

**RMSA- Recruitment to Model Schools**  
**Category of Post: PGT - Botany**  
**Syllabus**

**Part – I**

**GENERAL KNOWLEDGE AND CURRENT AFFAIRS (Marks: 10)**

**Part – II**

**CHILD DEVELOPMENT AND PEDAGOGY (Marks: 10)**

**1. Development of Child**

Development, Growth & Maturation – Concept & Nature, Principles of development, Factors influencing Development – Biological, Psychological, Sociological, Dimensions of Development and their interrelationships – Physical & Motor, Cognitive, Emotional, Social, Moral, Language relating to Infancy, early Childhood, late Child hood, Adolescence, Understanding Development – Piaget, Kohlberg, Chomsky, Carl Rogers, Individual differences – Intra & Inter Individual differences in the areas of Attitudes, Aptitude, Interest, Habits, Intelligence and their Assessment, Development of Personality – Concept, Factors and Assessment of Personality, Adjustment, Behavioural problems, Pro-social behaviour and Mental Health, Methods and Approaches of Child Development – Observation, Interview, Case study, Experimental, Cross sectional and Longitudinal, Developmental tasks and Hazards

**2. Understanding Learning**

Concept, Nature of Learning – input – process – outcome, Factors of Learning – Personal and Environmental, Approaches to Learning and their applicability– Behaviourism (Skinner, Pavlov, Thorndike), Constructivism (Piaget, Vygotsky), Gestalt(Kohler, Koffka) and Observational (Bandura), Dimensions of Learning – Cognitive, Affective and Performance, Motivation and Sustenance –its role in learning, Memory & Forgetting, Transfer of Learning.

**3. Pedagogical Concerns**

Teaching and its relationship with learning and learner, Learners in Contexts: Situating learner in the socio-political and cultural context, Children from diverse contexts–Children With Special Needs (CWSN), Inclusive Education, Understanding of pedagogic methods – Enquiry based learning, Project based learning, Survey, Observation and Activity based learning, Individual and Group learning: Issues and concerns with respect to organizing learning in class room like Study habits, Self learning and Learning to learn skills, Organizing learning in heterogeneous class room groups – Socio-economic background, Abilities and Interest, Paradigms of organizing Learning-Teacher centric, Subject centric and Learner centric, Teaching as Planned activity – Elements of Planning, Phases of Teaching – Pre active, Interactive and Post active, General and Subject related skills, competencies required in teaching and attributes of good facilitator, Learning resources – Self, Home, School, Community, Technology, Class room Management: Role of student, teacher, Leadership style of teacher, Creation of non-threatening learning environment, Managing behaviour problems, Guidance & Counselling, Punishment and its legal implications, Rights of a child, Time Management, Distinction between Assessment for Learning & Assessment of Learning, School based Assessment, Continuous & Comprehensive Evaluation: Perspective & Practice Understanding teaching & learning in the context of NCF, 2005 & Right To Education Act, 2009.

### **Part - III**

#### **PERSPECTIVES IN EDUCATION (Marks: 10)**

1. History of Education : Pre-Vedic and Post-Vedic period, Medieval Education, Recommendations of various committees during British period with special reference to Woods Despatch (1854), Hunter Commission (1882), Hartog Committee (1929), Sargent Committee (1944), Recommendations of various committees during post independent period with special reference to Mudaliar Commission (1952-53), Kothari Commission(1964-66), Ishwarbhai Patel committee (1977), NPE-1986, POA-1992
2. Teacher Empowerment: Meaning, interventions for empowerment, Professional code of conduct for teachers, Teacher motivation, Professional development of Teachers and Teacher organizations, National / State Level Organizations for Teacher Education, Maintenance of Records and Registers in Schools.
3. Educational Concerns in Contemporary India: Environmental Education, Meaning and scope of Environmental Education, Concept of sustainable development, Role of Teacher, School and NGOs in development and protection of environment, Democracy and Education, Equality, Equity, Quality in Education, Equality of Educational opportunities, Economics of Education, Meaning and scope, Education as Human Capital, Education and Human Resource Development, Literacy – Saakshar Bharat Mission, Population Education, Significance of Population Education, Population situation, policies and programmes in India, Approaches to Population Education and role of school and teacher, Themes of population Education, Family life Education, Sustainable development, Adolescence Education, Health Education, Gender – Equality, Equity and Empowerment of Women, Urbanization and migration, Life skills, Inclusive Education, Conceptual Clarification and Definition, Prevalence, Myths & Facts, Characteristics, Classification & Types, Importance of Early Identification and assessment, Planning Inclusive Education, Classroom Management in Inclusive Education, Evaluation, Documentation and Record Maintenance, Psycho-Social management, Awareness & Sensitization Strategies, Liberalization, Privatization and Globalization, Value Education, Sarva Siksha Abhiyan, National Programme for Education of Girls at Elementary Level (NPEGEL), Mid-day-meals, Rashtriya Madhyamika Siksha Abhiyan(RMSA), KGBVs and SUCCESS Schools.
4. Acts / Rights: Right of Children to Free and Compulsory Education Act, 2009 and Child Rights.
5. National Curriculum Framework, 2005: Perspective, Learning and Knowledge, Curricular Areas, School Stages and Assessment, School and Classroom Environment and Systemic Reforms.

### **Part - IV**

#### **LANGUAGE - ENGLISH (Marks: 10)**

1. Poets, Essayists, Novelists, Dramatists and their works.
2. Forms of Language – Story, Essay, Letter writing, Editorial, Précis writing, note- making, autobiography and biography.
3. Pronunciation – Sounds – Use of dictionary
4. Parts of Speech
5. Tenses
6. Types of Sentences
7. Articles and Prepositions
8. Degrees of Comparison
9. Direct and Indirect – Speech

10. Clauses
11. Active and Passive Voice
12. Use of Phrases
13. Comprehension of a Prose passage / Poems
14. Vocabulary

## Part - V

### CONTENT (Marks: 48)

1. **Classification of Plant Kingdom**
2. **Branches of Botany**
3. **Bacteria and Viruses:** General account of Viruses: Characteristics, Chemistry, Ultra structure, Composition, Replication, Bacteriophage, Transmission of plant viruses. General account of Bacteria: Characteristics, Shape, Ultra structure of the cell, Nutrition, Reproduction, Classification and Importance.
4. **Algae:** Introduction and general classification of algae, criteria for the classification, thallus organisation of algae, economic importance of algae, general characteristics structure, reproduction, pigments, phylogeny, life cycles of Chlamydomonas, Volvox, Oedogonium, Chara, Vaucheria, Ecocarpus, Polysiphonia.
5. **Fungi:** General characteristics of fungi, occurrence, thallus structure of fungi, modes of nutrition, reproduction, phylogeny of these types: Albugo, Mucor, Penicillium, Puccinia, Peziza, Alternaria. General account of Lichens, Economic importance of Fungi.
6. **Bryophyta:** General characteristics of Bryophyta, sporophyte, evolution in Bryophyta, classification of Bryophyta, structure, reproduction in Marchantia, Anthoceros, Polytrichum.
7. **Pteridophyta:** General characteristics of Pteridophyta, classification of Pteridophyta, structure, reproduction in Rhynia, Lycopodium, Equisetum and Marsilea.
8. **Palaeobotany:** Origin & evolution of land plants, Homospory, Heterospory, origin of seed, Telome theory and Origin of Sporophyte.
9. **Gymnosperms:** Characteristics and classification of Gymnosperms, Morphology, Life History & affinities of Cycas, Pinus & Gnetum.
10. **Angiosperms:** Taxonomy of Angiosperms, Systems of Classification: Hutchinson, Takhtajan, Pressey, Engler & Prantl, Bentham & Hooker. Principles of taxonomy: Criteria of classification, categories of classification, International code of Botanical Nomenclature, principles, typification, citation & authority. Study of the following families with reference to their characteristics, economic importance and attributes etc. a) Annonaceae b) Malvaceae c) Fabaceae d) Caesalpinaceae e) Mimosaceae f) Cucurbitaceae g) Asclepiadaceae h) Euphorbiaceae i) Orchidaceae j) Rubiaceae k) Poaceae
11. **Cell Biology and Anatomy:** Ultra structure of cell and cell organelles, cell wall structure, tissue and tissue systems, meristems, shoot & root apices, normal & anomalous secondary growth.
12. **Cytology, genetics and Evolution:** Mitosis and Meiosis; Chromosome (Morphology, Structure, importance); concept of gene laws of inheritance; gene action; genetic code; linkage and crossing over; general account of mutations; polyploidy and its role in crop improvement, Concept of Primitive flower; development of anther and ovule; general account of embryosac and types of embryo; fertilization; endosperm morphology and types; polyembryony and apomixes.

- 13. Ecology:** Ecosystem: Concept, biotic & abiotic components, ecological pyramids, productivity. Biogeochemical cycles (Carbon, Nitrogen, Sulphur, Phosphorous cycles), Plant succession – Xerosere and Hydrosere Bio-diversity and conservation.
- 14. Physiology**  
Absorption and translocation of water; Transpiration and stomatal behaviour; Absorption and uptake of Ions, Donnan's equilibrium; Role of micronutrients in plant growth; Translocation of solutes; Photosynthesis (Light and dark reaction, Red drop, Emerson effect, Two pigment systems, Mechanism of Hydrogen transfer, Calvin cycle, Enzymes of CO<sub>2</sub> reduction, Hatch and slack cycle, C<sub>4</sub> cycle, CAM Pathway, Factors affecting photosynthesis, Pigments.); Respiration (Glycolysis, Pentose phosphate shunt, structure and role of mitochondria, Krebs's cycle, Oxidative Phosphorylation, Photorespiration, respiratory quotient, fermentation, Pasteur effect, factors affecting.); The enzymes (Nomenclature and classification, structure and composition, Mode of enzyme action, Factors affecting.); Nitrogen metabolism and bio synthesis of proteins, Nitrogen fixation, Nitrogen cycle, (Physical and Biological); Nitrogen assimilation, Amino acid metabolism, Plant Hormones(Auxins, Gibberellins, Cytokinins, Abscissic acid – general account.)
- 15. Economic Botany:** Utilisation of plants, food plants, fibres, vegetable oils, wood yielding plants, spices, medicinal plants, beverages and rubber.
- 16. Recent aspects of Botany:** Genetic Engineering; Plant tissue culture; Social forestry; Environmental Pollution (Water, Soil, Air) Health hazards and control, Biotechnology.

#### **Part -VI**

#### **TEACHING METHODOLOGY (Marks: 12)**

1. The Nature & Scope of Science: A brief introduction of Oriental and Western Science, Nature of Science, Scope of Science, Substantive and Syntactic Structure of Science.
2. Aims and Values of Teaching Biological Sciences: Aims of teaching Biological Sciences, Values of teaching Biological Sciences.
3. Objectives of Teaching Biological Sciences: Importance of Objectives of Teaching Biological Sciences, Bloom's Taxonomy of Educational Objectives and limitations, Writing Instructional Objectives and Specifications.
4. Approaches and Methods of Teaching Biological Sciences: Inductive Approach and Deductive Approach, Methods of Teaching 1. Lecture Method, 2. Lecture cum Demonstration Method, 3. Heuristic Method, 4. Project Method, 5. Experimental Method, 6. Laboratory Method.
5. Planning for effective Instruction: Year Plan, Unit Plan, Lesson Plan – Herbartian and Bloom's Approach, Criteria for Evaluation of Lesson Plan. Self Evaluation and Peer Evaluation, Learning experiences – Characteristics, Classification, Sources and Relevance, Teaching – Learning Material and Resources in Biological Sciences.
6. Science Laboratories: Importance of Practical work in Biological Sciences, Planning Science Laboratory, Procurement, Care and Maintenance of Laboratory Equipment, Maintenance of different Registers, Safety and First aid, Development of Improvised Apparatus.
7. Science Curriculum: Principles of Curriculum Construction, Defects in the existing School Science Curriculum, Correlation of Biological Sciences with other School Subjects, Qualities of a good Biological Science Text-book.

8. Biological Science Teacher: Qualities of a good Biological Sciences Teacher, Roles and Responsibilities.
9. Non-formal Science Education: Science club, Eco-club, Blue-club, Red ribbon club, Science fairs – Objectives, levels of organizations, importance, Science Laboratories, Role of NGO'S and State in popularizing science.
10. Evaluation: Concept and process of Measurement and Evaluation, Continuous Comprehensive Evaluation, Tools of Evaluation, Preparation of Scholastic Achievement Test (SAT), Analysis and interpretation of scores.