

**द्वितीय पत्र (Paper II): Technical Subject**

**Section A- 20 Marks**

**1. ENVIRONMENTAL FACETS**

**1.1 Environment: Concept, Scope and Practices**

- 1.1.1 Development of human society and environment
- 1.1.2 Physical, biological and socio-economic aspects of environment and their interrelationships
- 1.1.3 Environmental degradation and manifestations (land, water and air)
- 1.1.4 Environmental movements and environmental ethics

**1.2 Ecology**

- 1.2.1 Population characteristics and regulations
- 1.2.2 Community characteristics, regulation and succession
- 1.2.3 Ecosystem dynamics: energy flow, biogeochemical cycles
- 1.2.4 Terrestrial biomes and characteristics

**1.3 Environmental Geology**

- 1.3.1 Geological materials and structures
- 1.3.2 Weathering and erosion: types, cycle and control
- 1.3.3 Mass movement: causes and mechanisms
- 1.3.4 Fluvial, glacial and aeolian environmental processes

**1.4 Climatology and Hydrometeorology**

- 1.4.1 Horizontal and vertical temperature distribution
- 1.4.2 Mechanisms of wind development, air masses dynamics
- 1.4.3 Climatic systems, distribution and classifications
- 1.4.4 Floods: classification, causes, triggering factors

**1.5 Global Environmental Issues**

- 1.5.1 Global warming
- 1.5.2 Green economy
- 1.5.3 Payment for ecosystem services
- 1.5.4 Ozone layer depletion and acid rain

**2. ENVIRONMENTAL RESOURCES**

**2.1 Water Resources**

- 2.1.1 Water resources: sources, extent and assessment
- 2.1.2 Integrated Water Resource Management (IWRM)
- 2.1.3 Water resources of Nepal
- 2.1.4 Problems of water resource management in Nepal

**2.2 Food Resources**

- 2.2.1 Major food resources and production
- 2.2.2 Human nutrition and health
- 2.2.4 Food resources of Nepal

**2.3 Energy Resources**

- 2.3.1 Energy resources: sources and classification
- 2.3.2 Alternative energy resources
- 2.3.3 Environmental issues of energy use
- 2.3.4 Energy resource conservation practices
- 2.3.5 Energy resources of Nepal

**2.4 Forest and Biodiversity**

- 2.4.1 Forest types and biodiversity status of Nepal
- 2.4.2 Ex-situ and in-situ conservation

2.4.3 Biodiversity conservation approaches

2.4.4 Carbon sequestration

## **2.5 Resource Economics**

2.5.1 Micro-economic analysis for accounting environmental resources

2.5.2 Environmental Kuznets curve, cost benefit analysis and resource accounting

2.5.3 Economic and regulatory instruments to control pollution

## **Section B- 30 Marks**

### **3. ENVIRONMENTAL POLLUTION AND ENGINEERING**

#### **3.1 Water Pollution**

3.1.1 Point and non-point sources and categories of water pollutants

3.1.2 Water pollutants effect on human health and ecosystems

3.1.3 Standard methods of water analysis

3.1.4 Water and wastewater treatment technologies

#### **3.2 Air Pollution**

3.2.1 Sources and categories of air pollutants

3.2.2 Emission, transport, receptors of air pollutants, criteria air pollutants

3.2.3 Air pollutants effects on human health, property and visibility

3.2.4 Air pollution measurement and emission estimates

3.2.5 Air pollution control technologies

#### **3.3 Noise Pollution**

3.3.1 Noise sources and criteria

3.3.2 Health effects of noise and control mechanisms

#### **3.4 Waste Management**

3.4.1 Sources, types and composition of solid wastes

3.4.2 Solid waste management systems

3.4.3 Issue, generation and management of e-waste, hazardous and hospital waste

3.4.4 Management of industrial and agricultural chemical pesticides

#### **3.5 Toxicology and Eco-toxicology**

3.5.1 Acute, sub-acute and chronic toxicity

3.5.2 Dose and frequency response relationships

3.5.3 Bioassays and attributes for predicting species response to pollution stress

#### **3.6 Climate Change**

3.6.1 Climate variability and theories of climate change

3.6.2 Climate models and model based projections of greenhouse effect

3.6.3 Climate change impacts: agriculture and food security, water resources, energy, human health, biodiversity, settlement and infrastructure and livelihood

3.6.4 Vulnerability assessment of climate change and mitigation and adaptation approaches (NAPA, LAPA)

## **Section C- 20 Marks**

### **4. ENVIRONMENTAL MANAGEMENT SYSTEMS**

#### **4.1 Environmental Assessment**

4.1.1 Environmental assessment: evolution in global and national perspectives

4.1.2 Environmental assessment: process, practices, methods and tools

4.1.3 Strategic environmental assessment for decision making and integrated planning

#### **4.2 Environmental Management Systems (EMS) & Modeling**

4.2.1 Concept, components and stages of EMS

4.2.2 ISO 14000 series, standards and certification systems

4.2.3 Life cycle assessment and environmental labeling

4.2.4 Types and importance of environmental models

#### **4.3 Remote Sensing & GIS**

4.3.1 Concept, scope and stages in remote sensing and GIS

4.3.2 Remote sensing image: acquisition, resolution, analysis and interpretation

4.3.4 GIS applications in assessing environmental studies

#### **4.4 Environmental Statistics**

4.4.1 Sampling, data analysis and interpretation

4.4.2 Central tendency, measures of dispersion

4.4.3 Correlation and regression

4.4.4 Parametric and non-parametric tests

#### **4.5 Environmental Governance**

4.5.1 Institutional arrangement (organogram) and environmental governance; concerned stakeholders and networks

4.5.2 Governance tools and strategies

4.5.3 Adaptive management and sustainability

### **Section D- 30 Marks**

## **5. LEGAL FRAMEWORKS**

### **5.1 Guidelines and Standards**

Guidelines and Standards Relating to Air (Ambient, Indoor and Stack) and Water (Tolerance Limits for Industrial Effluents to be Discharged into Public Sewers and Inland Surface Waters); Specific Industrial Effluent Standards

### **5.2 Existing Legislations**

Constitution of Nepal; Environmental Protection Act; Environment Protection Rules; National EIA Guidelines; EIA Guidelines for Forestry Sector; EIA Guidelines for Industry Sector; Plant Protection Act; National Parks and Wildlife Conservation Act; Water Resources Act; Forest Act; Soil and Watershed Management Act; Solid Waste Management Act; Pesticides Act; Pesticide Regulation; Hydropower Development Policy; Climate Change Policy

### **5.3 International Treaties, Protocols & Conventions**

Convention on Biological Diversity, 1992; United Nations Framework Convention on Climate Change, 1992; United National Convention to Combat Desertification, 1994; Kyoto Protocol, 1997; Vienna Convention for the Protection of the Ozone Layer, 1985; Montreal Protocol on Substances that Deplete Ozone Layer, 1987; Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, 1989; Stockholm Convention on Persistent Organic Pollutants, 2004

## **6. CURRENT ENVIRONMENTAL ISSUES**

### **6.1 Urban Environment**

6.1.1 Urbanization and its implications on environment (sanitation, solid and hazardous waste, air pollution, water pollution, groundwater depletion, food security)

6.1.2 Urbanization infrastructures and environment (housing, water supply and sanitation, waste management, transportation, electricity, markets and commercial areas, religious and heritage sites, open spaces and recreational areas)

6.1.3 Concept of urban planning and sustainable cities

## **6.2 Land use and Watershed Management**

- 6.2.1 Land use and environment (land use pattern and zoning; Guided Land Development (GLD) and land pooling)
- 6.2.2 Principles of land use and land reclamation
- 6.2.3. Factors governing land utilization and land use pattern
- 6.2.4 Scenario of watershed management in Nepal
- 6.2.5 Development and conservation challenges in watershed management
- 6.2.6 Watershed as ecosystems; Upstream-downstream linkages; Measures for watershed conservation

## **6.3 Agriculture and Food Security**

- 6.3.1 Farming systems
- 6.3.2 Modern agriculture and its impacts on environment, green revolution
- 6.3.3 Sustainable agriculture and food aid policies
- 6.3.4 Food security in Nepal

## **6.4 Disaster Risks & Vulnerability Assessment**

- 6.4.1 Hazard, disaster, risk, exposure and vulnerability analysis
- 6.4.2 Disasters due to earthquake, landslide and river bank erosion, flood, GLOF, drought, epidemics, fire and industrial accidents
- 6.4.3 Disaster risk management and practices

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 जनाको समिति रहनेछ ।

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|-------------------------|---|---------|
| आयोगका अध्यक्ष वा सदस्य | - | अध्यक्ष |
| 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 ।