

**RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**  
**SYLLABUS FOR EXAMINATION FOR THE POST OF**  
**LECTURER -BIOLOGY,**  
**(SCHOOL EDUCATION)**  
**PAPER - II**

**Part – I (Knowledge of subject concerned : 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.

Salient features and classification of plants (major groups upto class). Life cycle of Algae, Fungi, Bryophytes, Pteridophyta, Gymnosperm and Angiosperm.

**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

Morphology, anatomy and functions of Morphological types Inflorescence, flower and fruits.

**3. 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.

**4. Animal Physiology :**

Digestion and absorption,

Breathing and Respiration,

Body fluids and circulation,

Excretory product and their elimination,

Locomotion and movement,

Neural control and coordination,

Chemical coordination and regulation,

Reproduction.

**5. Reproduction in Plants :**

Vegetative, Asexual and Sexual Reproduction. Structure of flower, Pollination, Fertilization, Development of embryo.

**6. Genetics and Evolution:**

Mendelian Inheritance: chromosome Theory of Inheritance

Sex determination in human beings.

Linkage and crossing over.

Origin of life – theories and evidence.

**7. Biology and Human Welfare :**

Basic concepts of immunology, vaccines, Pathogens, Parasites, Cancer, AIDS

**8. Ecology and Environment:**

Organism and its environment. Population and ecological adaptations

Environmental factors (climatic, edaphic and biotic )

Ecosystems- components, types, energy flow; Food chain, food web.

**Part – II (Knowledge of subject concerned : Graduation Level)**

**1. Taxonomy :**

Salient features and classification of non chordata and chordata upto order level with examples.

Symmetry, coelom, metamerism, arthropodization.

Floral variations in Ranunculaceae, Apiaceae, Asteraceae and Poaceae.

**2. Biology and Human welfare :**

Economic importance of protozoa, Helminthes, molluscs and insects.

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)

**3. Biotechnology and its Applications :**

Definition, scope and application; Recombinants DNA technology;

Transgenic animals and plants

Application in Health and Agriculture

Tissue culture-methods and application

**4. Environmental biology :**

Plant and animal succession.

Biogeochemical cycles: Carbon, Nitrogen, Phosphorus .

Environmental Pollution, Air, Water and Noise and Soil Pollution.

**5. Structure (External Internal), Reproduction and life cycle of the following**

Amoeba, Obelia, Taenia, Ascaris, Pheretima , Periplanata, Rana, Rabbit.

**6. Embryology :**

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.

**7. Plant physiology :-**

Water relations, Transpiration, Photosynthesis, Respiration, Growth, Mineral Nutrition, Plant movements, Nitrogen and Lipid Metabolism.

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

**Part – III (Knowledge of subject concerned : Post graduation level)**

**1. Technique in Biology :**

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

**2. Microscopy : Principle of light, Phase contrast and Electron microscope.**

**3. Ethology :**

A brief account of types of behavioral of animals - Feeding , Learning, Instinctive, Motivated, Social and Reproductive.

**4. 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)**

1. Importance of Psychology in Teaching-Learning :
  - Learner,
  - Teacher,
  - Teaching-learning process,
  - School effectiveness.
  
2. Development of Learner :
  - Cognitive, Physical, Social, Emotional and Moral development patterns and characteristics among adolescent learner.
  
3. Teaching – Learning :
  - Concept, Behavioural, Cognitive and constructivist principles of learning and its implication for senior secondary students.
  - Learning characteristics of adolescent and its implication for teaching.
  
4. Managing Adolescent Learner :
  - Concept of mental health and adjustment problems.
  - Emotional Intelligence and its implication for mental health of adolescent.
  - Use of guidance techniques for nurturing mental health of adolescent.
  
5. Instructional Strategies for Adolescent Learner :
  - Communication skills and its use.
  
  - Preparation and use of teaching-learning material during teaching.
  - Different teaching approaches:  
Teaching models- Advance organizer, Scientific enquiry, Information, processing, cooperative learning.
  
  - Constructivist principles based Teaching.
  
6. ICT Pedagogy Integration :
  - Concept of ICT.
  - Concept of hardware and software.
  - System approach to instruction.
  - Computer assisted learning.
  - Computer aided instruction.
  - Factors facilitating ICT pedagogy integration.

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## Scheme of Examination

### Subject Concerned

S. No.	Subject	No. of Questions	Total Marks
1	Knowledge of Subject Concerned : Senior Secondary Level	55	110
2	Knowledge of Subject Concerned : Graduation Level	55	110
3	Knowledge of Subject Concerned : Post Graduation Level	10	20
4	Educational Psychology, Pedagogy, Teaching Learning Material, Use of Computers and Information Technology in Teaching Learning	30	60
	<b>Total</b>	<b>150</b>	<b>300</b>

**Note :** 1 All the question in the Paper shall be Multiple Choice Type Question.

2 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.

Explanation : Wrong answer shall mean an incorrect answer or multiple answer.

3 Duration of the paper shall be 3 Hours.

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