

Royal University of Bhutan
Paro College of Education
Autumn Semester Examination – 2012

B.Ed(S) IV - ECOLOGY (BIO410)

Full mark: 100

Pass mark: 50

Time: 3 hours

Instruction

Do not write for the first ten minutes. This time is to be spent in reading the questions. This question paper consists of two sections A and B. Read the instruction in each section carefully.

Section A (40 marks)

Answer all the Questions.

Question 1

Each question carries four possible answers. Choose the most appropriate answer from the given options. (15x2=30 marks)

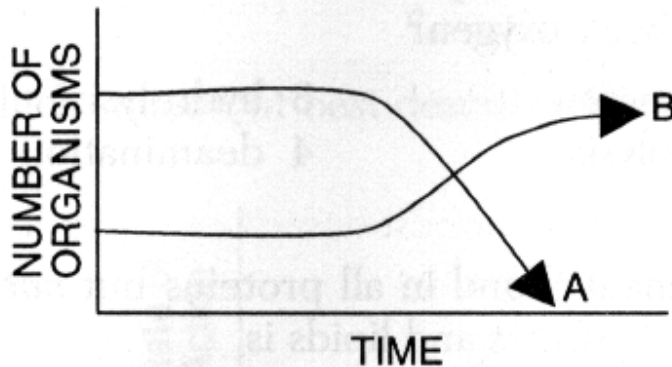
- a. A self supporting community - plants and animals interacting with each other and the non-living environment to provide a balanced system is a;
 - i. Ecosystem
 - ii. Ecotone
 - iii. Energy chain
 - iv. Ecology

- b. The kind of relationship between the nitrogen fixing bacteria and root nodules of the leguminous plants.
 - i. Predation
 - ii. Competition
 - iii. Mutualism
 - iv. Parasitism

- c. The soil water that remains readily available to the roots is;
 - i. Gravitational water
 - ii. Capillary water
 - iii. Hygroscopic water
 - iv. Water vapour

- d. Which of the following is **not** the ecological principle that emerged from the study of food chain?
- There is unidirectional flow of energy from the sun to producers and then to a series of consumers in a food chain.
 - The size of a population of quaternary consumers is more than that of tertiary consumers and that of tertiary consumers is more than secondary consumers.
 - Food chain always begins with photosynthesis and ends with decay
 - The more steps the food chain has, the greater is the wastage of energy
- e. The region of atmosphere extends up to 32190 km from the earth and has a very high temperature due to solar radiation.
- Exosphere
 - Troposphere
 - Stratosphere
 - Thermosphere
- f. Bhutan has been designated as one of the ten Biodiversity Hotspots in the world because there are areas;
- With a low diversity of locally endemic species that are not threatened at present and are richly found outside the hotspot.
 - That support natural ecosystems that are largely intact and where native species and communities associated with these ecosystems are well represented
 - That represents huge population of flora and fauna which are found throughout the world.
 - Where flora and fauna are poorly represented in a community.
- g. Which one of the following is the fossorial adaptation?
- Small tapering head with snout for burrowing
 - Well developed claws help in grasping and climbing
 - spindle shaped body that offers no resistance to air
 - all of the above adaptations
- h. Which of the following distinctive processes that controls the development of a community during ecological succession can be defined as 'establishment of the initial bare surface'?
- Stabilisation
 - Ecesis
 - Nudation
 - Migration

- i. The graph below shows that changes in two populations of herbivores in a grassy field. A possible reason for these changes is that:



- i. All of the plant populations in this habitat decreased
 - ii. Population B competed more successfully for food than population A did
 - iii. Population A produced more offspring than population B did
 - iv. Population A consumed the members of population B
- j. All of Earth's water, land, and atmosphere within which life exists is known as:
- i. population
 - ii. community
 - iii. biome
 - iv. biosphere
- k. A rocky island appears as oceanic waters recede. Which of the following forms of vegetation would probably appear first on the bare rocks?
- i. Lichens
 - ii. Weeds
 - iii. Shrubs
 - iv. Pioneer trees
- l. All the plants, animals, and protists living in a forest make up a:
- i. population
 - ii. community
 - iii. species
 - iv. phylum
- m. The sequence of energy flow through a food chain is:
- i. primary consumers- producers- higher order consumers.
 - ii. producers- higher order consumers- primary consumers.
 - iii. higher order consumers- primary consumers- producers.
 - iv. producers- primary consumers- higher order consumers.

- n. Which one is the incorrect match?
- i. **Halophytes** - plants found on saline soil
 - ii. **Psammophytes** - plants found on sandy soil
 - iii. **Lithophytes** - plants found on rocky surface
 - iv. **Chasmophytes** - Plants that require lime
- o. In some plants, the growth of buds becomes checked on windward side. Which ecological factor contributes to this process?
- i. Light
 - ii. Temperature
 - iii. Wind
 - iv. water

Question 2

Fill in the blanks.

(5x1=5 marks)

- a. A large..... allows the birds to maintain equilibrium and co-ordination.
- b.lakes are characterized by great depth of water and poor in biotic components.
- c. promotes the growth of epiphytes and promotes the germination of spores in fungi
- d. Plants which grow well in shady conditions are known as
- e. reproduce rapidly and damage, displace or destroy native species.

Question 3

Write true or false for the following statements

(5x1 =5 marks)

- a. A study of the ecology of black necked crane is an example of synecology
- b. Xerophytes are plants adapted to grow in dry lands where water content is low
- c. Deciduous trees lose their leaves in winter and enter into a state of dormancy, where the buds are covered for protection against the cold
- d. B-complex metabolizing bacteria residing in human stomach is an example of parasitism.
- e. Radio communication is possible in exosphere layer by reflecting the radio waves back to Earth.

Section B (60 marks)

In this section, there are six sets of questions. You are asked to choose any five.

Question 4

(3+ 4+ 3+ 2)

- Write an account on the importance of biodiversity in relation to ecological and cultural values.
- How does pH of the soil affect the plants? Support your answer by giving examples.
- Compare and contrast Rapid zone and Pool zone in terms of their characteristics and life forms.
- What type of water conservation adaptations are observed in desert vegetation?

Question 5

(4+4+4)

- Describe the process of community dynamics from nudation to climax community.
- Differentiate between the following:
 - Autotrophic and Heterotrophic succession
 - Autogenic and Allogenic succession
- How does presence of minerals affect the distribution of various life forms? Support your answer by giving relevant examples.

Question 6

(5+3+4)

- Describe the biogeochemical cycles of phosphorus with the help of labeled diagram. Trace the element from the point of their release from a decaying animal to their incorporation into a living animal.
- Dew and sleets make a very vital contribution to precipitation in the regions of low rainfall. Justify.
- The two basic strategies of biodiversity conservation are *in-situ* and *ex-situ*. Discuss about them by giving relevant examples.

Question 7

(5+4+3)

- Draw a sigmoid growth curve of population and discuss its five phases.
- Elaborate with examples how topography acts as an important ecological factor.
- Discuss primary succession by giving examples.

Question 8

(3+3+3+3)

- Elaborate clearly the differences between primary succession and secondary succession.
- Compare and contrast food chain and food web with examples
- Define biological corridor. How does it help to conserve the biodiversity?
- Explain how biotic factors affect the organisms of an ecosystem?

Question 9

(2+4+2+4)

- a. Biological clocks give organisms a rhythmic pattern to follow daily, monthly or even yearly. Why do you think it is very important for the coordination of these rhythms?
- b. List down all the factors affecting population and explain any three of them how they affect the population.
- c. Altitude affects vegetation. Justify
- d. Temperature is one of the most important ecological factors that influence living things. Elaborate on how it influences various living things with appropriate examples.