

QUESTION ONE

- A. Define the following ecological terms:
- i. Ecological niche. (2 marks).
 - ii. Adaptation. (2 marks).
 - iii. Speciation. (2 marks).
 - iv. Extinction. (2 marks).
 - v. Biodiversity. (2 marks).
 - vi. Evolution. (2 marks).
 - vii. Environmental disease. (2 marks).
- B. Giving examples, describe how the prey – predator relationship can help stabilize an ecosystem. (11 marks).

TOTAL 25 MARKS

QUESTION TWO

- A. Give the meaning of the following terms **ecosystem, biome, and life zone** and **list any four biomes and any four life zones** respectively. (12 marks).
- B. Provide details of any **one** biome or life zone you have listed in (A) above under the following themes:
- i. Location. (2 marks).
 - ii. Plants species. (4 marks).
 - iii. Animal species. (4 marks).
 - iv. Threats. (3 marks).

TOTAL 25 MARKS

QUESTION THREE

There is a close connection between people and ecosystems. Describe in details under themes a, b, c, d, e below giving supporting reasons **how** the livelihoods and survival of people would be affected through their adverse impacts on ecosystems.

- a. Earth's main environmental problems. (5 marks).
- b. Fresh water demand. (5 marks).
- c. Industrial development. (5 marks).
- d. Household waste production. (5 marks).
- e. Energy use. (5 marks).

TOTAL 25 MARKS

QUESTION FOUR

- A. What is a biogeochemical cycle? (1 mark).
- B. Name any **four** biogeochemical cycles. (4 marks).
- C. Draw and label one of the terrestrial biogeochemical cycles you have listed above. (10 marks).
- D. Describe how human activities have impacted on the carbon cycle and list the consequences of these impacts on human life. (10 marks).

TOTAL 25 MARKS

QUESTION FIVE

- A. Define a **system** as applied in ecology. (2 marks).
- B. List two characteristics of a system. (2 marks).
- C. Differentiate between a **positive feedback** and a **negative feedback**. (4 marks).
- D. Below are a number of examples of how both positive and negative feedback mechanisms might operate in the physical environment. Label each example below as either positive or negative feedback. (7 marks).

The examples of possible positive and negative feedback in physical systems are:

1. As carbon dioxide levels in the atmosphere rise:

- Temperature of Earth rises as Earth warms:
- The rate of photosynthesis in plants increases
- More carbon dioxide is therefore removed from the atmosphere by plants, reducing the greenhouse effect and reducing global temperatures

2. As Earth warms:

- Ice cover melts, exposing soil or water
- Albedo decreases
- More energy is absorbed by Earth's surface
- Global temperature rises
- More ice melts

3. As Earth warms, upper layers of permafrost melt, producing waterlogged soil above frozen ground:

- Methane gas is released in anoxic environment
- Greenhouse effect is enhanced
- Earth warms, melting more permafrost

4. As Earth warms, increased evaporation:

- Produces more clouds
- Clouds increase albedo, reflecting more light away from Earth
- Temperature falls
- Rates of evaporation fall

5. As Earth warms, organic matter in soil is decomposed faster:

- More carbon dioxide is released
- Enhanced greenhouse effect occurs
- Earth warms further
- Rates of decomposition increase

6. As Earth warms, evaporation increases:

- Snowfall at high latitudes increases
- Icecaps enlarge
- More energy is reflected by increased albedo of ice cover
- Earth cools
- Rates of evaporation fall

7. As Earth warms, polar icecaps melt releasing large numbers of icebergs into oceans:

- Warm ocean currents such as Gulf Stream are disrupted by additional fresh water input into ocean
- Reduced transfer of energy to poles reduces temperature at high latitudes
- Ice sheets reform and icebergs retreat
- Warm currents are re-established

E. In the following cases, number and write the missing term in your answer book to complete the sentences using the terms “open”, “closed”, “isolated”, “solar”, and “matter”. (6 marks).

- i. A -----system exchanges matter and energy with its surroundings.
- ii. A -----system exchanges energy but not matter with its surroundings.
- iii. A -----system exchanges neither matter nor energy with its surroundings.
- iv. All ecosystems are ----- systems, because of the input of ---
----- energy and the exchange of ----- with other ecosystems.

F. Draw a food web and label the different trophic levels. (4 marks).

TOTAL 25 MARKS)