

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

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नेपाल शिक्षा सेवा, शिक्षा प्रशासन समूह, विज्ञान उपसमूहको राजपत्राङ्कित तृतीय श्रेणी पदको खुल्ला र आन्तरिक
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- 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

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द्वितीय पत्रको एकाईहरुको 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 प्रश्नहरु (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

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- 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

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नेपाल आर्थिक योजना तथा तथ्याङ्क, इन्जिनियरिङ्ग, कृषि, वन, विविध र शिक्षा सेवाका सबै समूह/उपसमूह,
राजपत्राङ्कित तृतीय श्रेणी र एवं स्वास्थ्य सेवाको सातौं र आठौं 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 परीक्षण १० पूर्णाङ्क र ३० मिनेट अवधिको हुनेछ जुन नेताविहिन सामूहिक छलफल (Leaderless Group Discussion) को रूपमा अवलम्बन गरिने छ। दिइएको प्रश्न वा Topic का विषयमा पालैपालोसँग निर्दिष्ट समयभित्र समूहबीच छलफल गर्दै प्रत्येक उम्मेदवारले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ। यस परीक्षणमा मूल्याङ्कनको लागि देहाय अनुसारको ३ जना भन्दा बढीको समिति रहनेछ।

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

सामूहिक छलफलमा दिइने नमूना प्रश्न वा Topic

उदाहरणको लागि - उर्जा संकट, गरीबी निवारण, स्वास्थ्य बीमा, खाद्य सुरक्षा, प्रतिभा पलायन जस्ता Topics मध्ये कुनै एक Topic मात्र दिइनेछ।