

द्वितीय पत्र :- विज्ञान सम्बन्धी विषय

Section A- 30 Marks

- 1. Properties of matter** **10%**
 - 1.1 Vector, Motion, Torque.
 - 1.2 Circular motion, Simple harmonic motion
 - 1.3 Gravitation and Gravity
 - 1.4 Fluids at rest, Elasticity.
 - 1.5 Thermometry and Calorimetry
 - 1.6 Thermodynamics, Heat transfer.
- 2. Light, Sound Electricity and magnetism** **10%**
 - 2.1 Basic properties, Huygen's principle.
 - 2.2 Interference, Diffraction, Polarization of light,
 - 2.3 Electromagnetic waves.
 - 2.4 Beats, Stationary waves, Waves in strings, Waves in pipes, Musical notes of sound
 - 2.5 Charge, Current, Potential difference, Power
 - 2.6 Whetstone bridge, Potentiometer
 - 2.7 Magnetic effects of electric current
 - 2.8 Alternating currents
 - 2.9 Magnetic materials
 - 2.10 Semiconductor, Electronics
- 3. Earth and Space Science** **10%**
 - 3.1 Origin of Solar system
 - 3.2 Solar system and its members
 - 3.3 Eclipse, Satellites, Meteors, Comets, Galaxies
 - 3.4 Astronomical instruments
 - 3.5 Sun and Stars
 - 3.6 Earth quake: Meaning, Causes, nature, prevention measures
 - 3.7 Mountains: Formation, advantages, disadvantages
 - 3.8 History of the Earth: Major division, size, functions of each part, Rocks, uses

Section B- 20 Marks

- 4. Atomic structure, Periodic Table and Chemical Bonding** **10%**
 - 4.1 Rutherford's, Bohr's model, drawbacks
 - 4.2 Quantum numbers, Orbitals
 - 4.3 Pauli's & Aufbau's principle
 - 4.4 Hydrogen spectrum.
 - 4.5 Classification, Hybridization
 - 4.6 Interpretation, properties of Chemical bondings
 - 4.7 Vanderwaal force
 - 4.8 Modern periodic table
 - 4.9 Important periodic properties
 - 4.10 Bond energy Electron affinity, Atomic size, Ionic radius
 - 4.11 Superiority and defectas of Long form of periodic table

- 5. Metals and metallurgy, man made materials, Organic compounds 10%**
- 5.1 Extraction, properties, uses of Group I B and Group II B, Group VIII
 - 5.2 Preparation, properties and uses of Copper oxide, Cupric Sulphate, Cupric Carbonate, Silver chloride, Silver nitrate
 - 5.3 Plastics, Pesticides, Cement, Glass, Fibers, Soaps, Detergents, (nature preparation, properties, uses)
 - 5.4 Homologous series
 - 5.4.1 Alkenes, Alkenes, Alkynes
 - 5.5 Benzene
 - 5.5.1 Structure, preparation & properties
 - 5.6 Introduction, general methods of preparation, physical and chemical properties of Aromatic nitro compounds
 - 5.6.1 Amino compounds
 - 5.6.2 hydroxy compounds
 - 5.6.3 aldehyde, Ketone
 - 5.6.4 Carboxylic acids

Section C- 20 Marks

- 6. General Biology and Evolution 10%**
- 6.1 Algae, Fungi, Bryophyta, Pteridophyta: Habit, habitat, structure & lifecycle
 - 6.2 Classification of plants & animals
 - 6.3 Microbiology (bacteria): Symptoms, modes of transmission & control
 - 6.4 Plant Physiology & anatomy: Cell division, Mendel's law, gene and gene action, Evolution
- 7. Economic Biology and Environmental Science 10%**
- 7.1 Economic plants: Distribution, Classification, economic importance of medicinal and vegetable plants
 - 7.2 Economic zoology :Bee, Sericulture, (silkworm), Pesiculture (fish)
 - 7.3 Ecosystem, biochemical cycle
 - 7.4 Environmental pollution

Section D- 30 Marks

- 8. Nature, Objectives and Psychology of learning 10%**
- 8.1 Nature, Objectives of Science Teaching
 - 8.2 Psychology of learning in relation to science
 - 8.2.1 Piaget, Brunner, Gagne
- 9. Curriculum & Methods of Teaching 10%**
- 9.1 Curriculum, Curriculum materials in science education
 - 9.2 Techniques of science teaching
 - 9.3 Use of environmental resources
 - 9.4 Facilities
 - 9.5 Some innovative science curriculum and projects
- 10. Planning Evaluation 10%**
- 10.1 Planning
 - 10.2 Evaluating Student's learning
 - 10.3 Professional growth of Science Teacher/ personnel

लोक सेवा आयोग
नेपाल शिक्षा सेवा, शिक्षा प्रशासन समूह, विज्ञान उपसमूहको राजपत्राङ्कित तृतीय श्रेणी पदको खुल्ला र आन्तरिक
प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्रको एकाईहरूको प्रश्नसंख्या निम्नानुसार हुनेछ

द्वितीय पत्रका खण्ड	A			B		C		D		
द्वितीय पत्रका एकाई	1	2	3	4	5	6	7	8	9	10
प्रश्न संख्या	1	1	1	1	1	1	1	1	1	1

विषयगत नमूना प्रश्नहरू (Sample questions)

1.
 - i) Boiling water poured into a cold glass often breaks it. Boiling water poured into an iron pot does not break it. Explain. 5
 - ii) How could you handle a problem in which you wished to find the resultant of three vectors? For example, imagine you are walking on the deck of a ship that is traveling in water that is moving. 5
2.
 - a) What is the difference between intrinsic and extrinsic conduction in semi-conductors. Explain the terms donor impurity and acceptor impurity. 2+4+4=10
 - b) How can Hugen's principle be applied to refraction, diffraction and reflection. Explain.
3. How can we study about the solar system under the headings – distance, size, rotation, mass, surface temperature and atmosphere? What conclusions can be drawn from the study? 8+2=10
4.
 - a) Explain the hybridisation and the types of bonds in the formation of CH₄, C₂H₂ and O₂H₄.
 - b) What do you understand by electron affinity? How does this property change in moving down from Cl to I (Chlorine to Iodine)? 6+4=10
5. Answer the followings:
 - i) What happens when nitrobenzene is treated with tin and hydrochloric acid?
 - ii) What happens when benzaldehyde is heated with concentrated NaOH (Sodium hydroxide) solution?
 - iii) What are aromatic acids?
 - iv) Explain preparation of cement and uses of pesticides. 2+2+2+4=10
6.
 - a) Why do all organisms require nitrogen ? How in what form is nitrogen obtained by –
 - i) amoeba ii) Macor and iii) a flowering plant?
 Why do animals produce nitrogenous waste compounds and how do they eliminate them? 1+3+2+2+2=10
 - b) What is meant by variation?
7.
 - a) Describe briefly experiments to demonstrate the following :
 - i) A potted planted loses water through its leaves. 2
 - ii) Water passes up through the stem in the vascular bundles. 3

- iii) A herbaceous plant takes in water through its roots. 3
- b) Explain the economic importance of apes. 2
8. Teaching mixed ability science students in science classes is a challenge. Develop techniques to use with the mixed ability class under the headings -
- a) Whole-class teaching
- b) Group work 3+3+4=10
- c) Circus of activities/experiments.
9. You are assigned to prepare the "Science Practical test Assessment Inventory." Develop the inventory under the headings: - 5x2=10
- a) Drawing
- b) Naming titles and parts
- c) Making tables
- d) Kinds of explanation
- e) Drawing conclusions
10. You are going to train pre-service to be secondary teachers on the topic "Periodic Table."
- Do the following –
- i) Write the paragraph carefully to give you some brief ideas about the topic that you will teach.
- ii) Write six different questions to use as the basis for the kinds of questions that you will ask/present during training.
- iii) Use six cognitive domain test items to test whether the trainees learned or not. 3+3+4=10