) Dihybrid ratio (5 animal examples)
- iii) Sex linkage - eye color in *Drosophila*; color blindness and haemophilia in man (2 each)
- iv) Problems on inheritance of blood groups (3 examples) **4 prts.**

II. Study of Blood Groups (ABO & Rh): Identification of Blood Groups **1prts.**

**III. DROSOPHILA STUDY :**

- i) Collection and Culture of *Drosophila melanogaster* **1prt.**
- ii) Identification of Male and Female Flies & Life Cycle **1 prt.**
- iii) Mounting of Sex Comb & Study of Mutants **1 prt.**
- iv) Preparation and observation of polytene chromosome of *D.melanogaster* **2prt.**

**IV. EVOLUTION AND PALEONTOLOGY**

- i) (a) Study of Homologous Organs – Fore Limb Skeleton of Frog and Bird; Beak of Darwin finches (b) Study of Analogous Organs - Wing of Bird, Bat and Insects. **2 prts**
  - ii) Study of Vestigial Organs of Man – Vermiform Appendix; Coccyx; Molar Teeth; Comparative Study of Vertebrate Embryos - Shark, Frog, Lizard, Fowl, Rabbit/Man **1prt.**
  - iii) Study of Fossils – Casts and Moulds; Study of Tyrannosaurus, Brontosaurus, Pterosaur, Ichthyosaurus; Archaeopteryx **2 prts.**
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**Practical. 6.2**  
**SCHEME OF PRACTICAL EXAMINATION**

Time : 3 hrs.

Max. Marks : 50

Q I Identify the blood group (ABO & Rh) / prepare sex comb/Polytene chromosome squash of *Drosophila* (by lot) 10

(Requirements and procedure 3marks+ Conduct 5marks+ Report 2marks)

Q II Identify with reasons **A & B**

2x5 =10

[i] from egg, lava, pupa, male and female *Drosophila* (any one)

[ii] from *Drosophila* mutants (any one)

(Identification 1+fig 2 mark + Reasons 2 marks)

Q III Genetic Problem (*any two problem.*)

2x6=12

(Any two from Dihybrid, Sexlinked, Blood group)

Data 1mark+ Solving 3 marks+ Punnettchekkar board 1 mark + Comments 1mark)

Q IV Identify and comment on **C & D** (*from evolution and Paleontology*)

(Identification 1+fig 1 mark + Comments 2 marks) 2x4=08

Q V Internal Assessment (Viva + Record)

10



## First Semester B.Sc. Degree Examination .....

## ZOOLOGY – I CBCS - SCHEME

Paper – I: NONCHORDATA, BIODIVERSITY AND PARASITOLOGY  
(2016-17 Syllabus)

Time : 3 Hours

Max Marks : 80

- Instructions:** 1. Objective questions should be answered in the first Two pages of the answer book.  
2. Draw labelled diagrams **wherever** necessary.  
3. Write your question answers in orderly fashion from 1 to 13

## SECTION – A

## (Short Answer Questions)

Answer any Ten in not more than Thirty words.

10X2=20

- Mention the differences between Species and Genetic diversity.
- Classify Porifera with examples.
- Name the skeletal structure of Sponges.
- Write the Systematic position of Obelia.
- What is regeneration? Name the animal with regeneration.
- Draw the labelled diagram of Starfish.
- Draw the labelled diagram of Octopus.
- Write the Branchial Formula of Prawn.
- Mention adaptations in Parasite.
- What is metamerism and cephalization?
- What is Cnidoblast? Mention its functions.
- Write the scientific name of Liverfluke and name the disease caused by it.

## SECTION – B

Explain any Six of the following.

6X5=30

- List distinctive characters of Protozoa and classify with examples.
- Explain Thoracic appendages of Prawn.
- Mention the characters and Classify phylum Annelida with examples.
- Explain briefly types of locomotion in Protozoa.
- Briefly explain structure and pathogenicity of Entamoeba.
- Explain distinctive features and comment on systematics of *Peripatus*.
- Write a short note on Water vascular system.
- Draw labelled diagram of *Balanoglossus* and write its classification

## SECTION – C

## (Long Answer Questions)

Answer any Three of the following.

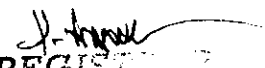
3X10=30

- Explain the general characters of Mollusca and classify with examples.
- Explain the Polymorphism in Coelenterata.
- Explain Zoological nomenclature, International code, cladistics and Molecular Taxonomy
- Explain structure, life history and pathogenicity of *Entamoebahistolytica*

## REFERENCES

1. Kotpal series for different Invertebrate phyla
2. Birds by Kotpal
3. General Zoology by Kotpal
4. Invertebrates and Vertebrates volumes by E Ayyar
5. Invertebrate Zoology by Jordan and Verma
6. Ecology/ Fundamentals of Ecology by Odum
7. Introduction to Embryology by Balinsky
8. Evolution of Vertebrates by Colbert
9. Life of Vertebrates / Life of Mammals by Young J Z
10. Cytology, Genetics and Evolution by Verma&Agarwal
11. General Endocrinology by Turner
12. Chordate Embryology by Verma
13. Zoology books published by Saras Publications
14. Cytology by Powar
15. Cytology & Molecular biology by De Robertis and De Robertis
16. Genetics by Strikberger
17. Gene VII by Lewin
18. Genetics and Evolution by Dobzonsky and others
19. Zoogeography by V Rastogi
20. Palaeontology by Verma&Agarwal
21. Biochemistry by Lenizer
22. The Invertebrates volumes by Hyman L H
23. Cell physiology by A C Giese
24. The text book of Biotechnology by R C Dubey
25. The text book of Histology by Leeson
26. The text book of Biochemistry by Berry
27. Developmental Biology by Berril N J
28. Text book of Zoology Vol I & Vol II by Parker and Haswell
29. Comparative Animal Physiology by Prosser
30. Economic Zoology by Shukla&Upadhyaya
31. Economic Zoology by Venkiaraman
32. Genetics by Verma&Agarwal
33. Genetics by Winchester
34. Fundamentals of Computers by Rajaraman V
35. The ABC & XYZ of Bee Culture by Morse A Roger
36. Livestock and Poultry Production by Harbans Singh & E N Moore
37. Biostastics by Raghuvanshi&Chavan / Shukla
38. The text book of Animal Physiology by Goel
39. Adaptations by Wallace
40. An atlas of Histology by Freeman
41. Animal Behaviour by Sasidhara
42. Zoogeography of India by Tiwari
43. Immunology by Fatima and Kuby
44. Cell biology Genetics Mol. Biology Evolution and Ecology by Verma
45. Biostastics by Ramakrishna

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