

Annexure XXV

(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 CRT Science in Urban Residential School

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. **Measurement:** Measurement of lengths, Units of Measurements, Measurement of thickness of a coin, Measurement of the length of a curved path, Measurement of Area, Measurement of the area of a regular and irregular surface, Measurement of volume, measurement of volume of liquids, Measurement of volume of irregular solids using a measuring cylinder.
2. **Natural Resources:**
 - i. **Air and Water:** Composition of air, Hot air and Cool air, Effects of moving air, Cyclone, Measurement of Atmospheric Pressure, Air Pollution, Sources water on earth, Forms of water, evaporation of water, condensation of water, water cycle, Water and its uses, Measurement of the volume of water, Water pollution, Process of waste water treatment, safe drinking water stages, Diseases caused by untreated water, other ways of disposing sewage, Types of drainage systems, Draughts, Floods, Conservation of water.
 - ii. **Weather and Climate:** Measuring components of weather, measurement of temperature of a place, Measurement of rainfall, direction of wind, Humidity, Climate and life style.
 - iii. **Coal and Petroleum:** Sources of materials, Exhaustible and Inexhaustible materials, Coal - formation, Uses of Coal - Coal, coke and Coal tar, Col gas, Petroleum - formation, refining of petroleum, uses of petroleum, use of natural gases, Petrochemical products, conservation of coal and petroleum, Misuse of energy resources and consequences, harmful effects caused during use of fuels.

iv. Combustion, Fuels and flame: Combustible and non-combustible materials, Process of combustion, Ignition temperature, Types of combustion, Fuels, calorific value, Fire control, Flame, structure of flame

3. **Natural Phenomena**

i. **Light:** Sources of light, Shadows, Reflection, Laws of Reflection, Periscope,

Kaleidoscope, Pin hole camera, Reflection of light by plane surfaces- Formation of image by a pinhole camera, Fermat principle, Plane mirror, Reflection of light by plane mirror, Plane of reflection, Formation of an image by plane mirror and its characteristics, uses of plane mirrors, Rear view mirror, Spherical mirror, Convex mirror and Concave mirror, Real and Virtual image, Regular and Irregular reflections, Lateral inversion.

ii. **Sound:** Identifying different sounds, Sound is a form of energy, Production of sound, Propagation of sound in different media, Types of waves, Sound waves- Longitudinal, Characteristics of the sound Wave-Loudness, feebleness, Wave length, Amplitude, Time period and frequency, Speed of sound wave, Noise and Music, Musical instruments, Characteristics of a musical Sound-Pitch, Loudness, Quality, Audible range, Sound pollution, Measure to control sound pollution.

iii. **Heat:** Sources of Heat, Heat is a form of an Energy, Heat, Temperature and Units, Measurement of Temperature, Fahrenheit and Centigrade scales, Different types of thermometers.

iv. **Some natural phenomena:** Types of charges and their interaction, Presence of charge of a body, transfer of charge, Lightning, Lightning safety, Lightning conductors, Earthquakes, Tsunami, protection against Earthquakes, Earthquakes in Telangana.

v. **Stars and solar system-** Length of a shadow, North-south movement of the Sun. Sun dial, Moon, Phases of Moon, Solar and Lunar eclipses, Constellations, Pole star, Solar System, The planets, Stars, Meteors, Asteroids and Comets, Artificial Satellites.

4. **Kinematics and Dynamics**

i. **Motion-** Motion and rest, Types of motions- Translatory motion, Rotatory motion, Oscillatory motion, Speed, Average speed.

ii. **Force:** Types of forces- Contact forces and field forces, Net force, Effects of net force acting on a table, Effect of stretched rubber bands on fingers, calculation of net force from free body diagrams, Effect of force on change the state of motion and its direction, Effects of net force on direction of moving object, other effects of force, Pressure,

- iii. Friction:** Types of friction, Factors affecting friction, friction produces heat, Increasing and decreasing of friction, principle of ball bearings, Fluid friction, factors influencing the fluid friction.
- iv. Time:** Estimating time, Units of time, Time Measuring instruments.
5. **Magnetism:** Story of magnet, Magnets of different shapes, materials attracted by Magnet, Poles of a Bar magnet, Directions of a Bar magnet, Magnetic compass, attraction and repulsion between two magnets, Earth as a Magnet, Magnetic and non-magnetic substances, Making of a magnet and magnetic compass, Magnetic induction.
 6. **Electricity** -Electric cell-Dry cell, Bulb, Switch, Torch light, Electric symbols and their uses, Simple electric circuits, Connecting Electric cells and bulbs in Series and Parallel, Heating effect of electric current, Tube lights, Compact Florescent lamps, Miniature circuit breaker(MCB), Electric fuses, Testing conductivity of materials- conductors, insulators, Electric conductivity of liquids, Electric conductivity of electrolyte, Chemical effect of electric current, Electrolytic cell, Electroplating and its uses,
 7. **States of Mater** – Matter around us- Properties of Materials-Transparent, Opaque, translucent, States of matter, Changes in Matter(Physical change and Chemical Change, Slow and fast changes, temporary and permanent changes), Matter- Changing its states.
 8. **Materials**
 - i. Acids, Bases and Salts:** Natural indicators, Chemical indicators to test Acids and Bases, Acid rains, Manures, Salts.
 - ii. Natural Fibres, Synthetic Fibres and plastics:** Types of fibres, Natural fibres- Cotton, Jute, Silk, Wool, Yarn to fabric, identifying fibres - burning test, Synthetic fibres- Nylon, Rayon, Acrylic, Polyesters, Plastics-Resin identification codes, Plastics, Types of plastics - Thermo plastics, Thermosetting plastics, plastics and environment, Bio degradable and non-biodegradable, 4R principle, recycling code.
 - iii. Metals and Non-metals:** Physical properties of Metals-Appearance, Sonority, Malleability, Ductility, Electric and Thermal conductivity. Chemical properties of metals- Reaction with oxygen, rusting of metals, Reaction with water, Reaction with Acids, Reactivity of metals, Uses of metals and non-metals.
 9. **Separation of Substances**

Separating the components of a mixture, Hand picking, Sedimentation and decantation, sieving and filtration, Crystallization, Sublimation, Evaporation, chromatography.
 10. **Biological Sciences:** Introduction, Living and Non-living, Our Food, Food components, Habitat, Importance of Biology in human welfare, Biologists
 11. **Living World:** Life and its Characteristics, Classification of Living Organisms, Biodiversity and its conservation, Extinct, Endangered, Endemic and Invasive Alien Species

12. **Microbial World:** The world of Microorganisms- Virus, Bacteria. Algae. Fungi and Protozoan. Useful and Harmful Micro-organisms, Diseases- Infectious and non-infectious
13. **Cell & Tissues:** Discovery of the cell, Diversity in Cells, Cell is a Structural and Functional unit of life. Prokaryotic and Eukaryotic Cell. Structure of Eukaryotic Cell, Cell Organelles – Structure and functions, differences between Plant Cell and Animal Cell. Cell Division - Mitosis and Meiosis – their significance, Tissues - Plant and Animal tissues - Structure, Functions and Types.
14. **Plant World:** Morphology of a typical flowering plant - Root, Stem, Leaf, Flower - Parts of a Flower and their functions, Fruit, Modifications of Root. Stem and Leaf, Nutrition in plants- Photosynthesis, Insectivorous plants, Transpiration, Transportation (Ascent of Sap). Respiration, Excretion and Reproduction in Plants, Seed dispersal, Economic importance of Plants, Fibre to fabric- Silk and wool, Soil- our life, Water in our life, Forest- our life, Agricultural Operations – production of food from plants, Seasonal crops, Crop diseases and Control measures, Improvement in Crop yield, Storage and Preservation.
15. **Animal World:** Organs and Organ Systems, Movements in Animals, , Reproduction in animals – Oviparous, Viviparous,, Reproduction in humans, Nutrition in man Nutrients and their functions, Balanced Diet, Deficiency diseases. Tropical diseases, Skin diseases. Blindness in humans: Causes, Prevention and Control, Health agencies, Economic Importance of Animals, Animal Husbandry, Breeding of Cows and Buffaloes
16. **Our Environment:** Water in our Life, Abiotic and Biotic factors, Ecosystem, Different Ecosystems – Terrestrial, Aquatic and Mangrove, Food chain, Food web, Ecological pyramids and their types, Energy Flow in an ecosystem, Energy relations in an Ecosystem, Natural Resources Classification, Judicial use of Renewable, Non-renewable and Alternative Resources, Bio-mass and Bio-fuels Non-Conventional Energy Sources Wild Life Conservation, Sanctuaries, National Parks in India. Bio-Geochemical Cycles, Environmental pollution – Common pollutants and their sources, Primary and secondary pollutants, Air, Water, Soil and Sound – causes, effects and preventive measures, Global Warming (Green House Effect), Acid Rains and Depletion of Ozone layer,
17. **Applied Biology:** Production of food from Animals- Pisciculture, Apiculture, Sericulture. Poultry management. NECC, Hybridization.

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 Scientists - Aristotle, William Harvey, Lamarck, Charles Darwin, J.C. Bose, M.S. Swaminathan, Birbal Sahni, Elizabeth Blackburn,– Isaac Newton, John Dalton, J.C. Bose, Albert Einstein, Niels Bohr, C.V.

Raman, Louis Victor de Broglie, Bimla Buti, Venkataraman Ramakrishnan, APJ Abdul Kalam, Marie Curie; Science in Everyday Life.

2. Aims of Learning Science:

Values, Aims and Objectives of Teaching 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 Science Education to Physical and Social Environment, Technology, Society and Environment.

3. Learning objectives of 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; Writing learning objectives – Remembering, Understanding, Applying, Analysing, Evaluating, Creating; Academic Standards in Science.

4. Science Curriculum:

Historical of Development of Curriculum Framework; Curriculum Framework - Curriculum and Syllabus; Principles of Curriculum construction in 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 Position Paper (2011) on Science; Constructivist approach in 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 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 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 Science Education – Audio aids, Video aids, Educational TV, Use of computer for simulation, internet and Open Learning Resources.

8. Assessment and Evaluation in 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 - 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 Science:

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

10. Child Development

Psychology of teaching and learning of Science; Learning disabilities – Difficulties in education of Exceptional and disabled children.