

**SECTION A(50 MARKS)**  
**ANSWER ALL QUESTIONS**

**Question 1**

a) 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]

- i. Which **ONE** of the following is an example of sedimentary biogeochemical cycle?
  - A Nitrogen cycle
  - B Calcium cycle
  - C Carbon cycle
  - D Water cycle
- ii. If the population of Red Panda in Phrumsungla National Park increases exponentially, its carrying capacity will
  - A increase exponentially.
  - B remain same.
  - C decrease.
  - D increase.
- iii. When the life style of people improve, the natural resources will
  - A remain same.
  - B deplete.
  - C increase.
  - D change.
- iv. Carrying capacity of earth for human population
  - A is fixed.
  - B can be expanded indefinitely.
  - C will decrease overtime because resources are depleted.
  - D will increase over time because of technological advancement.
- v. The scientific term for a farmer's calendar is
  - A hydrology.
  - B phenology.
  - C climatology.
  - D meteorology.

vi. Study the table below.

Water weed	1.....
Risup	Traditional conservation initiative.
Ecotourism	Responsible travel to natural area and sustain local people.

What will be a suitable word for number 1?

- A exotic species
- B native species
- C endemic species
- D endangered species

vii. Following are hazardous waste **EXCEPT**

- A acid.
- B bleach.
- C rubber.
- D chlorine.

viii. Although, it is one of the cleanest and most reliable sources of energy, it has impacts on the river system and human settlement. Which **ONE** of the following is best described in the above statement?

- A geothermal energy
- B hydropower
- C solar energy
- D wind energy

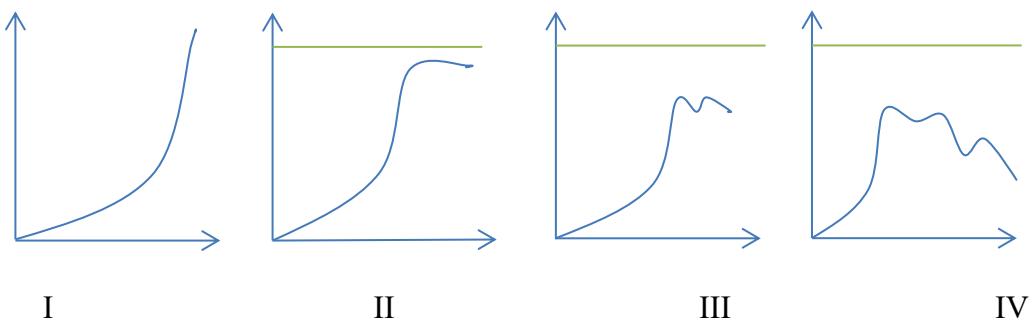
ix. The main aim of Vienna Convention is to

- A protect ozone layer.
- B protect cultivated and wild plants.
- C protect and conserve cultural heritage.
- D control trans-boundary movement of hazardous waste.

x. Phosphorous is important for the production of energy by the plant. The major reservoir for phosphorus is

- A plants.
- B aquifers.
- C earth crust.
- D atmosphere.

xi. Study the graphs below.



Which graph has reached its carrying capacity in an ecosystem?

- A    IV
- B    III
- C    II
- D    I

xii. Which **ONE** of the following resources is mostly harvested by the Bumthaps?

- A    fishes
- B    forests
- C    minerals
- D    cordyceps

xiii. Which **ONE** of the following factors is responsible for maximum pressure to natural resources?

- A    natural disaster
- B    global temperature
- C    population of human
- D    population of wild animals

xiv. Coronavirus which is commonly known as COVID-19, has not only impacted the economy of the world but also led to the loss of human lives. The above statement is related to

- A    climatological disaster.
- B    hydrological disaster.
- C    geological disaster.
- D    biological disaster.

xv. The change of weather pattern over a period of time is known as

- A    seasonal change.
- B    climatic change.
- C    weather change.
- D    time change.

xvi. Study the table given below.

Species	Ecosystem A	Ecosystem B	Ecosystem C	Ecosystem D
Bear	14	12	24	2
Tiger	5	11	12	8
Lion	10	10	16	4

Which ecosystem shows species evenness and richness?

- A ecosystem A and B
- B ecosystem C and D
- C ecosystem A and D
- D ecosystem B and C

xvii. The following are the impacts of land use changes **EXCEPT**

- A loss of nutrients.
- B loss in biodiversity.
- C increased soil compaction.
- D decreased ecological damage.

xviii. The National Renewable Energy Laboratory (NREL), USA has done a solar resource assessment for Bhutan using satellite data. According to the NREL report, it was found that Bhutan has high solar energy potential. With this background information, Bhutan decided to install solar panels as it is



- A inexpensive.
- B a renewable resource.
- C a non-renewable resource.
- D appropriate for a mountainous country.

xix. Which **ONE** of the following activities is under sustainable development goals?

- A protecting ecosystem
- B use of private vehicles
- C constructing unsafe buildings
- D procuring low efficient machineries

xx. The examples of extrinsic factors for a stable ecosystem are

- A dying of an organism and natural change in the environment.
- B changes in natural environment and human activities.
- C organism dying before reproduction and breeding.
- D surviving of an organism and human activities.

xxi. Study the factors below:

- I urbanization
- II modernization
- III population growth

In a developing country like Bhutan, natural resources degradation is mainly brought by

- A I and II
- B I and III
- C II and III
- D I, II and III

xxii. Following are the examples of meteorological disasters **EXCEPT**

- A hailstorms.
- B droughts.
- C cyclones.
- D blizzards.

xxiii. Which greenhouse gas is produced in abundance globally?

- A methane
- B nitrous oxide
- C carbon dioxide
- D chlorofluorocarbon

xxiv. Wind is the cleanest source of energy and has potential to run the turbine. The amount of wind energy depends upon

- A direction of wind.
- B velocity of wind.
- C size of generator.
- D size of turbine.

xxv. The occurrence of environmental related disaster disrupts life of the people and generally greater impact is seen in remote regions. Which statement best supports to explain this?

- A lack of immediate relief services
- B settlements are always scattered in remote places
- C magnitude of any hazard is more in remote places
- D environmental vulnerability is high in remote places

**b) Fill in the blanks with appropriate word(s).**

**[5]**

i. Continuous interaction between biotic and abiotic components contribute to _____ cycle.	
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ii.	Areas such as cropland, forest and fishing ground used for production of food and crops required by human is called _____.
iii.	Fresh air can become polluted and unsafe for breathing. The word that most closely defines “polluted” is _____.
iv.	Bhutanese way of conserving fauna for a month is called _____.
v.	The holistic approach to sustainable development in Bhutan is the philosophy of _____.

c) **Match the items of column A with the most appropriate items in column B. [5]**  
 Rewrite the correct pairs by writing the alphabets against the numbers in the space provided.

<b>Column A</b>	<b>Column B</b>
i. Nitrifying bacteria	a) Disaster Risk Reduction
ii. Use of goods and services by an individual	b) Solar PV
iii. Develop and maintain disaster risk map	c) biodiversity
iv. Varieties of flora and fauna	d) Nitrobacter
v. Converts solar energy to electricity	e) Disaster Risk Management
	f) consumption
	g) Micrococcus

<b>Column A</b>	<b>Column B</b>
i.	
ii.	
iii.	
iv.	
v.	

**d) State TRUE or FALSE against the statements in the space given below. Rewrite the false statements in the correct form. [5]**

- i. During rainy season, water carries calcium to or from the soil through the process of weathering and leaching. \_\_\_\_\_
- ii. Larger the individuals need, smaller the ecological footprint. \_\_\_\_\_
- iii. Overshoot of carrying capacity is a permanent phenomenon of an ecosystem. \_\_\_\_\_
- iv. Bhutan is located in one of the most seismically active regions in the world. \_\_\_\_\_
- v. Local traditions help in the conservation of biodiversity. \_\_\_\_\_


**e) Answer the following questions.**

The picture given below shows logging.



- i. Write any **TWO** ways to conserve our forests. [2]



ii. Due to climatic change, glaciers and snows have been melting at a higher rate posing risk to human life and properties. Suggest any **FOUR** ways to minimize the causes of climatic change. [2]


iii. Bhutan aims to become self-sufficient in the field of agriculture. Therefore, land use plays a vital role in agricultural practices. Is it possible to achieve this goal? Give **TWO** reasons to support your answer. [2]


iv. How do the following affect the ecosystem stability? Justify with **ONE** reason.

A Human activities.

[1]


B Natural activities.

[1]


v. Why should Bhutan conserve energy? Give **TWO** reasons.

[2]


**SECTION B (50 MARKS)**  
**ANSWER ANY FIVE QUESTIONS**

**Question 2**

a) Define the following:

i. Nitrification

**[1]**


ii. Phosphorus cycle

**[1]**


b) Human beings have gained from living diverse lifestyles. Explain with **TWO** examples.

**[2]**


c) Write **ONE** difference between natural and technological disasters with an example each. [2]

<b>Natural disasters</b>	<b>Technological disasters</b>	

d) You are the Gup of Dungna and have observed the degradation of biodiversity in the Gewog for the last few years. What measures will you take to minimize further biodiversity degradation? Write at least **TWO** measures. [2]


e) What will happen if chemical wastes are not properly managed? Give **TWO** consequences. [2]



**Question 3**

a) What do you understand by exponential growth and logistic growth?

[2]


b) With modernization, most parts of Bhutan are connected with hundreds of kilometers of farm roads. What do you think are some of its effects on the natural environment? Mention **FOUR** points.

[2]


c) Black necked cranes migrate to Bhutan from Tibet every winter. What are migrating indicators? Mention **TWO**. [2]

d) What is incineration? Write **ONE** advantage and disadvantage each of incineration. [2]

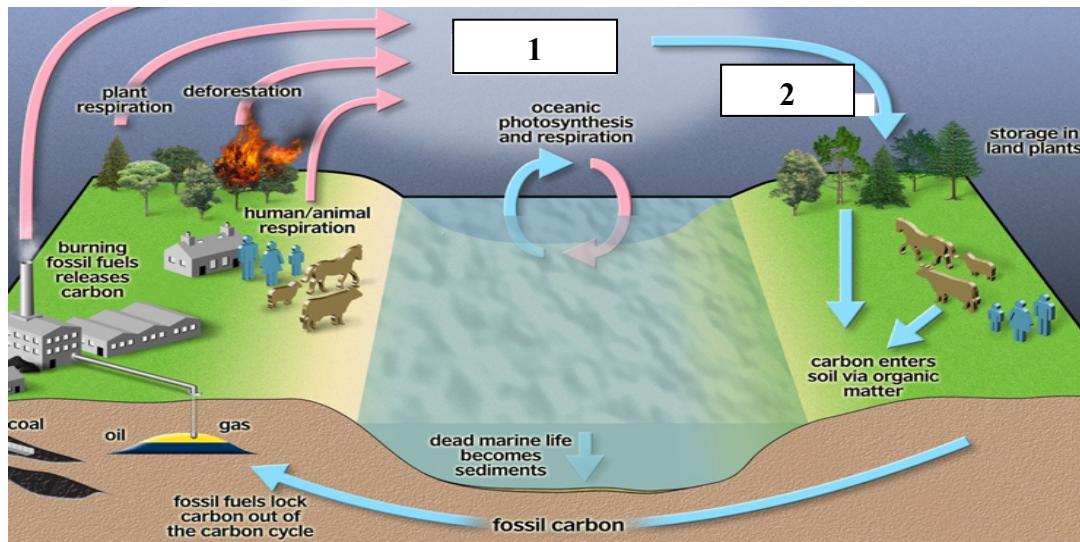

e) Ensuring sustainable development is a challenge for Bhutan. Give **TWO** reasons.

[2]

## Question 4

a) Study the diagram and label the parts 1 and 2.

[2]



Part - 1

## Part - 2

b) State any **FOUR** factors affecting the over harvesting of earth's natural resources.

[2]

c) Why are developing countries vulnerable to disasters? Give **TWO** reasons.

[2]

d) What makes Bhutan rich in biodiversity?

[1]


e) Name any **TWO** endangered birds in Bhutan.

[1]

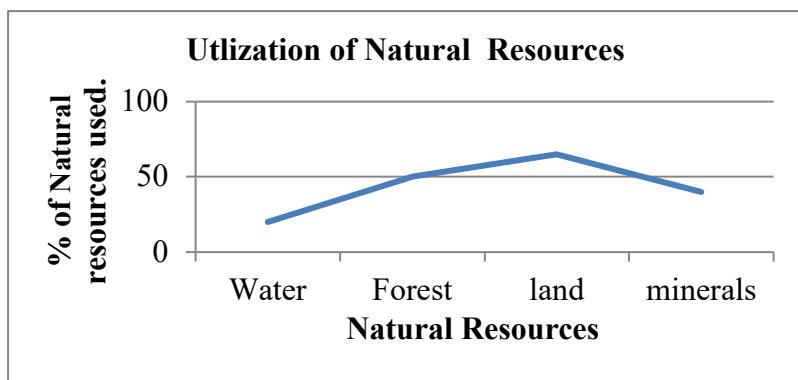
f) List and explain **TWO** usages of having wind source maps.

[2]

### Question 5

a) Ecosystem will show either resistance or resilience during any disturbance by extrinsic or intrinsic factors. What is meant by resistance and resilience? [2]

b) Study the graph given below.



Name the most and least used natural resource.

[2]


c) Changes in climatic conditions have significant impact on biogeochemical cycle, thereby, affecting food production around the world. Mention **ONE** advantage and disadvantage each of warmer temperatures.

[2]


d) Green energy has become one of the much needed energies in the present world. The Environmental Commission of Bhutan has announced to have a logo for Green Energy Bhutan. Design a logo for Green Energy Bhutan. [2]

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e) What do you understand by sustainable development? [1]


f) Write **ONE** aim of sustainable development.

[1]


**Question 6**

a) Explain with **TWO** reasons, the importance of biogeochemical cycle to an ecosystem. [2]


b) Explain the following in your own words.

i. Deforestation

[1]


ii. Over-exploitation of natural resources

[1]


c) Study the figure given below and answer the question that follows.



This disaster causes destruction to property and life. Suggest **FOUR** preparatory measures to keep people safe.

[2]


d) Can loss of biodiversity be prevented? Justify with **FOUR** points.

[2]

e) What is solar energy? Name **TWO** appliances that use this energy.

[2]

### Question 7

a) Suppose in an ecosystem the only available water source is a small pond. A number of wolves, crocodiles, buffaloes, deer and fishes live in the ecosystem. The pond is drying up slowly. What do you think will happen to the ecosystem? Mention any **TWO** consequences. [2]


b) The picture given below shows people in their environment.



Mention any **TWO** observations.

[2]



c) Mention any **TWO** factors affecting the carrying capacity of the earth. [2]


d) Explain in your own words how industries lead to climate change. [2]


e) Complete the following table. [2]

<b>English terms</b>	<b>Dzongkha Terms</b>	
Paddy field	1.....	
2.....	Kamzhing	
Pasture land	3.....	
Shifting cultivation	4.....	