

University of Ruhuna – Faculty of Technology

Bachelor of Biosystems Technology Degree

Level I (Semester I) Examination

November 2019

Course Unit: BST 1162 – Introduction to Environmental Science (Theory)

Index No:

INSTRUCTIONS: Please read the instructions carefully before answering the paper.

Number of pages: Seven (7)

Time allowed: Two hours (02 hrs.)

Please ensure that you have written your **index number** in the space provided above.

Mobile phones and calculators are not permitted.

PART I - Answer all questions. (10 minutes)

1) The animal which consumes decaying organic matter is

- A. carnivore
- B. detritivore
- C. herbivore
- D. producer

2) Environmental water purification and pollination are examples of

- A. regulating services
- B. supporting services
- C. provisioning services
- D. cultural services

	Population	Births	Deaths	No. of individuals lost
A	10	10	10	50
B	20	1	1	50
C	50	1	1	50
D	100	200	0	0

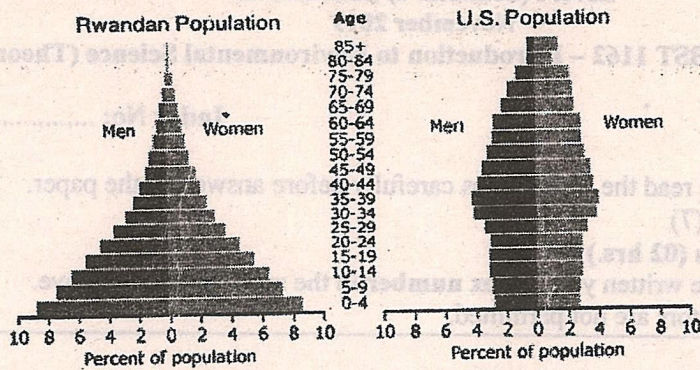
3) Provisioning services include

- A. all products that are obtained from an ecosystem.
- B. nonmaterial services that enhance the spiritual, intellectual and social development of humans.
- C. jobs that allow all other ecosystem services to function.
- D. benefits that we receive from the regulation of ecosystem processes.

4) The rate at which the new individuals are added to a population in a unit time is

- A. density
- B. natality
- C. mortality
- D. dispersion

- 5) According to the data in the figure below, in Rwanda, there are more young children than teenagers, and more teenagers than adults. This age structure indicates a population that;



- A. has stopped growing.
 B. shows a constant growth rate.
 C. will double in 30 years.
 D. will decrease in 30 years.
- 6) The table shows how several different populations have changed over a one year time span. Look at each population and determine which population has had an overall increase?

Population	Births	Deaths	No. of individuals that emigrated	No. of individuals that immigrated
A	10	10	50	0
B	20	1	50	1
C	50	1	1	50
D	100	200	0	0

- A. Population A
 B. Population B
 C. Population C
 D. Population D
- 7) Choose the correct statements about climate and weather.
- a. Weather is the condition of the atmosphere at a particular place over a short period of time.
 b. Weather can be described in terms of temperature, precipitation (snow, rain & hail), wind speed and direction.
 c. Climate is the weather conditions prevailing in an area in general or over a long period.
- A. a and c only
 B. a and b only
 C. b and c only
 D. a, b and c

8) The Stevenson screen contains all of these EXCEPT:

- A. Wet and dry bulb thermometer
- B. Minimum and Maximum thermometer
- C. Ordinary thermometer
- D. Campbell-Stokes sunshine recorder

9) is an instrument used to measure the wind speed and direction.

- A. Thermometer
- B. Hygrometer
- C. Barometer
- D. Anemometer

10) Which of the following is not a greenhouse gas?

- A. Carbon di-oxide
- B. Methane
- C. Nitrous oxide
- D. Carbon monoxide

(1 × 10 = 10 marks)

PART II – Answer all questions. (20 minutes)

1. Answer following questions regarding Energy and Environment.

I. List two (02) different ways used by ancient society to fulfil the energy requirements in daily life.

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(1 × 3 = 3 marks)

II. List three (03) different ways used by modern society to fulfil their energy requirements in daily life.

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(1 × 3 = 3 marks)

III. Briefly explain the importance of uninterrupted supply of energy to maintain peace and ethics in the world giving two (02) reasons.

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(2 × 2 = 4 marks)

IV. List three (03) environmental problems associated with energy generated by fossil fuel combustion.

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(1 × 3 = 3 marks)

V. Briefly explain the importance of renewable energy to protect the environment giving three (03) reasons.

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(3 marks)

(3 marks)

(2 marks)

(2 × 3 = 6 marks)

2. Answer following questions regarding Land and Water Use.

I. Write down three (03) types of Forest Fires.

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(3 marks)

(4 marks)

(4 marks)

(1 × 3 = 3 marks)

II. Why forests are called as an important global resource? Write four (04) reasons.

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(3 marks)

(1 × 4 = 4 marks)

III. There are four (04) Global reserves in Mining. What are they?

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(2 marks)

(1 × 4 = 4 marks)

(2 marks)

(10 marks)

PART III – Answer only three (03) questions. (1hour & 30 minutes)

- 01) I) Name the levels of organization in organismal ecology. (3 marks)
- II) Distinguish and give examples of abiotic and biotic factors in the environment. (3 marks)
- III) Diagram a typical food chain, labeling organisms as producer, primary consumer, secondary consumer and tertiary consumer. (5 marks)
- IV) Define, discuss and give one detailed example of each of the following symbiotic relationships: Commensalism, Mutualism, and Parasitism. (9 marks)
- 02) I) What is biodiversity? (2 marks)
- II) Name and sketch two idealized models of population growth. (4 marks)
- III) Name four (04) factors limiting growth rate of populations. (4 marks)
- IV) Explain Darwin's theory of natural selection in steps. (10 marks)
- 03) I) What is an externality? (3 marks)
- II) Identify whether each of the following situations is an example of a negative or a positive externality: (5 marks)
- a. You are a bird watcher and your neighbor has put up several birdhouses in the yard as well as planting trees and flowers that attract birds.
 - b. Your neighbor paints his house a hideous color.
 - c. Investments in private education raise your country's standard of living.
 - d. Trash dumped upstream flows downstream right past your home.
 - e. Your roommate is a smoker, but you are a nonsmoker.
- III) What is meant by pollution? (2 marks)
- IV) Explain three (03) major types of pollution describing their major sources and impacts on human health and the environment. (10 marks)

04) A).

Solar energy is one of most popular form of renewable energy. Faculty of Technology, University of Ruhuna plans to fix Crystalline Silicon solar panels on the roof of the Phase 3 building. The area of the roof expected to cover by solar panels is 1000 m^2 . The available solar energy per year in Kamburupitiya area is 2000 kwh/m^2 . The conversation efficiency of Crystalline Silicon solar panel is 8% .

- I) Calculate the expected electric energy production per year by the solar panels to be fixed. (4 marks)
- II) The average energy consumption for the production, transportation and installation of Crystalline Silicon solar panel is 320 kwh/m^2 . Calculate the energy payback time of the solar panels to be fixed at the Faculty of Technology. (6 marks)

B).

Kelarawalapitiya "Yugadanawi" power station one of most important power station in Sri Lanka. The efficiency of "Yugadanawi" power station is increased in environmental friendly manner by combined cycle Technology.

- I). List the two types of turbines in "Yugadanawi" power station. (2 marks)
- II). Draw a schematic illustration of combined cycle Technology used in "Yugadanawi" power station. (4 marks)
- III) Briefly explain the efficiency increasing mechanism of combined cycle. (4 marks)

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