TEST NAME: 305 - ZOOLOGY

ANIMAL DIVERSITY OF INVERTBRATES

Brief history, significance of diversity of invertebrates. Phylum Protozoa:- General Characters and outline classification up to classes with examples: type study: Elphidium. Physlum Porifera:- General characters and outline classification up to classes with examples; Type study: Sycon, Canal system in sponges. Phylum coelenterate:- General characters and outline classification Up to classes with examples; type study: Aurelia, polymorphism in coelenterates: corals and coral reef formation. Phylum platy helminthes:- general characters and outline classification up to classes with examples; type study: fasciola hepatica.Phylum nemathelminthes:- general characters and outline classification up to classes with examples.

Phylum annelid:- General characters and outline classification up to classes with examples; Type study: Leech., Metamerismin Annelid. Vermiculture: Scope, Significance of Vermiculture Earthworms Sps, Processing of vermiculture, Vermicompost, Economic Importance of Vermicost.

Phylum arthropoda:- General characters and outline classification up to classes with examples; Type study: Macrobrachiumrosenbergii (Scampi). Phylum Mollusca:- General characters and outline classification up to classes with examples; Pearl formation in Pelecypoda. Torsion in Gastropoda. Physlumexhinodermata: General characters and outline classification up to classes with examples; Water Vascular system of star fish. Invertebrates. Laral Forms: Amphilastula, Ephyra, Trochophora, Nauplius, Zoea, Mysis, Megalopa, Glochidium, Bipineria.Hemichordata: General characters and outline classification up to classes with examples; Balanoglossus: Structure, Affinities & Tornaria Larvae

ANIMAL DIVERSITY - CHORDATES

General Characters of Chordates and its origin. Protochordata: Sailent Features. Structure and life history of Herd mania. Significance of Retrogressive metamorphosis. Structure and affinities of Amphioxus.

Cyclostomata: General characters of Cyclostomes. Difference between petromyzon and myxine

Fishes: General Characters of Fishes. Classification of fishes up to sub-class level with examples. Scoliodon-External features, Digestive system, Respiratory system, Heart, aortic arches, Brain. Migration in fishes. Types of scales. General account of dipnoi.

Amphibia: General characters of Amphibia. Classification of Amphibiaupto orders with suitable examples. Ranahexadactyla-External features, Digestive system, Respiratory system, Heart, Arterial system and Brain. Parental care in Amphibia.

Reptelia: Skull in Reptiles.

Aves: General Characters of Aves. Classification of Aves up to sub-classes with examples. Columba Livia-External features, Digestive System, Resipratory systems, Heart, Arterial System (Double Circulation)Brain. Migration of Birds. Flight adaptations in Birds. Brief account of Archaeopteryx.

Mammalia and Zoogeography: General Characters of mammalia. Classification of Mammalia up to sub classes with examples. Dentition in Mammals.

Zoogeography: Characteristics and fauna of Oriental region, Australian Region, Ethiopian Region.

CYTOLOGY, GENETICS AND EVOLUTION

Cytology: Definition, History, Prokaryotic and eukaryotic cells, virus, viroid's. Mycoplasma. Electron microscopic structure of eukaryotic cell. Plasma Membrane-Different models of plasma Membrane.

Cell Organelles: Structure and functions of Endoplasmic Reticulum. Structure and functions of Golgi apparatus. Structure and Functions of Lysosomes. Structure and functions of Ribosomes. Structure and functions of Mitochondria. Nucleus. Chromatin-Structure and Significance, Chromosomes-Structure, Types, Functions.

Genetics: Mendel's work on transmission of traits. Principles of inheritance. Incomplete dominance and co-dominance. Lethal alleles, Epistasis, Pleiotropy. Sex Determination. Sex Linked inheritance. Linkage and crossing over .Extra chromosomal inheritance. Human Karyotyping

Evolution: Origin of life. Lamarckism, Darwinism, Neo-Darwinism, Hardy-Weinberg Equilibrium. Variations, isolating mechanisms, natural selection. Types of natural Selection (Directional, Stabilizing, disruptive). Artificial Selections and forces of evolution. Speciation (Allopatric and Sympatric). Macro evolutionary principles (Examples: Darwin's finches).

EMBRYOLOGY, PHYSIOLOGY, ECOLOGY, ANIMAL BEHAVIOUR

Embryology: Gametaogenesis & Fertilization. Types of Eggs – A lecithil, Microliecithil, Mesoliecithil, Megalecithil & Centrolecithil. Development of Frog up to gastrulation. Formation of primary germ layers and their fate. .Foetal membrane of chick .Placentaion in mammals.

Physiology: Digestion: Definition, digestion of Carbohydrates, Proteins and Lipids. Absorption of digested food materials .Respiration: Pulmonary Ventilation & Transport of Respiratory Gases.
Circulation: Human Heart – Structure & Function and Cardiac Cycle. Excretion: Structure of Human Kidney & Nephron and Urine Formation .Nerve Impulse: Nature, Origin and Propagation-Local circuit theory, Saltatory Conduction & Synaptic Transmission. Muscle Contraction: Ultra Structure of Skeletal Muscle Fiber & Sliding Filament Theory .Human Endocrine Glands & Their Hormones: Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid and Adrenal glands, Pancreas and gonads.

Ecology: Meaning & Scope of Ecology. Pond exosystem – Biotic & Abiotic factors (Temperature, Light, Water), Food Chain & Energy Flow.Bio-geo chemical cycles of nitrogen, carbon and phosphorous. Animal Habital & Niche and Ecological Succession. Community Interactions: Mutualism, Commensalism, Competition and Predation.

Animal Behaviour: Animal Behaviour: Defination & Types. Innate Behaviour: Taxes & Reflexes-Reflex Arc Mechanism. Learned Behaviour: Associate Learning (Eg. Classical Conditioning &Instrumental Learning).Learning & Memory. Biological Clocks & Circadian Rhythms.

ANIMAL BIOTECHNOLOGY

Restriction modification systems: Types I, II and III. Mode of action, nomenclature,applications of Type II restriction enzymes in genetic engineering

DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases

Cloning Vectors: Plasmid vectors:pBR and pUC series, Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs,

Techniques of Recombinant DNA technology

Gene delivery: Use of linkers and adaptors Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated delivery. Basics of PCR .Sanger's method of DNA sequencing- traditional and automated sequencing. Southern, Northern and Western blotting, Preparation and uses.

Animal Cell Technology: Natural and Synthetic. Primary culture, secondary culture, continuous cell lines; Protocols for Primary Cell Culture; Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb. Types of stem cells, applications

Manipulation of reproduction in animals: Artificial Insemination, In vitro fertilization, super ovulation, Embryo transfer, Embryo cloning.

Applied Biotechnology: Fermentation: Different types of Fermentation: Short notes on - Submerged & Solid state; batch, Fed batch & Continuous; Stirred tank, Air Lift, Fixed Bed and Fluidized; Downstream processing - Filtration, centrifugation, extraction, chromatography, spray drying and lyophilization

ANIMAL HUSBANDRY

General introduction to poultry farming. Principles of poultry housing. Poultry houses. Systems of poultry farming. Management of chicks, growers and layers. Management of Broilers.

Poultry feed management – Principles of feeding. Nutrient requirements for different stages of layers and broilers. Methods of feeding. Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management.

Selection, care and handling of hatching eggs. Egg testing. Methods of hatching. Brooding and rearing. Sexing of chicks.

Breeds of Dairy Cattle and Buffaloes – Definition of breed; Classification of Indian Cattle breeds, exotic breeds and Indian buffalo breeds. Systems of inbreeding and crossbreeding. Housing of dairy animals – Selection of site for dairy farm; systems of housing – loose, housing system. Conventional dairy barn. Cleaning and sanitation of dairy farm. Weaning of calf. Castration and dehorning. Deworming and Vaccination programme. Records to be maintained in a dairy farm.

Care and management of dairy animals - Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks.

IMMUNOLOGY

Overview of Immune system: Introduction to basic concepts in Immunology. Innate and adaptive immunity.

Cells and organs of Immune system: Cells of immune system. Organs of immune system. Basic properties of antigens. B and T cell epitopes, haptens and adjuvants. Factors influencing immunogenicity. Structure of antibody. Classes and functions of antibodies. Monoclonal antibodies. Structure and functions of major histocompatibility complexes. Exogenes and Endogenes pathways of antigen presentation and processing. Classification and brief description of various types of hyper sensitivities. General introduction to vaccines. Types of vaccines.

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