

## 11. Environmental Science (Env.311), 2066

Time : 3 hour

Full Marks : 100

Group "A"

**1. Attempt any THREE Questions.**

**3×10=30**

- 1.1. Define conservation . What are various methods of biodiversity conservation ? Discuss.
- 1.2. What is biogeochemical cycle ? Illustrate sulphur cycle and its significance in the environment.
- 1.3. What is humus ? Write down the processes in formation of humus in soil. Discuss its importance in soil environment.

- 1.4 What are actual wind, geostrophic wind, thermal wind and baroclinicity in the physical environment? Explain.

**Group "B"**

2. Describe briefly any TEN Questions : 10×5=50
- 2.1. Ecological pyramids of forest and grassland ecosystems.
  - 2.2. Significance of adaptation
  - 2.3. Ecological dominance
  - 2.4. Ecotone and edge effect
  - 2.5. Soil profile
  - 2.6. Causes of earthquakes
  - 2.7. Mining and its effects
  - 2.8. Causes of nitrogen oxides pollution
  - 2.9. Principles of conductometric titration
  - 2.10. Biological control of pests
  - 2.11. Significance of micrometeorology on vegetated surfaces and urban areas.
  - 2.12. Techniques used for the estimation of microbial population

**Group "C"**

3. Attempt ALL the Questions : 10×2=20
- Differentiate between :
- 3.1. Food chain and trophic level
  - 3.2. Primary succession and secondary succession
  - 3.3. Volumetric and colorimetric analysis
  - 3.4. Organic and inorganic water pollutants
  - 3.5. Soil erosion and landslide
  - 3.6. Micronutrients and macronutrients
  - 3.7. Radiation inversion and subsidence inversion
  - 3.8. Turbulence and diffusion
  - 3.9. Algae and fungi
  - 3.10. Gram positive and gram negative bacteria

**Environmental Science (Env.311), 2067**

Bachelor Level/Science & Tech. / 1 Year

Full Marks: 100

Time: 3 hrs.

**SECTION "A"**

1. Attempt any THREE questions. 3×10=30
- 1.1. What do you understand by biotic community? Discuss the major biotic communities with examples.
  - 1.2. What is biogeochemical cycle? Describe phosphorus cycle and its significance in the environment.
  - 1.3. What are the geological agents of environmental changes? Discuss.
  - 1.4. What is atmospheric stability? Illustrate the adiabatic diagram of parcel method.



### SECTION "B"

2. Describe briefly any TEN questions 10x5=50
- 2.1. Y - shaped energy flow model.
  - 2.2. Ecotone and edge effect.
  - 2.3. Methods of biodiversity conservation.
  - 2.4. Ecological dominance.
  - 2.5. Soil profile.
  - 2.6. Decomposition of organic matter in soil.
  - 2.7. C : N ratio and its significance.
  - 2.8. Causes of carbon monoxide pollution.
  - 2.9. Integrated pest management (IPM).
  - 2.10. Principles of potentiometric titration.
  - 2.11. Impacts of climate change.
  - 2.12. Factors affecting growth of microorganisms.

### SECTION "C"

3. Attempt ALL the questions.  $10 \times 2 = 20$  Differentiate between :
- 3.1. Intraspecific and interspecific competition.
  - 3.2. Nitrification and denitrification.
  - 3.3. Gross and net primary productivity.
  - 3.4. Precision and accuracy.
  - 3.5. Land slide and soil erosion.
  - 3.6. Minerals and rocks.
  - 3.7. Warm and cold air mass.
  - 3.8. Frontolysis and frontogenesis.
  - 3.9. Algae and cyanobacteria.
  - 3.10. Log and lag phase of growth micro-organisms.

### OLD COURSE

#### SECTION "A"

1. Attempt any THREE questions. 3x10=30
- 1.1. What is bio-diversity? Describe the importance of bio-diversity in the environment.
  - 1.2. What is biogeochemical cycle? Illustrate carbon cycle and its significance in the environment.
  - 1.3. What is humus? Write down the processes in the formation of humus. Discuss its importance in the soil.
  - 1.4. What is monsoon? Describe Asian monsoon.

#### SECTION "B"

2. Describe briefly any TEN questions 10x5=50
- 2.1. Ecological pyramids of forest and grassland ecosystems.
  - 2.2. Climax community.
  - 2.3. Ecological dominance.
  - 2.4. Consequences of forest degradation.

- 2.5. Weathering of rocks.
- 2.6. Internal structure of the earth.
- 2.7. Earth as a closed system.
- 2.8. Principles of potentiometric titration.
- 2.9. Statistical methods in chemical analysis.
- 2.10. Biological control of pests.
- 2.11. Microbial interaction in the environment.
- 2.12. Biodeterioration of organic compounds.

#### SECTION "C"

3. Attempt ALL the questions. 10x2=20
- Differentiate between
- 3.1. Intraspecific and interspecific competition.
  - 3.2. Gross and net primary productivity.
  - 3.3. Predation and parasitism.
  - 3.4. El Nino and ENSO.
  - 3.5. Climate and weather.
  - 3.6. Focus and epicentre.
  - 3.7. Micro nutrients and macro nutrients.
  - 3.8. Speciation and extinction.
  - 3.9. Radiation and subsidence inversion.
  - 3.10. Volumetric and gravimetric analysis.

### Environmental Science (Env.311), 2068

Bachelor Level /Science & Tech./I Year

Full Marks: 100

Time: 3 hrs.

#### SECTION "A"

1. Attempt any THREE questions. 3x10=30
- 1.1. What is primary productivity? Describe the methods used for measuring primary productivity.
  - 1.2. What is biogeochemical cycle? Why is it important in environment? Describe briefly on phosphorus cycle.
  - 1.3. Write down the different categories of pesticides and how they affect the environment. Describe briefly on integrated pest management.
  - 1.4. Describe briefly the meteorological parameters responsible for transport and diffusion of air pollutants.

#### SECTION "B"

2. Describe briefly any TEN questions. 10x5=50
- 2.1. Internal structure of earth
  - 2.2. Ecological indicators
  - 2.3. Estimation of microbial population
  - 2.4. Wind roses
  - 2.5. Evolution of biosphere
  - 2.6. Effects of mining in the environment



- 2.7. Role of microorganisms in decomposition of organic matter
- 2.8. Geological agents in environment
- 2.9. Soil colloidal system
- 2.10. Significance in chemical Significance of statistical methods chemical analysis
- 2.11. Phases of growth of microorganisms
- 2.12. Atmospheric stability

### SECTION "C"

3. Attempt ALL the questions. 10×2=20
- Differentiate between:
- 3.1. Hygroscopic water and gravitational water
  - 3.2. Geostrophic and thermal wind
  - 3.3. Species evenness and species richness
  - 3.4. Aerobic and anaerobic bacteria
  - 3.5. Oligothermal and polythermal organisms
  - 3.6. In situ and ex situ conservation
  - 3.7. Competition and amensalism
  - 3.8. Allopatric and sympatric speciation
  - 3.9. Volumetric and gravimetric analysis
  - 3.10. Primary and secondary air pollutants

## Environmental Science (Env. 311), 2069

Bachelor Level/Science & Tech./I Year  
(For: Regular Examinee only)

Full Marks : 100  
Time :3hrs.

### SECTION 'A'

1. Attempt any THREE questions. 3×10=30
- 1.1 What is ecological succession? Describe the stages of primary succession.
  - 1.2 What is nutrient cycling? Why is it important in environment? Describe the processes involved in nitrogen cycle.
  - 1.3 What is soil genesis? Describe the processes and factors responsible for soil genesis.
  - 1.4 What are air pollutants? Describe the effects of air pollution on environment.

### SECTION 'B'

2. Describe briefly any TEN questions 10×5=50
- 2.1 Classification of landslide
  - 2.2 Ecological pyramids
  - 2.3 Distribution of microorganisms in environment
  - 2.4 Seasons of Nepal
  - 2.5 Composition of primary minerals
  - 2.6 Significance of adaptation
  - 2.7 Role of microorganisms in wastewater treatment

- 2.8 Earth as a closed system
- 2.9 Soil types of Nepal
- 2.10 Effects of meteorological parameters on air pollutants
- 2.11 Importance of humus in soil
- 2.12 Impacts of climate change in Nepal

#### SECTION 'C'

3. Attempt ALL the questions.

10×2=20

Differentiate between:

- 3.1 Free living and symbiotic bacteria
- 3.2 Hygroscopic and capillary water
- 3.3 Geostrophic and thermal wind
- 3.4 Reservoir and cycling pool in biogeochemical cycles
- 3.5 Major and minor communities
- 3.6 In vitro storage and cryopreservation
- 3.7 Psychrophiles and thermophiles
- 3.8 Heterotrophic and autotrophic components of an ecosystem
- 3.9 Organic and inorganic water pollutants
- 3.10 Relative humidity and absolute humidity

### Environmental Science (Env. 311), 2070

Bachelor Level / Science & Tech. / I Year

Full Marks: 100

Time: 3 hrs.

#### SECTION "A"

1. Attempt any THREE questions.

3×10=30

- 1.1 Define ecological succession. Describe briefly the general process of primary succession.
- 1.2 Describe Y - shaped energy flow model in an ecosystem.
- 1.3 Explain the geological work of rivers and glaciers.
- 1.4 Describe the effects of meteorological parameters on the diffusion and transport of air pollutants.

#### SECTION "B"

2. Describe briefly any TEN questions

10×5=50

- 2.1 Pyramid of energy
- 2.2 Competitive exclusion principle
- 2.3 "Light and dark bottle method" to estimate primary productivity
- 2.4 Significance of nitrogen cycle in the environment
- 2.5 Microbial interactions in the environment
- 2.6 Factors affecting soil formation
- 2.7 Microbial flora of soil
- 2.8 Continental drift hypothesis
- 2.9 Mass wasting phenomenon
- 2.10 Atmospheric stability



2.11 Integrated pest management

2.12 Scavenging process

**SECTION "C"**

3. Attempt ALL the questions.

10×2=20

Differentiate between:

3.1 Random and clumped dispersion

3.2 Food chain and food web

3.3 Density dependent factors and density independent factors

3.4 Habitat and niche

3.5 Ecads and ecotypes

3.6 Eurythermal and stenothermal organisms

3.7 Silicate minerals and carbonate minerals

3.8 Porosity and void ratio

3.9 Frontogenesis and frontolysis

3.10 Primary and secondary pollutants

**OLD COURSE**

**SECTION "A"**

1. Attempt any THREE questions.

3×10=30

1.1 What is primary succession? Describe the stages for completion of primary succession.

1.2 What is biogeochemical cycle? Why is it important? Describe the processes involved in completion of phosphorus cycle.

1.3 Describe the processes and factors responsible for soil formation.

1.4 Describe briefly the effects of climate change on earth.

**SECTION "B"**

2. Describe briefly any TEN questions

10×5=50

2.1 Effects of mining

2.2 Ecological pyramid of energy

2.3 Role of decomposers in environment

2.4 El Nino

2.5 Significance of C:N ratio

2.6 Colorimetric analysis

2.7 Microbial interaction

2.8 Internal structure of the earth

2.9 Soil profile

2.10 Scavenging process

2.11 Nature and properties of humus

2.12 Sources of water pollution

**SECTION "C"**

3. Attempt ALL the questions.

10×2=20

Differentiate between:

3.1 Intraspecies and interspecies competition.

- 3.2 Gravitational and hygroscopic water
- 3.3 Amensalism and commensalisms
- 3.4 In-situ and ex-situ conservation
- 3.5 Euryhydric and stenohydric organisms
- 3.6 Accuracy and precision
- 3.7 Log and lag phase for the growth of microorganisms
- 3.8 Gross and net primary productivity
- 3.9 Insecticides and herbicide
- 3.10 Stable and unstable atmosphere

## Environmental Science (Env. 101), 2070 (New course)

Four Year Bachelor Level/Science & Tech./I Year

Full Marks: 100

Time: 3 hrs.

### SECTION "A"

1. Attempt All the questions. 4×10=40

- 1.1. What do you mean by ecological niche? Explain different types of ecological niches, with suitable examples.

OR

What is community? Describe briefly the characteristics of community.

- 1.2 Define productivity. Discuss the methods that are used for the determination of primary productivity of grassland ecosystems.
- 1.3 What do you mean by pedogenesis? Describe briefly the chemical and mineralogical composition of soil.
- 1.4 Describe briefly about the composition and structure of the atmosphere.

OR

Explain briefly the application of meteorological principle to the transport and diffusion of pollutants.

### SECTION "B"

2. Describe briefly any EIGHT questions 8×5=40

- 2.1 What are ecological pyramids? Elaborate.
- 2.2 Describe the different positive interactions of species in the environment.
- 2.3 Discuss briefly about the growth models of populations in ecosystems.
- 2.4 Draw a neat and labelled diagram reflecting sulphur cycle.
- 2.5 What are the factors affecting the growth of microorganisms? Discuss.
- 2.6 What are the importances of microbes in environment?
- 2.7 Elaborate the role of water as a geological agent of change.
- 2.8 Discuss the composition and properties of humus.
- 2.9 What is thunderstorm? Discuss briefly its effects in Nepal.
- 2.10 Describe briefly the historical development of society, culture and its relevance to environment

### SECTION "C"

3. Attempt ALL the questions. 10×2=20  
Differentiate between :



- 3.1 Phagotrophs and saprotrophs
- 3.2 Stable and diminishing populations
- 3.3 Speciation and extinction
- 3.4 Ecads and ecotypes
- 3.5 Actinomyces and cyanobacteria.
- 3.6 Inner core and outer core
- 3.7 'O' and 'A' horizon of soil
- 3.8 Dry adiabatic and environmental lapse rate
- 3.9 Pre-monsoon and monsoon
- 9.10 Industrialized and agrarian society

## Environmental Science (Eny, 101), 2071

Bachelor Level (4 Yrs.) / I Year/Science & Tech.

Full Marks: 100

Time: 3 hrs.

### SECTION "A"

1. Attempt All the questions. 4×10=40
- 1.1. What do you mean by ecological niche? Explain with suitable examples on trophic and hyper volume niches.

OR

Describe briefly the characteristics of biotic community.

- 1.2 Describe the application of thermodynamic laws in relation to energy flow in ecosystems.
- 1.3 What are geological agents of environmental change? Describe briefly the major changes caused by water and glacier.
- 1.4 What is wind rose? Describe briefly the application of meteorological principles to transport and diffusion of air pollutants.

OR

What is global warming? Explain the consequences of climate change in Nepal.

### SECTION "B"

2. Describe briefly any EIGHT questions 8×5=40
- 2.1 Explain how ecological indicators help us to know the status of ecosystem.
- 2.2 Explain the impacts of human activities on carbon cycle.
- 2.3 Describe a conceptual framework of earth as a closed system.
- 2.4 Describe the role of microbes in waste water treatment process.
- 2.5 Write short notes on bacteriological indicators of water quality.
- 2.6 Explain briefly on physical and chemical weathering processes.
- 2.7 What are the ethical guidelines for working with the earth? Discuss.
- 2.8 Describe briefly the phenomenon of temperature inversion.
- 2.9 Write short notes on Numerical Weather Prediction.
- 2.10 Mention the importance of indigenous knowledge in environmental conservation.

## SECTION "C"

3. Attempt ALL the questions.

10×2=20

Differentiate between:

- 3.1 Edaphic and biotic factors
- 3.2 S shaped and J shaped growth curves
- 3.3 Habitat and niche
- 3.4 Eurythermal and stenothermal organisms
- 3.5 Autogenic succession and allogenic succession
- 3.6 Intensity and magnitude of earthquake
- 3.7 Cleavage and fracture
- 3.8 Tornado and hurricane
- 3.9 El NINO and ENSO
- 3.10 Atomistic view and holistic view

## Environmental Science (Env. 101), 2072

Bachelor Level (4yrs. prog.) 1 Year/Sci. & Tech.

Full Marks: 100

Time: 3 hrs.

### Section "A"

1. Attempt All the questions.

[4×10=40]

- 1.1. Define biotic community. Describe the categories of species interaction with suitable examples.

OR

What is population? Describe briefly the characteristics of population.

- 1.2. Define nutrient cycle. Describe the different stages of nitrogen cycle in the environment.
- 1.3. Describe, briefly, about the types, classification and abundance of earth materials.
- 1.4. What is climate change? Discuss the impacts of climate change in Nepalese context.

OR

What is atmospheric stability? Describe briefly on adiabatic.

### Section "B"

2. Describe briefly any EIGHT questions.

8×5=40

- 2.1. Describe briefly the life supporting systems of earth.
- 2.2. Explain briefly the role of competition in natural ecosystems.
- 2.3. What is intrinsic rate of natural increase? Discuss.
- 2.4. With suitable diagram show the structural components of pond ecosystem.
- 2.5. Discuss briefly the distribution of microorganisms in soil and water.
- 2.6. What are the techniques for estimating microbial population? Elaborate.
- 2.7. What are the endogenous geological processes in the environment? Discuss.
- 2.8. Write short notes on basic chemical properties of soil?



- 2.9. Discuss briefly the meteorological fundamentals in the environment?  
 2.10. Describe briefly the importance of indigenous knowledge for the environmental conservation.

### Section "C"

3. Attempt ALL the questions.

Differentiate between:

10×2 = 20

- 3.1. Grazing and detritus food chain.
- 3.2. r-selection and k-selection
- 3.3. Mutualism and commensalism
- 3.4. Autogenic and allogenic succession.
- 3.5. Gram positive and gram negative bacteria
- 3.6. Sedimentary and metamorphic rocks
- 3.7. Mollisol and alfisol
- 3.8. Tornadoes and hurricanes
- 3.9. Weather and climate
- 3.10. Pastoral and agricultural society

## 12. Computer Science I Paper (CS.311), 2066

Time : 3 hour

Full Marks : 100

### Group "A" (Introduction to computers)

1. Long Questions :

Attempt any TWO Questions.

2×10=20

- 1.1. What are different Registers available in 8085 CPU ? Explain the function of Program Counter and Stack Pointer registers in 8085 CPU.
- 1.2. Draw block diagram of SR Flip Flop with truth table. Explain the merits of D Flip over SR Flip Flop.

2. Problems :

2×5=10

- 2.1. Simplify the following Boolean function using four variables K - map and draw the simplified function using gates.  
 $F(A,B,C,D) = \sum(0,1,2,4,5,7,11,15)$
- 2.2. Write an assembly language program in 8085 to add two hex number 32H and 24H. Store the result in memory location 2004H.

3. Short Questions :

Attempt any TWO Questions.

10×3=30

- 3.1. Explain in brief about instruction cycle time, Machine Cycle time and T State.
- 3.2. Explain the function of I/O processor in I/O sub-system.
- 3.3. Draw 2 to 4 Decoder block diagram using gates.
- 3.4. Explain the Seek time, Rotational Latency time and Transfer rate of storage devices.
- 3.5. What are the different type of Network Technologies ? Explain in brief about Token Ring protocol.
- 3.6. What are the main differences between RISC and CISC architecture ?