

# **RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**

## **SYLLABUS FOR EXAMINATION FOR THE POST OF LECTURER (SCHOOL EDUCATION) BIOLOGY**

### **PAPER - II**

#### **Part – I Senior Secondary Level**

##### **1. Taxonomy:**

- Definition of life, Biodiversity, Need for classification, concept of species and taxonomical hierarchy, Binominal nomenclature.
- Tools for study of taxonomy – Museums, Zoos, Herbaria, Botanical gardens.
- Classification of Living organism, five kingdom system.

##### **2. Structural Organization in Animals and Plants:**

- Animal tissue: Types, Origin, Location, Structure and functions.
- Plant tissue: Anatomy of root, stem and leaves of monocots and dicots.
- Structure of flowers, types of Inflorescence and fruits.

##### **3. Plant Physiology:**

- Water relations.
- Transpiration.
- Photosynthesis.
- Respiration.
- Mineral nutrition.
- Plant movements.
- Nitrogen and lipid metabolism.
- Growth and development.

##### **4. Animal Physiology:**

- Digestion and absorption.
- Breathing and respiration.
- Body fluids and circulation.
- Excretory products and their elimination.
- Locomotion and movement.
- Neural control and coordination.
- Chemical coordination and regulation.
- Reproduction.

##### **5. Genetics and Evolution:**

- Mendelian Inheritance.
- Chromosomal theory of inheritance.
- Sex determination in human beings.

- Linkage and crossing over.
- Origin of life – theories and evidence.

## 6. Biology in Human Welfare:

- Economic importance of Protozoa, Helminths, Insects and Molluscs.
- Plant utilization- Cereals (Wheat, Rice), Fiber yielding plants (Cotton, Jute), Vegetable oils (Groundnut, Mustard), Spices (Coriander, Fenugreek and Cumin), Medicinal Plants (*Commiphora*, *Withania*), Beverages (Tea, Coffee).
- Basic concepts of Immunology, Vaccines, Pathogens, Parasites, Cancer, AIDS.

## 7. Environmental Biology:

- Organism and its environment.
- Biogeochemical cycles: Carbon, Nitrogen, Phosphorus.
- Environmental Pollution: Air, Water, Noise and Soil.

## Part – II Graduation Level

### 1. Cell Structure and Functions:

- Concept of Cell Theory; Structure of Prokaryotic and Eukaryotic cell; Plant and Animal cell.
- Structure, properties and functions of cell surface - cell process.
- Cell organelles-structure and function.
- Chromosomes – Structure, types, aberrations.
- Chemical constituents of living cells:
  - Biomolecules - Structure and functions of proteins, carbohydrates, lipids, nucleic acids.
  - Enzymes – Types, properties and enzyme action.
- Cell cycle; cell division - mitosis, meiosis and their significance.

### 2. Taxonomy:

- Levels of Organization, Symmetry, Coelom and Metamerism in animals.
- Salient features and classification of non chordata and chordata upto order level with examples.
- Salient features and classification of plants (major groups upto class).
- Floral variations in Ranunculaceae, Apiaceae, Asteraceae and Poaceae.

### 3. Structure (External Internal), Reproduction and Life cycle of the following- Amoeba, Obelia, Taenia, Ascaris, Pheretima, Periplanata, Rana and Rabbit.

### 4. Structure Reproduction and Life cycle of the following:

Algae, Fungi, Bryophytes, Pteridophytes, and Gymnosperms.

### 5. Developmental Biology:

- Gametogenesis, Spermatogenesis and Oogenesis.

- Fertilization, Cleavage, Blastula, Gastrula-Morphogenetic movement, Fate maps, embryonic induction.
- Metamorphosis of frog. Regeneration, Amphibian limb regeneration.
- Extra-embryonic membranes in chick.
- Placenta in mammals.
- Endocrine control of ovulation, pregnancy, parturition and lactation.

#### **6. Reproduction in Higher Plants:**

- Vegetative, Asexual and Sexual Reproduction.
- Pollination and Fertilization.
- Embryogenesis.

#### **7. Ethology:**

**Types of Animal Behavior:** Feeding, Learning, Instinctive, Motivated, Social and Reproductive.

#### **8. Biostatistics:**

- Mean, Mode, Median, Standard deviation.
- Tabular and graphical representation of data- histogram, Pie diagram, bar diagram, line graph.

### **Part – III Post Graduation Level**

#### **1. Ecology:**

Ecosystems- components and types. Energy flow; Food chain, food web. Environmental factors (climatic, edaphic and biotic). Population and ecological adaptations. Plant and animal succession.

#### **2. Biotechnology and its Applications:**

Definitions, scope and applications.  
 Recombinant DNA technology.  
 Transgenic animals and plants.  
 Application in Health and Agriculture.  
 Tissue culture- methods and application.

#### **3. Techniques in Biology:**

Electrophoresis, Centrifugation, Chromatography, Colorimetry, Spectrophotometry, ELISA.

#### **4. Microscopy:**

Principle of Light microscopy, Phase contrast microscopy and Electron microscopy.

#### **5. Biogeography and Wild Life Conservation:**

Endemism, Hot spots, Plant and Animal distribution with special reference to Rajasthan. Wild life conservation. Biosphere reserves, Wild life sanctuaries and National Parks.

## **Part – IV (Educational Psychology, Pedagogy, Teaching Learning Material, Use of Computers and Information Technology in Teaching Learning)**

### **I. Educational Psychology**

- Concept, scope and functions of educational psychology.
- Physical, cognitive, social, emotional and moral developmental characteristics of adolescent learner and its implication for teaching-learning.
- Behavioural, cognitive and constructivist principles of learning and its implication for senior secondary students.
- Concept of mental health & adjustment and adjustment mechanism.
- Emotional intelligence and its implication in teaching learning.

### **II Pedagogy and Teaching Learning Material (Instructional Strategies for Adolescent Learner)**

- Communication skills and its use.
- Teaching models- advance organizer, concept attainment, information processing, inquiry training.
- Preparation and use of teaching-learning material during teaching.
- Cooperative learning.

### **III Use of Computers and Information Technology in Teaching Learning**

- Concept of ICT, hardware and software.
- System approach.
- Computer assisted learning, computer aided instruction

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For the competitive examination for the post of School Lecturer:-

1. The question paper will carry maximum 300 marks.
2. Duration of question paper will be **Three Hours**.
3. The question paper will carry 150 questions of multiple choices.
4. Negative marking shall be applicable in the evaluation of answers. For every wrong answer one third of the marks prescribed for that particular question shall be deducted.
5. Paper shall include following subjects :-
  - (i) Knowledge of Subject Concerned: Senior Secondary Level
  - (ii) Knowledge of Subject Concerned: Graduation Level.
  - (iii) Knowledge of Subject Concerned: Post Graduation Level.
  - (iv) Educational Psychology, Pedagogy, Teaching Learning Material, Use of Computers and Information Technology in Teaching Learning.