

नेपाल सरकार  
शिक्षक सेवा आयोग  
निम्नमाध्यमिक शिक्षकको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम, २०७५

**Section B : Science**

**-60 Marks**

**A. Physics, Geology and Astronomy**

**30 Marks**

**1. Mechanics, Heat and Optics**

**1.1 Mechanics**

- 1.1.1 Scalar and vector quantities
- 1.1.2 Newton's laws of motion
- 1.1.3 Conservation of Momentum
- 1.1.4 Verification of Newton's laws of Gravitation
- 1.1.5 Work, Energy and Power
- 1.1.6 Hooke's law
- 1.1.7 Simple Harmonic Motion and its Application
- 1.1.8 Pressure in a fluid
- 1.1.9 Archimedes Principle

**1.2 Heat and Optics**

- 1.2.1 Thermal expansion
- 1.2.2 Specific heat capacity
- 1.2.3 First and second laws of thermodynamics
- 1.2.4 Nature and propagation of light
- 1.2.5 Refraction at plane surfaces
- 1.2.6 Newton's rings
- 1.2.7 Defects of vision and their correction
- 1.2.8 Phenomenon of polarization of light

**1.3 Numerical problems related to mechanics, heat and optics**

**2. Waves, Sound, Electricity and Magnetism**

**2.1 Wave and Sound**

- 2.1.1 Longitudinal and Transverse motion of waves
- 2.1.2 Ultra and Infra sound
- 2.1.3 Sound pollution
- 2.1.4 Sonometer

**2.2 Electricity and Magnetism**

- 2.2.1 Ohm's law
- 2.2.2 Electromotive force and potential difference
- 2.2.3 Thermoelectric effect-Seebeck Effect
- 2.2.4 Faraday's laws of electromagnetic induction
- 2.2.5 Factors affecting resistance
- 2.2.6 Magnetic field and angle of declination
- 2.2.7 Dia-, Para- and Ferro-magnetic materials
- 2.2.8 Magnetic effect of current-Oersted's experiment

**2.3 Numerical Problems relation to waves, sound, electricity and magnetism**

**3. Modern Physics**

- 3.1 Cathode rays, X-Rays and Radioactivity (Meaning, Properties and Uses)
- 3.2 Nuclear Reaction : Meaning and its Types

**4. Astro-Geo Science**

**4.1 Geology**

- 4.1.1 History of the earth
- 4.1.2 Structure of the earth

- 4.1.3 Types of rocks
- 4.1.4 Green House Effect
- 4.1.5 Water Cycle
- 4.1.6 Natural disasters
- 4.1.7 Minerals
- 4.1.8 Volcano and earthquake
- 4.1.9 Ozone layer, its importance and depletion of ozone layer
- 4.2 Astronomy**
  - 4.2.1 Solar system
  - 4.2.2 Galaxies
  - 4.2.3 Lunar and solar eclipses
  - 4.2.4 Birth and death of stars and its significance
  - 4.2.5 Satellites`
  - 4.2.6 Constellations
  - 4.2.7 Heliocentric theory

## **B. Chemistry**

**15 Marks**

### **5. Chemical Arithmetic, Atomic Structure, Electronic Theory of Valency and Bonding**

#### **5.1 Chemical Arithmetic**

- 5.1.1 Postulates of Dalton's atomic theory
- 5.1.2 Law of conservation of mass
  - 5.1.3 Law of constant proportions
  - 5.1.4 Law of multiple proportions
  - 5.1.5 Law of reciprocal proportions
  - 5.1.6 Law of gaseous volumes
- 5.2 Atomic Structure and, Electronic Theory of Valency and Bonding
  - 5.2.1 Discovery of fundamental particles of atom
  - 5.2.2 Bohr's model of atom and its limitation
  - 5.2.4 Electronic configuration of the atom and ions
  - 5.2.5 Octet rule
  - 5.2.6 Ionic and Covalent bonds, ionic and covalent compounds and their properties

#### **6. Periodic Table**

- 6.1 Modern periodic law and modern periodic table
- 6.2 Characteristics of element on the basis of electronic configuration
- 6.3 Ionization Potential, Electron affinity and Electro negativity

7. Laboratory preparation of hydrogen, oxygen, carbon dioxide, nitrogen and ammonia gases

#### **8. Metallurgy**

- 8.1 Characteristics of metals, non-metals and metalloids
- 8.2 Extraction, properties and uses of copper, zinc, mercury, iron and silver

9. Properties and uses of chemical and organic fertilizers and Properties and uses of pesticides (insecticides, herbicides, weedicides and fungicides)

#### **10. Basics of organic chemistry**

- 10.1 Definition of organic compounds
- 10.2 Bonding and Hybridization
- 10.3 Tetravalency and catenation property of carbon
- 10.4 Differences between organic and inorganic compounds
- 10.5 Alkanes, alkenes and alkynes(structures, general preparation - including laboratory preparation of ethene and ethyne, properties and uses)

**C.Biology****15 Marks**

11. Cell Biology, Biodiversity, Economic Biology, Sociobiology and Environmental Science
- 11.1. Cell Biology, Biodiversity and Economic Biology
- 11.1.1 Structures of plant and animal cell
- 11.1.2 Plant and animal tissues with their functions
- 11.1.3 Protoplasm and Chromosome
- 11.1.4 Mitosis and Meiosis cell division
- 11.1.5 Laws of inheritance (Mendalism), Mono-hybrid cross
- 11.1.6 Life cycle of plasmodium volvox , paramecium, marchentia and funaria
- 11.1.7 Economic importance of nostoc, virus, mushroom, earthworm, silkworm , honey bee , jute , cotton, cardamom and coffee
- 11.1.8 General characters and classification of leguminosae, compositae, protozoa, porifera , mollusca and chordata
- 11.1.9 Metabolism: Photosynthesis/Respiration, Mineral nutrition
- 11.2. Sociobiology and Environmental Science
- 11.2.1. Diseases: Typhoid, Tuberculosis and Cancer
- 11.2.2 Structural and functional aspects of Pond and Forest Ecosystems
- 11.2.3 Interaction of biotic and abiotic factors
- 11.2.4 Ecological pyramids, productivity
- 11.2.5 In-situ and Ex-situ Conservation of animals
- 11.2.6. Bio-Geo-Chemical cycles: carbon and nitrogen
- 11.2.7. Physiological system of human (digestive, circulatory, respiratory, excretory, urinary. reproductive, muscular, skeleton, nervous system and glandular system)

**Subjective Question Plan (Specification Grid)**

Unit	Scope of Curriculum	Contentwise question weight	Full Marks
1	Mechanics, Heat and Optics	1*10	10
2	Waves, Sound, Electricity and Magnetism	1*10	10
4	Astro-Geo Science		
5	Chemical Arithmetic, Atomic Structure, Electronic Theory of Valency and Bonding	1*10	10
6	Periodic Table		
7	Laboratory preparation of hydrogen, oxygen, carbon dioxide, nitrogen and ammonia gases		
8	Metallurgy		
9	Properties and uses of chemical and organic fertilizers and Properties and uses of pesticides	1*10	10
10	Basics of organic chemistry		
3	Modern Physics		
11	Cell Biology, Biodiversity, Economic Biology, Sociobiology and Environmental Science	2*10	20
	<b>Total</b>	<b>6*10</b>	<b>60</b>