

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश  
प्रदेश निजामती सेवा अन्तर्गत प्रदेश शिक्षा सेवा, शिक्षा प्रशासन समुह विज्ञान उप-समूहका अधिकृत स्तर सातौं  
तहका प्रशिक्षक पदको खुला र अन्तर तह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

### **तृतीय पत्र (Paper III) : Technical Subject**

#### **Section A-30 marks**

- 1. Mechanics, Properties of matter, Heat and thermodynamics** **10 marks**
  - 1.1 Vector, Linear Motion, Circular motion
  - 1.2 Rotational motion, Torque, Simple harmonic motion
  - 1.3 Gravitation
  - 1.4 Fluids at rest, Elasticity, Surface tension, viscosity
  - 1.5 Thermometry and Calorimetry
  - 1.6 Thermodynamics, Heat Transfer
- 2. Light, Sound, Electricity and Magnetism** **10 marks**
  - 2.1 Reflection and Refraction of light, Huygen's principle
  - 2.2 Interference, Diffraction and Polarization of light
  - 2.3 Electromagnetic waves and Maxwell's equation
  - 2.4 Transverse waves, Longitudinal waves, Speed of wave, Progressive wave, Stationary waves, Waves in strings, Waves in pipes, Beats, Velocity of sound waves, Musical notes of sound
  - 2.5 Electric charge, Electric current, Potential difference, Ohm's law, Resistance, Emf and Internal resistance of cell, Electric power
  - 2.6 Wheatstone bridge, Meter bridge, Potentiometer
  - 2.7 Magnetic effects of electric current
  - 2.8 Alternating currents
  - 2.9 Magnetic materials, Earth's Magnetism
  - 2.10 Semiconductor, Electronics- Simple circuits
- 3. Earth and space science** **10 marks**
  - 3.1 Solar System: Origin and its members
  - 3.2 Eclipse, Satellites, Meteors, Comets, Galaxies
  - 3.3 Astronomical instruments
  - 3.4 Sun and Stars
  - 3.5 Earthquake: meaning and origin, types, causes, seismic waves, magnitude and intensity, safety measures
  - 3.6 Mountains: Formations, advantages, disadvantages
  - 3.7 History of Earth: Major division, size, functions of each part, Rocks, uses

#### **Section B- 20 Marks**

- 4. Atomic structure, periodic table and chemical bonding** **10 marks**
  - 4.1 Rutherford and Bohr's model of atom and their drawbacks
  - 4.2 Shell, subshell, orbitals and quantum numbers
  - 4.3 Aufbau and Pauli's exclusion principle
  - 4.4 Hydrogen spectrum

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- 4.5 Classification of elements and modern periodic table
- 4.6 Important periodic properties of elements
- 4.7 Atomic size, Ionic radius, Electron affinity, Electron negativity
- 4.8 Superiority and limitations of long form of periodic table
- 4.9 Chemical bonding and shape of covalent molecules
- 4.10 VSEPR model, Valence Bond Theory (VBT) and Molecular Orbital Theory (MOT)
- 4.11 Hybridization, Hydrogen bonding, Van der Waals force
- 5. Metals and Metallurgy, Organic Compounds and manmade material**
  - 5.1 Extraction, properties and uses of group IB, group IIB and group VIII metals
  - 5.2 Preparation, properties and uses of copper oxide, cupric sulphate, cupric carbonate, silver nitrate, silver chloride and Zinc Sulphate
  - 5.3 Homologous series
    - 5.3.1 Alkane, Alkene, Alkynes
  - 5.4 Benzene and its compounds
    - 5.4.1 Structure, preparation and properties
  - 5.5 Aromatic Amino and nitro compounds
    - 5.5.1 Introduction, general method of preparation and properties
  - 5.6 Alcohols, Aldehydes, ketones and Carboxylic acids
  - 5.7 Preparation, properties and uses of Plastics, pesticides, cement, glass, fibers, soap, detergents and chemical fertilizers

## Section C- 20 Marks

- 6. General Biology and Evolution** **10 marks**
  - 6.1 Taxonomy: Classification of plants (non-flowering & flowering) and animals (invertebrates & vertebrates).
  - 6.2 Life cycle and structure of plants: Algae, Fungi, Bryophyta, & Pteridophyte.
  - 6.3 Microbiology (Bacteria and Virus): Cell structure, symptoms, mode of transmission, and control.
  - 6.4 Plant physiology and anatomy: Photosynthesis, respiration, growth hormones, anatomy of dicot and monocot plants.
  - 6.5 Cell biology and cytogenetics: Cell division, Mendel's law of inheritance, sex determination, sex-linked inheritance, and mutation.
  - 6.6 Human evolution: Early human ancestors, pre-historic man, and evolutionary changes in man.
- 7. Economic Biology, Application Biology, & Environmental Science** **10 marks**
  - 7.1 Economic botany: Distribution, classification, economic importance of medicinal and fiber plants.
  - 7.2 Economic zoology: Apiculture (Bee), Sericulture (Silkworm), & Pisciculture (Fish).
  - 7.3 Biotechnology: Plant tissue culture, animal tissue culture, vaccine, antibiotics, amniocentesis, organ transplantation, and fermentation technology.

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- 7.4 Ecology: Ecosystem, ecosystem services, biogeochemical cycles, environmental pollution, & ecological imbalances (greenhouse effect, acid rain, & ozone layer depletion).

### Section D- 30 Marks

#### 8. Nature, Objectives and Psychology of learning 10 Marks

- 8.1 Nature and Objectives of Science Teaching
- 8.2 Psychology of learning in relation to science
  - 8.2.1 Piaget, Brunner, Gagne
  - 8.2.2 Constructivism and Connectivism in science learning

#### 9. Curriculum & Methods of Teaching Science 10 Marks

- 9.1 Curriculum,
- 9.2 Teaching materials in Science Education
- 9.3 Techniques of Science Teaching
- 9.4 Use of environmental resources
- 9.5 Facilities in Science Teaching
- 9.6 Some innovative Science curriculum and projects

#### 10. Planning and Evaluation 10 Marks

- 10.1 Planning
- 10.2 Evaluating Student's learning
- 10.3 Professional growth of Science Teacher/ personnel

प्रदेश निजामती सेवा अन्तर्गत शिक्षा सेवाका सबै समूह/उपसमूहको सातौं तहका पदहरूमा प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र लिइने सामूहिक परीक्षण ( Group Test) को लागि

#### सामूहिक छलफल (Group Discussion)

यस प्रयोजनको लागि गरिने परीक्षाको पूर्णाङ्क १० र समय ३० मिनेटको हुनेछ जुन नेता विहीन सामूहिक छलफल (Leaderless Group Discussion) को रूपमा अवलम्बन गरिनेछ । दिइएको प्रश्न वा Topics का विषयमा पालैपालोसँग निर्दिष्ट समय भित्र समूह बीच छलफल गर्दै प्रत्येक उम्मेदवारले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ । यस परीक्षणमा मूल्याङ्कनको लागि देहाय अनुसारको समिति रहनेछ :

आयोगका अध्यक्ष वा सदस्य	-अध्यक्ष
आयोगका सदस्य	-सदस्य
दक्ष/विज्ञ (१ जना)	-सदस्य

#### सामूहिक छलफलमा दिइने नमूना प्रश्न वा Topic

उदाहरणको लागि -उर्जा संकट, गरिबी निवारण, स्वास्थ्य बीमा, खाद्य सुरक्षा, खाद्य पदार्थमा मिसावट, वातावरण प्रदूषण, प्रतिभा पलायन, प्राविधिक तथा व्यावसायिक शिक्षा, शैक्षिक गुणस्तर, महिला हिसा, मानव बेचबिखन रोकथाम आदि जस्ता विषयहरू मध्ये कुनै एक विषय मात्र दिइनेछ ।

दृष्टव्यः विज्ञान उप समूहको तृतीय पत्रको पाठ्यक्रम स्वीकृत मिति- २०८२/१०/१५