

SECTION A
(50 Marks)
Answer ALL questions.

Question 1

- I** For each question, there are four alternatives: **A, B, C** and **D**. Choose the correct alternative and **circle** it. Do not circle more than **ONE** alternative. If there is more than one choice circled, **NO** score will be awarded.

[25 Marks]

- 1) The use of goods and services by an individual is called
 - A lifestyle.
 - B production.
 - C manufacture.
 - D consumption.

 - 2) Many of the species are becoming endangered or getting extinct, this phenomenon is a great threat to biodiversity. The following activities contribute to the degradation of biodiversity **EXCEPT** the
 - A promotion of access to foreign sources of improved species varieties.
 - B changes brought about by destruction of required habitat.
 - C introduction of new predators or competitors.
 - D direct intervention of humans.

 - 3) The symbiotic relationship depicted in the figure where a bee is sucking nectar from the flower, is an example of
 - A parasitism.
 - B mutualism.
 - C competition.
 - D commensalism.
- A line drawing of a bee on a flower. The bee is positioned on the right side of the flower, with its head buried in the center of the flower's petals, sucking nectar. The flower has several large, pointed petals and a central cluster of stamens. The bee has wings, antennae, and a segmented body. This illustrates a mutualistic relationship where the bee gets food and the flower gets pollinated.
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- 4) Which one of the following is **NOT** the characteristic of invasive species?
 - A Has a tendency to spread
 - B Help other species to multiply
 - C Alter the predator-prey interactions
 - D Affect native species through competition

(Information below is to be used with question number 5)

Research shows that, “The HIV pandemic is most severe in Sub-Saharan Africa. Over 60% of all people living with HIV reside within the region”.

- 5) The above scenario describes about
- A biological hazard.
 - B geophysical hazard.
 - C climatological hazard.
 - D hydro-meteorological hazard.
- 6) The diagram shows one of the human activities that influence ecosystem stability. Such activities are examples of
- A intrinsic factors.
 - B extrinsic factors.
 - C human factors.
 - D competitive factors.



(The statement given below is to be used with question number 7)

The post disaster deals with activities such as providing temporary housing, public information, and health and safety education.

- 7) The above description is best suited for one of the following:
- A Disaster relief
 - B Emergency plan
 - C Disaster preparedness
 - D Disaster rehabilitation
- 8) Which mineral deficit would exhibit distorted growth in plants from improper cell formation?
- A Nitrogen
 - B Calcium
 - C Potassium
 - D Phosphorous

- 9) Which **ONE** of the following is the best farming practice that can be recommended to the farmers in order to have a good organic harvest?
- A Use of manure, machines and hybrid seeds.
 - B Use of traditional tools, manure and hybrid seeds.
 - C Use of machines, chemical fertilizers and organic seeds.
 - D Use of chemical fertilizers, organic seeds. and traditional tools.
- 10) Which **ONE** of the following disasters lead to famine due to lack of water for irrigation and increase in poverty?
- A Winter storm
 - B Earthquakes
 - C Heat waves
 - D Drought

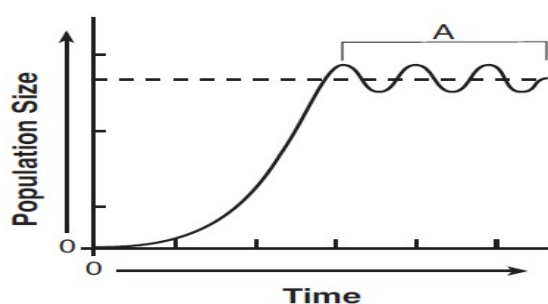
(The statement given below is to be used with question number 11)

Bhutanese families use the sun to dry everything from vegetables, crops, clothes to meat. Traditionally, goods are left out in the field, rooftop or on lines.

- 11) Which **ONE** of the following is best described in the above statement?
- A Solar Photovoltaic system
 - B Solar Cookers
 - C Solar Thermal
 - D Solar Driers
- 12) Some countries levy taxes on energy for all of the following reasons **EXCEPT** for
- A reducing energy use.
 - B protecting poorer households.
 - C increasing the production of energy.
 - D regulating the environmental consequences.

- 13) Denitrifying bacteria are important in the nitrogen cycle because they convert
- A nitrates to atmospheric nitrogen.
 - B ammonium to nitrites.
 - C nitrites to nitrates.
 - D nitrates to nitrites.
- 14) Bhutan has protected areas spread across the country. The main objective of this is to
- A promote ecotourism.
 - B conserve the biodiversity.
 - C maintain 60% forest cover .
 - D sustain the use of natural resources for local people's livelihood.

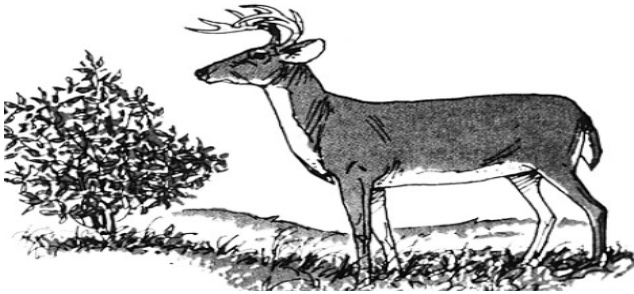
(The graph below indicates the size of a fish population over a period of time)



- 15) The section of the graph labelled 'A' represents
- A extinction of population.
 - B population at equilibrium.
 - C biodiversity within the species.
 - D nutritional relationships of the species.
- 16) As a responsible person aware of the limited amount of resources available, what is judicious resource consumption?
- A maintaining a very low standard of living
 - B initiating rapid developmental activities
 - C keeping abreast with latest technology
 - D using resources sustainably

- 17) The main aim of Basel Conventions is to
- A protect cultivated and wild plants.
 - B protect and preserve endangered species.
 - C control trans-boundary movement of hazardous wastes and their disposal.
 - D ensure the protection and conservation of cultural heritages around the world.
- 18) The growing number of tigers and bears in Jigme Dorji Wangchuck National Parks has affected its carrying capacity.
In this regard, the carrying capacity of Jigme Dorji Wangchuck National Park will
- A increase.
 - B decrease.
 - C be stable.
 - D remain the same.
- 19) Bhutan is carbon negative. This means that, Bhutan
- A produces more greenhouse gases than it emits.
 - B soaks up more greenhouse gases than it emits.
 - C produces more inert gases than it emits.
 - D soaks up more inert gases than it emits.
- 20) Which **ONE** of the following describes economic sustainability?
- A Stable economy with equitable sharing of resources
 - B Stable economy with inequitable sharing of resources
 - C Unstable economy with equitable sharing of resources
 - D Unstable economy with inequitable sharing of resources
- 21) The kind of commensalism in which one organism creates a suitable environment for another is termed as
- A phoresy.
 - B chemical.
 - C metabiosis.
 - D inquilinism.

(The diagram below shows a deer and a green plant, it is to be used with questions number 22).



22) The relationship between the deer and the plant is best described in a way that the

- A deer supplies food and oxygen to the green plant
- B green plant supplies food and oxygen to the deer
- C deer supplies food and carbon dioxide to the green plant
- D green plant supplies food and carbon dioxide to the deer

(The statement below is to be used with questions number 23).

Dechen has been observing the pattern of a mango tree for a year. She has recorded the time and season of budding, flowering, fruiting and shedding of leaves.

23) Which of the following event is best described in the above statement?

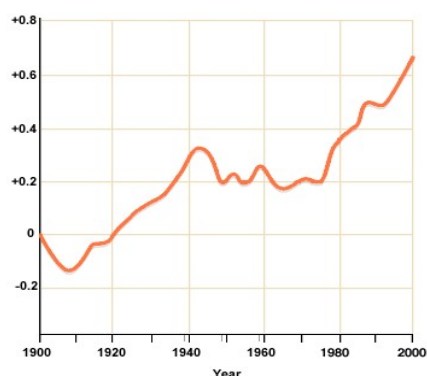
- A Ecology
- B Migration
- C Phenology
- D Global warming

24) According to the Convention on Biological Diversity, 80% of poor people's needs are obtained from the biodiversity in an ecosystem.

The benefits obtained from the ecosystem are termed as ecosystem

- A benefits.
- B services.
- C endowment.
- D consumption.

(The graph below shows variations in global temperature over the past 100 years).



25) What could be the reasons for constant rise in global temperature?

- A Ocean current
- B Natural calamities
- C Anthropogenic activities
- D Extinction of certain plants and animals

II Fill in the blanks with appropriate words.

[5 marks]

- a) Parasites like fleas and ticks that live on the body of host are called_____
- b) _____ area is used for production of crops and foods required by human.
- c) The practice of using resources by present generations without considering the needs of future generation is termed as _____ practice.
- d) The factor that keeps population size at an equilibrium is known as _____ facctor.
- e) _____ is the capacity of our ecosystem to respond to a disturbance by resisting damage and recovering quickly.

III Match the word or phrase of column A correctly against the word or phrase in column B. Rewrite the matching pair in the space provided. [5 marks]

Column A	Column B
1) Chuzhing	a) Population size at a given time.
2) Carrying capacity	b) The captive breeding of Takin.
3) Hydropower	c) Terraced wetland where rice and other crops are cultivated
4) Kamzhing	d) Energy produced using the potential of fast flowing water.
5) Ex-situ	e) The big wave that destroy settlements near the sea.
6) Tsunami	
7) In-situ	

IV. State TRUE or FALSE for the statements given below. Rewrite the false statement. [5 Marks]

- Barnacles attaching themselves on the bodies of whales in order to have more advantageous position in the life are an example of inquilinism.
- Greenhouse gases such as chlorofluorocarbons in the presence of ultraviolet rays help to retain ozone layer.
- As the world embraces and strengthens the ideology of global economy, there is less or no impact on the ecology.
- In an ecosystem, the number of organisms that can be supported depends on its productivity.
- The Kamzhing is the less dominant agricultural land use throughout Bhutan.

V Answer the following questions. **[10 Marks]**

- a) Agricultural activities bring about significant impacts on the climate change. In this regard, suggest at least **TWO** ways to reduce the effects on climate change caused by agricultural activities. **[2]**

- b) Overharvesting of natural resources leads to depletion and at times extinction of the natural resources. As an environmental student, how would you replenish the extracted natural resources? State at least **TWO** measures. [2]

- c) “Hydropower is one of the cleanest energy.”Do you agree with the statement? Justify. [2]

- d) The use of land continuously changes from one form to another. This are called as land use transformation. List **TWO** examples to show how land use is transformed. [2]

e) Suppose you are an Inspector of Bhutan Agriculture and Food Regulatory Authority based at Phuntsholing. How would you sensitize the people of Phuntsholing about the importance of protecting plants from spread of pests from neighbouring country?
 Discuss at least **TWO** suggestions. [2]

Section B (50 Marks)

Answer any FIVE questions

Question 2

(The table below is to be used with Question a, b & C)

Species	Ecosystem A	Ecosystem B	Ecosystem C
Tiger	25 individuals	20 individuals	20 individuals
Bear	20 individuals	25 individuals	5 individuals
Deer	50 individuals	20 individuals	100 individuals
Squirrel	0 individual	15 individuals	15 individuals
Monkey	0 individual	30 individuals	0 individual

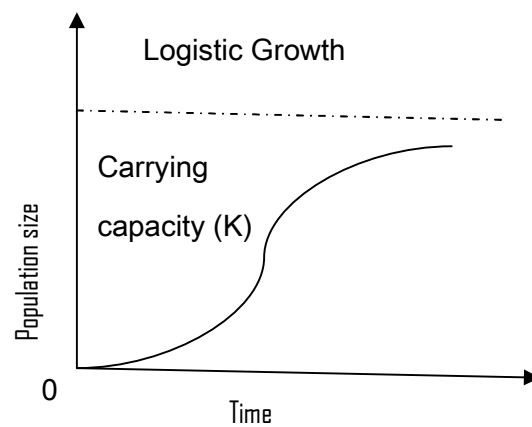
- a) What is species evenness? Which ecosystem has the most evenly distributed species? [2]

- b) Identify and explain the ecosystem that has least species richness. [2]

c) Which ecosystem has the highest population?

[1]

(The graph below is to be used with Question. d)



d) Explain the **sigmoidal** or “S-shaped” curve relating to biotic potential of a species.

[2]

- e) Why do you think species richness is not uniform throughout the earth? State **THREE** reasons. [3]

Question 3

- a) What would happen to the lives of the animals if the ecosystem is not stable? Give at least **TWO** reasons. [2]

(The diagram below is to be used with Question. b)



- b) How does the Ecological Footprint help to analyze the sustainability of people's lifestyles? [2]

- c) The Convention on Biological Diversity (CBD) is an example of an international agreement to tackle overharvesting of biological resources, which is signed by more than 150 countries of the world. State **TWO** main goals of the CBD [2]

d) Mention **ONE** example of intrinsic factor influencing the ecosystem. **[1]**

e) Bhutan has set an exemplary role in protecting the biodiversity and safeguarding the country's natural resources. State **THREE** initiatives taken by Bhutan. **[3]**

Question 4

- a) How does environmental degradation impact carrying capacity of an ecosystem? [2]

- b) State **THREE** ways to conserve the environment. [3]

c) How is meteorological disaster different from climatological disaster? [2]

d) Suppose you are a Disaster Management Coordinator in one of the dzongkhags. The recent flood in your area has severely affected both properties and lives of the people. In such a case, how would you coordinate multi-agency response and recovery phase to reduce the impact of disaster? List at least **THREE** measures. [3]

[illegible]

Question 5

- a) Name the atmospheric layer on which Ozone gas is abundantly found. [1]

- b) Explain any **TWO** strategies identified to address climate change in Bhutan. [2]

[illegible]

- c) Give **ONE** example to show how climate change has impacted the availability of resources for the survival of the people in your locality. [1]

(The diagram and the abstract given below are to be used with Q.5 d)



Naro is one of the remote gewogs in Thimphu dzongkhag. There is no shop or a farm road. The highlanders claim that the road's construction was approved seven years ago. Tenzin from Barshong, where the gewog centre is, said that the absence of a road affected the gewog's development activities.

Prime Minister admitted that there has been delay because the gewog falls in the Jigme Dorji National Park (JDNP), and the park didn't approve the environment clearance.

He assured them that the road would reach the gewog centre by next year.

However, some highlanders remained skeptical given the steep terrain and poor geology plagued with frequent landslides.

SOURCE: TUESDAY , JULY 25 2017 [HTTP://WWW.KUENSELONLINE.COM/SEVEN-YEARS-ON-GC-ROAD-YET-TO-BE-COMPLETED-IN-NARO/NN](http://www.kuenselonline.com/seven-years-on-gc-road-yet-to-be-completed-in-naro/nn)

Question 6

a) What is the role of ‘risups’ in the village? [1]

b) Name **TWO** ex-situ conservation for wild and domestic biodiversity established in Thimphu. [2]

c) Write any **TWO** advantages of traditional farming in Bhutan . [2]

d) Land dumping is a popular method of waste disposal practiced in Bhutan. State **TWO** reasons why this method is practiced. [2]

Question 7

- a) Write down **TWO** roles that hydropower plays in socio-economic development of Bhutan?

[2]

- b) Distinguish the aims of UNESCO World Heritage Convention and International Plant Protection Convention.

[2]

