Syllabus for the post of Lab Assistant – Zoology

Unit-1 Principles and Methods of Zoological Classification

Systematics: terms & definitions, taxonomic characters: definition and kinds - morphological, physiological, molecular, ecological, behavioral and geographical; Taxonomic keys: definition and kinds- bracket key, indented key and pictorial key; ICZN: historical background, overview of terms, principles and articles; Homonymy, Synonymy and Law of Priority; Typification: definitions, kinds and significance; Taxonomic publications

Unit-2 Animal Diversity- Invertebrates

General Characters and Classification upto order level: Protozoa, Porifera, Cnidaria, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata; Parasitic protozoa (*Entamoeba histolytica, Plasmodium, Trypanosoma, Leishmania, Giardia, Balantidium coli*); Canal system and skeleton in Porifera; Polymorphism in Cnidaria; Corals and coral reefs, Economic importance of Helminthes, Metamerism and Coelom in Annelida, Economic importance of Arthropoda, Torsion in gastropods, Water vascular system in Echinodermata

Unit-3 Animal Diversity- Vertebrates

General characters and classification upto order level: Pisces, Amphibia, Reptilia, Aves and Mammalia; Scales and fins in fishes; Parental care in Amphibia; Poisonous and non-poisonous snakes; Flight adaptations and migration in birds; Thermoregulation and Adaptive radiation in mammals

Unit-4 Anatomy & Physiology

Structure of digestive system & associated glands; Physiology of digestion; structure of lungs, transport & exchange of respiratory gases & regulation of respiration; Cell respiration: glycolysis, TCA cycle; Structure and function of heart; Composition and function of blood; Structure of kidney; Physiology of excretion; Central Nervous System: brain and spinal cord; Peripheral Nervous System: cranial and spinal nerves; Structure, function, regulation and disorders of endocrine glands; Sensory receptors; Colour tests for Carbohydrates, Proteins, Lipids; Estimation of Haemoglobin; RBC count; WBC count

Unit 5 Developmental Biology

Gametogenesis; Fertilization; Cleavage and formation of morula; Formation and implantation of blastocyst; Gastrulation in mammals; Extra embryonic membranes – formation, structure and function; Types of placenta; Organogenesis and foetal development; Endocrine regulation of development; Natural and artificial parthenogenesis, significance of parthenogenesis

Unit-6 Microscopy

Principles of Microscopy: Lenses and images, Oculars, Condensers, Light sources, Magnification, Resolution and Contrast; Basic principles, working and setting up of different types of microscopes: Simple dissecting microscope, Compound microscope, Fluorescence microscope, Phase contrast microscope, Polarizing microscope, Oil immersion microscope, Electron microscope (SEM and TEM); Photomicrography; Micrometry and measurement

Unit-7 Laboratory Instrument and sterilization

Volumetric apparatus: pipettes, Burettes, volumetric flasks, measuring cylinder; General principles and working of basic equipment (pH meter, Weighing Balance, Hot air oven, Water Bath, Incubator, Centrifuge); General Principles of Hygiene, Sterilization methods; Glassware & Plasticware Sterilization; Ethical and safety considerations; Laboratory waste (Biological & Chemical) and Treatment

Unit-8 Laboratory chemicals, reagents and solutions

Classification of laboratory reagents: Acids, bases, salts and solvents; Fixing and killing agents, Solution for clearing glass apparatus, Fixation and fixatives, preparations of solutions (molar, normal, percentage, stock and working solutions), Normal and Physiological saline, storage and handling of laboratory reagents; use of organic solvents (Ethanol, Methanol, Acetone, Chloroform, Xylene); alcoholic grades: dehydrating and clearing, Stains and staining, Mounts and mountants

Unit- 9 Histological and Histochemical Techniques

Animal tissues: Epithelial, Connective, Nervous and Muscular; Histologic Techniques: Fixation of the material, Dehydration, Clearing, Embedding of the material, Sectioning (Microtome, Cryostat), Staining, Mounting; Localization of Chemical components: Carbohydrates, Proteins, Lipids, Nucleic acids, and enzymes

Unit-10 Bio-Techniques

Microbiological techniques: media preparation and sterilization; inoculation & growth monitoring Cell culture techniques: cell viability testing; culture media preparation and cell harvesting methods, Centrifugation – principle & types, Electrophoresis-principle, types (AGE & PAGE) and applications, Chromatography-types and applications, PCR-variants & applications; ELISA; RIA