Annexure XIII

(Enclosure to Notification No. 1479/SS/T9/KGBV/URS/2022, Dt:16.06.2023 of DSE & EO-SPD, TSS, Hyd.)

Syllabus of Written Test for Recruitment of PGCRTs in KGBVs
PGCRT – Zoology

Part I - General Studies

1. Current Affairs - Regional, National & International.
2. Indian Constitution; Indian Political System: Governance and Public Policy.
3. Social Exclusion; Rights issues such as Gender, Caste, Tribe, Disability etc., and inclusive policies.
4. Society Culture, Civilization Heritage. Arts and Literature of India and Telangana
5. General Science; India's Achievements in Science and Technology
6. Environmental Issues; Disaster Management- Prevention and Mitigation Strategies and Sustainable Development.
7. Economic and Social Development of India and Telangana.
8. Socio-economic, Political and Cultural History of Telangana with special emphasis on Telangana Statehood Movement and formation of Telangana state.

Part II – Basic Proficiency in English

1. School Level English Grammar:

   Articles; Tenses; Noun & Pronouns; Adjectives; Adverbs; Verbs; Modals; Subject-verb Agreement; Non-finites; Reported Speech; Degrees of Comparison; Active and Passive Voice; Prepositions; Conjunctions; Conditionals.
2. Vocabulary:

   Synonyms and Antonyms; Phrasal Verbs; Related Pair of Words; Idioms and Phrases; Proverbs.
3. Words and Sentences:

   Use of Words; Choosing appropriate words and words often confused; Sentence Arrangement, Completion, Fillers and Improvement; Transformation of Sentences; Comprehension; Punctuation; Spelling Test; Spotting of Errors.

Part III - Perspectives in Education

1. **History of Education:** Pre-Vedic and Post-Vedic period, Medieval period 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 in the post independent period with special reference to Mudaliar Commission (1952-53), Kothari Commission (1964-66), Ishwarbhai Patel Committee (1977), National Policy on Education, 1968, National Policy on Education, 1986, Programme of Action, 1992 and National Educational Policy, 2020.

   Aims, Objectives, Functions, Unipolar, Bipolar and Tripolar Processes of Education, Types of Education - Formal, Informal and Non-formal Education, their significance and interrelations, Philosophical, Sociological and Psychological Perspectives of Education.

2. **Teacher Education:** Concept, Teacher Preparation, NCFTE-2009, Pre-service and In service Teacher Education Programs, Teacher Motivation, Continuous Professional Development.

   Teacher Empowerment: Meaning, Interventions for Empowerment, Professional Code of Conduct for Teachers, Role of Teacher Organisations in Professional Development of Teachers, National and State Level Institutions for Teacher Education.

3. **Educational Concerns in Contemporary India:**

   Environmental Education: Meaning, 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, Equality of Educational Opportunities, Role of Education in promoting Democracy; **Economics of Education**: Meaning and Scope, Education as Human Capital, Education and Human Resource Development; **Population Education**: Significance of Population Education. Population situation, Approaches to Population Education and Themes of Population Education, Family Life Education, Sustainable development, Adolescence Education, Health Education, Gender Equality, Equity and Empowerment of Women, the Role of School and Teacher, Urbanization and Migration, Life Skills; **Inclusive Education**: Concept, Prevalence, Areas of Disabilities, Disadvantaged Groups, Gender etc., Myths & Facts, Importance of Early Identification and Assessment, Planning Inclusive

Education, Initiatives in Education, Method & Strategies of Classroom Management, Psycho-Social Management, Creation of Awareness – Students, Parents and Society & Sensitization Strategies, Evaluation, Documentation and Maintenance of Records; **Liberalization, Privatization and Globalization**; **Value Education; Initiatives in Education:** Sarva Siksha Abhiyan (SSA), National Programme for Education of Girls at Elementary Level (NPEGEL), Mid-day-Meal Programme, Rashtriya Madhyamika Siksha Abhiyan (RMSA), Samagra Shiksha and its interventions, KGBVS and Model Schools etc.

4. Constitutional Provisions relevant to Education: Acts/Rights**,** Right of Children to Free and Compulsory Education Act, 2009, Right to Information Act 2005, Child Rights, Human Rights, PWD Act, 2016 and other Provisions pertaining to Education.

5. National Curriculum Framework, 2005 and NCFSE, 2023.

Part IV - Content

1. General Concepts

Nature, Scope and Meaning of Zoology, Branches of Zoology, Levels and Hierarchy of Classification, Nomenclature, Species Concept, Kingdom Animalia, Biodiversity, Levels of structural organization Unicellular, Multi cellular and Colonial forms, Prokaryotic and eukaryotic cells, Levels of organization of Tissues, Diploblastic, Triploblastic organization, Importance of symmetry, Levels of Organs & Systems, Coelom: Acoelomata, Pseudocoelomata, Protostomia and Deuterostomia, Animal tissues – Histology of mammalian tissues and organs – Epithelia, Connective, blood, bone. Cartilage skin, stomach, intestine liver, pancreas, kidney testis and ovary.

2. Non-Chordata

General characters and classification of vertebrates up to class level, Protozoa - Locomotion Nutrition and Reproduction in Protozoa, Protozoan diseases of man - Amoebiasis Malaria. Trypanosomiasis, Porifera - Canal system in Porifera, Skeleton in Porifera, Reproduction in sponges, Coelenterata – Polymorphism, Metagenesis, Coral formation, Obelia, Helminthes - Common Helminthic parasites of Man - Fasciola hepatica Schistosoma, Taenia solium, Echinococus granulesus, Ascaris, Ancylostoma, Trichinella their life cycles Pathogenecity and clinical significance, Parasitic adaptations in Helminths, Annelida - Excretory system in Annelida, Coelom formation, Coelom and coelom ducts, Metamerism, *Peripatus*, Arthropoda - Mouthparts of insects, Ommatidium, Useful and harmful insects, Metamorphosis in insects, *Periplanata americana* – type study. Crustacean

larvae, Mollusca – General Characters and classification, Echinodermata – Echinoderm larvae, Water vascular system.

3. Chordata:

General characters and classification of chordates up to class level. Origin of chordates. Phylogeny and Affinities of Hemichordata, Retrogressive metamorphosis, Vertebrate integument and its derivatives. Comparative account of Digestive Respiratory, Circulatory, Excretory and Reproductive systems of vertebrates, Pisciculture in India Common edible fishes, Origin and evolution of Amphibia, Neoteny or Paedogenesis, Poisonous and non-poisonous snakes – identification; Snake bite and its effect, Blood and circulation Blood corpuscles Haemopoiesis. Plasma function Blood groups, Haemoglobin Haemostasis.

4**. Cell Biology**

Ultra structure of animal cell, Prokaryotic and Eukaryotic cell – differences, Structure and function of cell organelles - Plasma membrane, Mitochondria, Golgi bodies, Lysosomes, Endoplasmic Reticulum, Ribosomes. Peroxisomes, Vacuoles and Nucleus, Chromosome structure & functions, Heterochromatin, Euchromatin, DNA & RNA, Cell division – mitosis and meiosis, Cell cycle & its regulation.

5. Genetics:

Mendel’s law of inheritance, Heredity and variations, Gene mapping methods – linkage – complete and incomplete linkage, Linkage maps, somatic cell hybrids, Crossing ever Types Somatic or Mitotic crossing over and Germinal or crossing ever, Mutations - Types (Somatic or mitotic crossing over and germinal or meiotic crossing over), Recombinant DNA technology Transgenesis & Cloning, Protein synthesis – Genetic code Initiation, elongation and Termination, Regulation of gene expression – Lac operon, Chromosomal aberrations (Deletion Duplication version and Translocation) ploidy and their genetic implications, Chromosomal abnormalities - Down's syndrome Trisomy-13, 18) Sex anamolies, Turner's syndrome, Kinfelter's syndrome, Human genetics Human Karyotyping. Genetic disorders due to mutant gene tuntington's chorea) Sickle-cell anaemia (SCA) Inborn errors of metabolism Phenylketonuria, Alkaptonuris, Human genetics Human karyotyping. Genetic disorders due mutant genes Huntington's chorea), Colour blindness, Sickle-cell anaemia (SCA) Inborn errors of metabolism, Phenylketonuria, Alkaptonuria System and Cell physiology

6. Body fluids and circulation

Blood and circulation, Blood corpuscles, Lymphatic system, clotting of blood, Circulating pathways, Human Cardiovascular system, Myogenic heart, Cardiac cycle, Types of circulations, Respiratory system: Transport of gases, Exchange of gases, Nervous system: Human Neural system, CNS, PNS, SNS, ANS, Reflex Action and Reflex Arc, Sensory Reception and Processing – Sense organs Eye, Ear, Nose, Tongue and Skin, Muscle-Ultra structure of skeletal muscle Mechanism of muscle contraction, Excretory system Structure & function of mammalian Kidney and Micturition, Kidney and Nephron, Micturition, Osmoregulation in Aquatic & Terrestrial animals, Osmoregulation: Osmoregulation in Aquatic & Terrestrial animals, Digestive system Digestive System Digestion, absorption, assimilation and egestion Endocrinology and Reproduction Endocrine glands, Types of hormones & Mechanism of hormonal action, Hormonal regulation, Endocrinology and Reproduction Endocrine glands Types of hormones & Mechanism of hormonal action. Hormonal regulation of reproduction in Humans, Reproductive health, Organic compounds - Carbohydrates, Proteins and Lipids, Glycolysis (EMP) Kreb's cycle (TCA cycle) Electron transport system (Oxidative phosphorylation) Pentose phosphate pathway Gluconeogenesis.

7. Organic Evolution:

Origin of Life, Chemical, Biological evolution and Evidences for biological evolution (paleontological, comparative anatomical, embryological, atavistic, connecting links, and molecular evidences), Geological time scale, Theories of evolution: Lamarckism, Darwin's theory of Evolution Natural Selection, Mutation Theory of Hugo De-Vries. Modern synthetic theory Evolution Hardy Weinberg Law, Types of Natural Selection: Adaptive radiation, Human evolution; Speciation Allopatric, sympatric. Reproductive isolation of life Theories and Evidences of organic evolution the modern synthetic theory, Mechanism of evolution, Population genetics (Gene pool, Gene flow, Genetic drift, Genetic load, Gene frequency), Hardy Weinberg's law, Isolation and speciation

8. Developmental Biology

Structure of male and female reproductive systems in human, Spermatogenesis and Oogenesis, structure of sperm, Menstrual cycle, Fertilization Cleavage Gastrulation Formation of germ layers Parthenogenesis, formation and Function of Foetal membranes, Types of placenta, reproductive health, birth control, Amniocentesis Infertility and Assisted Reproductive Technology (ART).

9. Biosphere – Ecology

What is ecology and its importance, organisms and environment, Elementary aspects, population interaction, components, Biogeochemical cycles (Carbon Nitrogen and

Phosphorous), Influence of environmental factors on animals, Ecosystem – components and types, Energy flow in Ecosystem. Food chains, Food web, Ecological pyramids and their types, Animal Associations- Neutralism, Mutualism, Symbiosis Commensalism, Parasitism, Predation and Competition, Ecological succession – Hydrosere, Xerosere and Mesosere, Environmental pollution Air, water, soil, thermal, causes, Effects and prevention, Green house effect, ozone depletion, Wildlife in India Conservation, Chipco movement, natural resources management, renewable and non-renewable energy resources, Biodiversity Economic significance Conservation, Hot spots of India.

10. Immunology

Cells of the immune system Lymphoid cells. Mona nuclear cells. Granulocytic cells Mast cells, Organs of the immune system. Primary and Secondary lymphoid organs. Lymphatic system, Antigens – Antigenic determinants or Epitopes Immunogenicity, Humoral immunity immunoglobulin (Fine structure of immunoglobulin and Immunoglobulin classes) , Natural killer cells, Innate (Non-specific immunity) Anatomical barriers, Phagocytosis, Natural killer cells (NK cells) Interferons, Cell mediated immunity Mechanism of cell mediated immunity,

11. Applied Biology:

Animal Husbandry: Apiculture. Pisciculture, Sericulture in India Poultry management Dairy management: Animal breeding: Bio-medical Technology: Diagnostic Imaging (X-ray, CT scan, MRI), ECG, EEG; Biotechnology its importance for human welfare Human insulin and vaccine production; Gene Therapy: Transgenic animals; ELISA vaccines, MABS, Cancer biology, Stem Cells, DNA finger printing, Human Genome Project (HGP) and its applications.

Part V - Pedagogy

1. **Nature of Science:**

The Nature and scope of Science, The History and Development of Science, including the eminent contributions of important Biologists – Aristotle, William Harvey, Lamarck, Charles Darwin, J.C. Bose, M.S. Swaminathan, Birbal Sahni, Elizabeth Blackburn, Recent advancement in Biological Science, Biological Science in Everyday Life.

2. **Aims of Learning Biological Science:**

Values, Aims and Objectives of Teaching Biological Science, Knowledge and understanding through Science, Nurturing Process, Skills of Science, Development of Scientific Attitude and Scientific Temper, Respect for Evidence, Open Mindedness, Truthfulness in reporting observations, Critical thinking, Logical thinking, Skepticism,

Objectivity, Perseverance, Role of Science Teacher, Relating Biological Science Education to Physical Science and Social Environment, Technology, Society and Environment.

3. **Learning objectives of Biological science:**

Meaning of Learning objectives, Developing of Learning objectives and features well developed learning objectives, Bloom's Taxonomy of Educational objectives, specific / behavioral / instructional objectives, Anderson and Krathwohl's Taxonomy, Academic Standards in Biological Science.

4. **Biological Sciences Curriculum:**

Historical of Development of Curriculum Framework, Curriculum Framework - Curriculum and Syllabus, Principles of Curriculum construction in Biological Science, Organization of subject matter – different approaches - correlated, integrated, topical, concentric, unit and chronological. Recommendations of NCF-2005 and TSCF -2011 on Science Curriculum National Focus Group Position Paper on Science and State Positon Paper (2011) on Science, Constructivist approach in Biological Science, Trends of Science Curriculum / Syllabus, Moving from Textbook to Teaching-Learning Materials, going beyond the Textbook, Print Resources: Textbooks, Popular Science Books, Journals and Magazines, Edger Dale's Cone of Experiences-Using the Cone of Experience, Teacher as Curriculum Developer.

5. **Approaches and Methods of teaching Biological Science:**

Lecture method, Lecture cum Demonstration method, Historical method, Heuristic method, Project method, Laboratory method, Problem Solving method, Scientific method, Microteaching, Team teaching, Inductive and Deductive Approaches, Constructivist Approach- 5 E Learning Model, Collaborative Learning Approach (CLA), Problem Solving Approach (PSA), Concept Mapping, Experiential Learning, Multimedia approach in teaching learning process and Programmed learning, Computer Assistant Instruction (CAI) and Computer Aided Learning (CAL).

6. **Planning for Effective Instruction in Biological Science:**

Year plan, Unit plan, Lesson plan, Learning experiences, Characteristics, Classification, Source and relevance, Teaching Learning Material (TLM) – Characteristics and importance, Principles to be followed in preparation and usage, Classification, Types, Hardware and Software in TLM, Planning ICT applications.

7. **Community and Learning Resources**

Using Community Resources - Bringing community to the class, taking class to the community: Field visit, Pooling of Learning Resources, Teaching Learning Material and Improvisation of Apparatus, Science Kits, Laboratory as a Learning Resource, different forms of ICT and its applications in Biological Science Education – Audio aids, Video aids, Educational TV, Use of computer for simulation, internet and Open Learning Resources.

8. Assessment and Evaluation in Biological Sciences:

Test, Examination, Measurement, Assessment and Evaluation, Continuous and Comprehensive Evaluation (CCE), Performance Based Assessment, Assessment Framework - Purpose of assessment, Learning Indicators, Tools and Techniques of Assessment - Written test, Project work, Field trips and field diary, Laboratory work, Interview/Oral test, Journal writing, Concept mapping, Use of Rubrics, Recording and Reporting of the project work, Technical and Academic Guidance, Measurement of students' achievements, Grading system, Measurement of process skills, Portfolio: Its role in evaluating students' performance, Assessment as a reflecting process, Assessment of Learning of Students with special needs.

9. Pedagogical Shift in Biological Science:

Pedagogical Shift: Science as Fixed Body of Knowledge to the Process of Constructing, Knowledge, Learners, learning and teachers, Scientific method to Science as inquiry, Inclusion- Science curriculum, Diversity in class approaches, Information and Communication Technology (ICT), Continues Professional Development (CPD): Role of reflective practices in professional development of biological teachers, Content-cum-methodology: Meaning, Concept & Nature.

10. Child Development

Psychology of teaching and learning of Biological Science, Learning disabilities – Difficulties in education of Exceptional and disable children.