Governmnt of Nepal

Teachers Service Commission

Secondary Level Curriculum of Subjective Examination- 2076

Subject: Science **Full Marks: 100** **Time: 3 Hours**

Section: A

Unit 1: Teaching Physics

1.1. Measurement: Physical quantities, SI units, fundamental and derived units.

1.2. Force, Energy and Power: Momentum**,** relation among velocity, acceleration, displacement and time, Newton's laws of motion, Newton's law of gravitation, acceleration due to gravity, weight, mass, freefall and weightlessness, kinetic and potential energy, sources of energy, work and power

1.3. Pressure: Concept of pressure, atmospheric pressure, liquid pressure, Archimedes' Principle, Pascal's law, law of floatation

1.4. Heat, Optics and Sound: Heat and temperature, thermometers, specific heat capacity, reflection and refraction of light, refractive index, total internal reflection, concave and convex lense and formation of image through lenses, defects of vision, optical instruments, sound waves, sources of sound, reflection and refraction of sound, loudness, pitch and velocity

1.5. Electricity Magnetism: Electric circuit, Ohm's law, conductivity, resistivity, molecular theory of magnet, magnetic lines of force, geomagnetism, motor effect, potential difference, series and parallel combinations of load and cell, house wiring, electric consumption, transformer, electric motor, dynomo and generator.

Unit 2: Teaching Geology and Astronomy

2.1. Earth: Origin, geological time scale, structure, rock and minerals

2.2. Natural Disasters: Earthquake, volcano, tornados, flood and landslide

2.3. **Atmosphere:** Structure, climate change, green house effect, acid rain and ozone layer depletion

2.4. Solar System: Introduction, moon and its phases, eclipse, rotation and revolution of earth and moon

2.5. Universe: Comets and meteors, galaxies, constellations, black hole, birth and death of stars

Unit 3: Teaching Chemistry

3.1. Structure and Properties of Matter: Classification of elements, atomic structure, electronic confuguration, valency, periodic table, bonding and molecular formula**.**

3.2. Chemical Reaction: Types, chemical equation, factors affecting rate of chemical reaction, limitation of chemical reaction

3.3. Acid, Base, Salt and Solution: Properties, types, uses, neutralization reaction, indicators, pH value, solution, solubility and crystallization

3.4. Laboratory Preparation and Properties of Gases: Hydrogen, Oxygen, Nitrogen, Amonia, Carbondioxide

3.5. Organic and Inorganic Compounds: Properties and uses of carbon and its compound, fertilizers, cement, glass, ceramics, plastic, soap, detergents and pesticides

3.6. Metals: Properties of metals, nonmetals and metalloids, availability, metallurgy, properties and uses of iron, almunium, cupper, silver and gold

Unit 4.Teaching Biology

4.1. Living Things: Classification (plants and animals), mosquito, silkworm and honey bee (structure and life cycle)

4.2. Adaptation and Micro-organism: Adaptation of plants and animals, introduction to microorganisms (bacteria, fungi, virus, protozoa)

4.3. Life Process: Interrelationship among cell, tissue and organ, skeleton system, circulatory system, nervous system, digestive system, respiratory system, glandular system and excretory system

4.4. Reproduction: Asexual and sexual reproduction, determination of sex and artificial reproduction in plants

4.5. Ecology and Heridity: Theory of evolution, heridity, Mendel's laws of heridity, variation and mutation, ecology, ecosystem, geo- bio chemical cycles, pollutions (water, soil, air, and sound), conservation of environment

Unit 5: Overview of Science Curriculum of Secondary Level

5.1. Curriculum and Textbook: Comparative study of science curriculum, textbooks and teachers guide of grade 9 -10

5.2. Teaching Materials: Development and use of teaching and supplementary materials in science teaching

5.3. Evaluation and Testing: Testing and evaluation in science teaching and specification grid.

5.4. Assessment: Continuous assessment system, grading system in student assessment

5.5. Teaching Learning Science: Science process skills, scientific method, approaches of teaching science, science laboratory and safety measures

Section: B

Unit 6: Properties of Matter

6.1. Kinematics and Dynamics: Circular motion, vector, torque and moment of inertia

6.2. Elasticity: Hooke's law, stress, strain, elasticity, plasticity and elastic modulus

6.3. Thermal Energy: Equation of state, external and internal work, internal energy, isothermal, adiabatic, isobaric and isochoric processes

6.4. Laws of Thermodynamics and Application: Carnot's theorem, absolute scale of temperature, concept of ideal and real gases, Joule's law for perfect gas, thermal conductivity

6.5. Simple Harmonic Motion: Damped oscillations, forced oscillations and resonance, progressive wave and stationary wave

Unit 7. Optics, Electricity and Magnetism

7.1. Optics: Interference, diffraction and polarization of light.

7.2 Static Electricity: Gauss's law, potential gradient and electric field intensity, parallel plate capacitors and their capacitance, series and parallel combinations of capacitors.

7.3. Current Electricity: Concept of electric current, electromotives forces, potential difference, resistance, ohmic and non-ohmic conductors, series and parallel combination of resistors, electric power and Joule's law of heating.

7.4. Electromagnetism: Molecular theory of magnet, diamagnetism, para-magnetism and ferromagnetism, magnetic field and the magnetic flux, flemming rule, electromagnetic induction, Faraday's law and transformer

Unit. 8. Fundamentals of Chemistry

8.1. Atomic Structure: Rutherford's, Bohr's model, Quantum numbers, Orbitals, Pauli's & Afbauf's principle, interpretation of properties of chemical bondings.

8.2. Modern Periodic Table: Important periodic properties, bond energy, electron affinity, superiority and defectas of long form of periodic table

8.3. Extraction, Properties and Uses: Iron, silver, copper, almunium and gold

8.4. Preparation, Properties and Uses: Copper oxide, cupric sulphate, cupric carbonate, silver chloride and silver nitrate

8.5. Organic Compounds: Classification, nomenclature, functional groups and homologous series, hydrocarbons - alcohols, ethers, aldehydes, ketones, carboxylic acid, amines, ester and isomerism in organic compound

Unit 9. Taxonomy, Adaptation and Ecology

9.1. General Characters and Classification: Bacteria, virus, fungi, algae, bryophyta, pteridophyta, gymnosperms and angiosperms, protozoa, porifera, coelenterata, platyhelminthes, aschelminthes, annelida, arthropoda, mollusca, echinodermata and chordata

9.2. Structure, Life Cycle and Economic Importance: Penicillium, spirogyra, marchantia, cycas, plasmodium and ascaris

9.3. Animal Adaptation and Behaviour: Aquatic, cursorial, arboreal, volant, fossorial, reflex action, taxis, bird migration and social behavior

9.4. Ecology: Ecosystem, energy flow, food chain and food web and biogeochemical cycles

9.5. Wildlife Conservation: National Parks, Wildlife Reserves and Conservation areas of Nepal

Unit 10. Anatomy, Physiology, Cell Biology, Genetics and Applied Biology

10.1. Anatomy: Plant and animal tissues, vascular bundles, primary anatomy of typical roots, stems and leaves

10.2. Physiology: Diffusion, osmosis, transpiration, photosynthesis, respiration, growth hormones, vegetative propagation, microsporogenesis, megasporogenesis, pollination and fertilization

10.3. Cell Biology: Cell structure, cell types, cell organelles, Cell division, biomolecules (minerals, water, carbohydrates, proteins, lipids and vitamins)

10.4. Heredity and Variation: Structure of nucleic acids (DNA and RNA), genetic disorders, genetic interactions (incomplete dominance, co-dominance, polygenic inheritance, multiple allelism)

10.5. Applied Biology: Biotechnology, tissue culture, fermentation, green manure, genetic engineering, plant breeding, immunology, vaccines and immunization, antibiotics, communicable disease (typhoid, tuberculosis and AIDS) and non-communicable diseases (cancer), modes of transmission and control measures of bacterial and viral diseases, concept and prevention of Novel Corona Virus (COVID-19)

Specification Grid

Subject: Science **Level: Secondary**

Units	Content area	Question	Mark
Section :A			
1	Teaching Physics	1	10
2	Teaching Geology and Astronomy	1	10
3	Teaching Chemistry	1	10
4	Teaching Biology	1	10
5	Overview of Science Curriculum of Secondary Level	1	10
Section:B			
6	Properties of Matter	1	10
7	Optics, Electricity and Magnetism	1	10
8	Fundamentals of Chemistry	1	10
9	Taxonomy, Adaptation and Ecology	1	10
10	Anatomy, Physiology, Cell Biology, Genetics and Applied biology	1	10
Total		10	100

Notes:

1. This curriculum is divided into sections A & Section B.
2. Generally from section A questions will be asked related to pedagogy.
3. From section B questions will be asked covering cognitive level.
4. Separate answer sheets will be used for each section.
5. The medium of the language in written test will be either Nepali or English or both.
6. This curriculum will be effective from 2076/11 /30.