

**SYLLABUS FOR COMPUTER BASED RECRUITMENT TEST (CBRT)**  
**FOR THE POST OF ASSISTANT PROFESSORS IN GOVERNMENT COLLEGE**  
**(ZOOLOGY)**  
**UNDER**  
**DIRECTORATE OF HIGHER EDUCATION**  
**(Advt No. 06 Year 2021)**

**I. General English including Grammar - 05 marks**

**II. General Knowledge, Current Affairs and Events of National and International Importance - 10 marks**

**III. Logical Reasoning and Analytical Ability - 10 marks**

**IV. Core: - 50 marks**

**Evolutionary Biology and Biodiversity**

Introduction to Evolutionary Biology: meaning and importance of evolution in biology. A brief history of life. The development of evolutionary theory Lamarckism, Darwinism, Natural selection, Neo-Darwinism and Mutation theory. Evolution of diseases: some examples.

**Biodiversity:** Genetic, species and ecosystem diversity. Biodiversity at global, national levels. Biogeographic classification of India, India as a mega diversity nation.

National Parks, Wild life Sanctuaries and Biosphere Reserves, Hotspots of Biodiversity. Threats to biodiversity- habitat loss, poaching and man-wildlife conflicts. Endangered and Endemic species of India: Common plant and animal species. Conservation of Biodiversity, insitu and exsitu conservation, Keystone species, measurement of biodiversity. Environmental Priorities, strategies and Environmental Legislation (Acts) in India, Environmental Impact Assessment. Bioremediation: Concept need and scope, environmental applications.

**Molecular Cell Biology**

Cell – Cell and Cell matrix adhesion and communication: Ca<sup>++</sup> dependent homophilic cell-cell adhesion; Ca<sup>++</sup> independent homophilic cell-cell adhesion; Cell junctions and adhesion molecules. Integrins; Collagen and Non-Collagen components ; Movement of leukocytes into tissues Unit 5: Cell Cycle: Cyclines and cyclin dependent kinases, Regulation of CDK – cyclin activity; Cell cycle control in mammalian cells; Checkpoints in cell cycle regulation. Intracellular protein traffic: Protein synthesis on free and bound polysomes; Uptake into ER; Membrane proteins; Golgi sorting; Post- translational modifications; Trafficking mechanisms.

**Ecotoxicology and its environmental significance, Environmental Pollution:** Air, water, soil and land pollution. Impact of pollutants on general fauna, flora and ecosystems. Factors influencing environmental concentration of toxicants and toxicity. Environmental monitoring of pollutants Environmental policy in control of pollution.

**Pesticide Toxicity:** Pesticides and Types: insecticides, herbicides, fungicides, rodenticides, nematicides, fumigants. Properties and effects of pesticides: Mechanism of action, Pharmacokinetics, Acute & chronic effects, treatment, Biological monitoring and regulation.

**Xenobiotic Metabolism:** Xenobiotics – Transfer across Membrane barriers, Absorption, Distribution. Biotransformation – Phase I (Oxidation, reduction and hydrolysis) and phase – II (Glucuronidation, Sulfation, Glutathione Conjugation, Acetylation, amino acid conjugation and Methylation) reactions. Excretion of xenobiotics.

**Biology of Animal Behavior**

**Communication:** Importance, types, components and evolution of communication. Role of Visual and auditory systems, hormones and pheromones. Language of communication in invertebrates and vertebrates.

**Social Behavior:** Aggregations – Schooling in fishes, flocking in birds, herding in mammals - group selection, kin selection, altruism, reciprocal altruism, inclusive fitness, social organization in insects and primates.

**Reproductive Behavior:** Evolution of sex and reproductive strategies, Mating systems, courtship, Sexual Selection, parental care.

## **Developmental Biology**

Fertilization and early development in invertebrates and vertebrates. Structure of the gametes, External fertilization, Mammalian fertilization Cleavage and pattern of embryonic cleavage; Comparative account of gastrulation; Early development in: Sea urchin, C. elegans; Drosophila; Amphibia; Birds; Mammals

**Later embryonic development:** Development of ectoderm, Neurulation and Central nervous system, Epidermis, Neural crest cell, Development of mesoderm: Paraxial mesoderm, Intermediate mesoderm, Lateral plate mesoderm. Development of endoderm' Unit 4: Body Axes and Tetrapod limb development: Establishment of body axes in C. elegans, Drosophila. Birds and Mammals, Limb bud; Axis specification: Proximo-distal, Anterior-posterior, Dorsal-ventral; Cell death pathway

## **Aquaculture Technologies**

Induced Breeding: Hormonal regulation of gonadal development, Activity of Gonadotropin releasing hormone, application of hormones in aquaculture.

Fish and Prawn/ Shrimp Diseases: Types of Diseases- viral, bacterial, fungal, protozoan and other parasitic diseases; Diagnosis; Control measures; Water quality parameters, Role of biopesticides; Application of monoclonal antibodies; Vaccines and immunostimulants; Drug resistance

**Aquafeed:** Nutrition, Feed formulation, Feed additives, Alternative feed ingredients. Fish products and byproducts, fish processing, production of fish sauce by lactic acid fermentation. Microbial hazards in seafood.

**Physiology of Muscular System:** An overview of the muscular tissue: types of muscle tissue, properties and functions of the muscle tissues. Skeletal muscle tissue and types. Contraction and relaxation processes and metabolism of skeletal muscle fibers. Physiology of smooth muscle. Disorders of muscular system: Myasthenia Gravis, muscular dystrophy, fibromyalgia, muscular atrophy and hypertrophy, Rigor Mortis.

**Animal biotech :** Structure and organization of animal cells, tissues and biology of cultured cells. General out-line of epithelial tissue, connective tissue, muscular tissue and nerve tissue. Cell adhesion; Junctions; Extracellular matrix; Cytoskeleton; Cell cycle; Differentiation; Cell signaling; Energy metabolism. Unit 2: Equipments and materials for animal cell culture technology. Aseptic conditions and requirement of equipment; Incubation; Storage; Different substrates. Introduction to the balanced salt solutions and growth medium: Media –Physical properties, balance salt solutions, complete media, serum Serum-Free media : Chemical, physical and metabolic functions of different constituents of culture medium. Role of carbon dioxide. Role of serum and supplements. Serum and protein free media and their application.

## **Note:**

**Duration for C.B.R.T : 75 Minutes**

**Maximum Marks for C.B.R.T : 75 Marks**