

**International Green Warrior Olympiad (IGWO)****Sample Paper****Pattern and Marking Scheme**

<b>Grade</b>	<b>Topic/Section</b>	<b>No. of Questions</b>	<b>Marks per Question</b>	<b>Total Marks</b>
<b>Grade 8</b>	Green Champ	40	3	120
	Green Challenger	10	6	60
<b>Grand Total</b>		<b>50</b>		<b>180</b>

The total duration of the exam is 60 minutes. There's a negative marking of  $1/3^{\text{rd}}$  marks for every wrong answer.

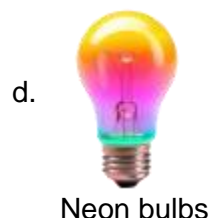
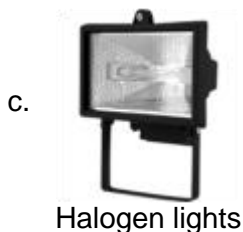
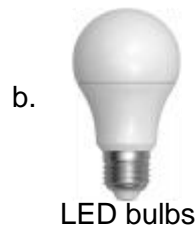
**Syllabus**

Clean Water and Sanitation, Affordable and Clean Energy, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Zero Hunger

For more details, visit <https://www.crestolympiads.com/green-olympiad-gwo>

## Green Champ (Each Question is 3 Marks)

- During a science experiment, Alex observes that when he heats a pot of water, he sees steam rising from the surface of the water. What part of the water cycle is this demonstrating?
  - Evaporation
  - Condensation
  - Collection
  - Precipitation
- An urban city with a high population density is facing a shortage of clean drinking water due to increased demand and pollution. The city administration is considering setting up a water-purifying plant. What should be their primary consideration while setting up this plant?
  - Cost of the plant
  - Efficiency of the plant
  - Environmental impact of the plant
  - A and B only
  - B only
  - B and C only
  - A, B and C
- In a water quality testing experiment, you're examining a water sample. Upon adding a specific reagent to the sample, it turns blue. What does the colour change of the water sample indicate about its quality in this experiment?
  - Presence of  $\text{CO}_2$
  - Neutral pH
  - High chlorine content
  - Presence of ammonia
- A school is planning to reduce energy consumption by replacing traditional light bulbs with energy-efficient options. Which type of energy-efficient lighting should they choose?



- In the following question, you will find an assertion and a reason. Select the appropriate option that applies.

Assertion: Energy conservation in homes can be achieved by using energy-efficient appliances and implementing better insulation practices.

Reason: Energy-efficient appliances consume less energy, and proper insulation reduces heat loss and gain in buildings.

- a. Both assertion and reason are true and reason is the correct explanation of assertion.
- b. Both assertion and reason are true and reason is not the correct explanation of assertion.
- c. Assertion is true but reason is false.
- d. Assertion is false but reason is true.

6. Nick installed a solar panel system on his rooftop to harness solar energy for his home. He wants to understand the practical process behind solar energy generation. Help him understand what happens when photons from sunlight strike the photovoltaic cells in a solar panel system.



- a. They generate heat energy for space heating.
  - b. They release electrons, creating an electric current to power appliances.
  - c. They produce hydrogen gas for fuel cells.
  - d. They heat up a storage tank of water for domestic use.
7. You are in the market for a new refrigerator for your home. You want to purchase an energy-efficient appliance to reduce your electricity consumption and lower your utility bills. While browsing, you come across refrigerators with an Energy Star label and others without it. What is the purpose of an Energy Star label on appliances and devices, like the refrigerators you are considering?



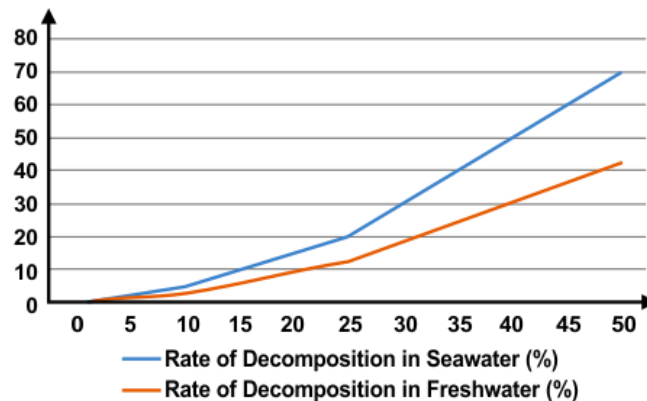
- a. It indicates that the product is expensive but high-quality.
  - b. It guarantees that the product will last a long time.
  - c. It signifies that the product is the newest in its category.
  - d. It certifies that the product meets energy efficiency standards.
8. A country is considering expanding its nuclear energy capacity. Which of the following key environmental considerations they should address before making a decision?
- A. Proper disposal of radioactive waste and ensuring plant safety
  - B. Promoting wildlife conservation in the vicinity of nuclear plants
  - C. Increasing water usage for cooling reactor
- a. A only
  - b. A and B only
  - c. B and C only
  - d. A, B and C

9. The government of a city wants to switch to renewable energy sources to help the environment. Which of the following strategies could the city use to promote renewable energy adoption and reduce environmental impact?
- Implementing tax incentives for solar energy installations
  - Developing new coal mining projects to boost energy production
  - Encouraging the use of gasoline-powered vehicles
  - Cutting down more trees to make space for wind farms
10. The city is experiencing heavy traffic congestion, leading to increased air pollution and longer commute times. The city council is considering implementing a carpooling program. What benefits would this program bring to the city?
- Decreased air pollution
  - Reduced traffic congestion
  - Fewer public transportation options
  - Higher car ownership rates
- A only
  - B only
  - A and B only
  - A and D only
11. A school is conducting an experiment to encourage students to spend more time in their green and public spaces. They introduce outdoor seating, games, and educational activities in these areas and monitor students' engagement. What is the main objective of the school's experiment?
- To reduce students' access to green and public spaces
  - To increase the school's expenses
  - To limit students' outdoor activities
  - To encourage students to spend more time in green and public spaces
12. John is a college student who's passionate about environmental conservation. He's looking for ways to incorporate the principles of Reduce, Reuse, and Recycle into his daily life. He decides to purchase a high-quality, durable water bottle to replace single-use plastic bottles. What principle of waste management is John applying in this scenario?
- Reducing waste
  - Encouraging single-use plastic bottles
  - Increasing waste production
  - Promoting paper cups
- A only
  - B only
  - A and B only
  - A, B and D
13. Sarah is a teacher at an elementary school. She collects scrap paper from her students and uses the blank sides for drawing, thereby extending the life of the paper before recycling it. What is Sarah doing in this scenario to contribute to waste reduction and sustainability?
- Throwing scrap paper away
  - Promoting the use of new paper
  - Reusing paper before recycling it
  - Increasing paper waste

14. A college student wants to reduce their energy consumption and bills. They adopt these practices:
- A. Turning off lights when leaving a room.
  - B. Using energy-efficient LED bulbs.
  - C. Setting the thermostat to a lower temperature during the winter.
- Which action exemplifies responsible energy consumption?
- a. Leaving lights on in every room
  - b. Using incandescent bulbs
  - c. Turning off lights when not in use
  - d. Increasing the thermostat temperature during the summer
15. A local community organises a recycling event. They provide separate collection bins for paper, plastic, glass, and electronic waste. Which of the following actions is appropriate at the event?
- a. Throwing all items in the same bin.
  - b. Separating and placing each type of recyclable in its designated bin.
  - c. Mixing paper, plastic, glass, and electronic waste in one container.
  - d. Ignoring the event and leaving recyclables at home.
16. Which of the following is a sustainable practice for heating and cooling a home?
- a. Keeping windows and doors open during extreme temperatures
  - b. Using a programmable thermostat to control temperature settings
  - c. Running the air conditioner and heater simultaneously
  - d. Insulating the house poorly to allow air leaks
17. A group of students in a science class is conducting an experiment to demonstrate the heat-trapping properties of greenhouse gases for a school project. They want to create a compelling demonstration. Which experimental approach should they choose?
- a. Burning fossil fuels in an open space
  - b. Comparing the absorption of infrared radiation by different gases
  - c. Measuring surface air temperatures
  - d. Monitoring ocean currents
18. Anya is a scientist who is studying the carbon cycle. She wants to measure the amount of carbon dioxide that is absorbed by plants during photosynthesis. She designs an experiment in which she measures the carbon dioxide concentration in the air around a plant before and after photosynthesis.
- What are some of the factors that Anya might consider when designing her experiment?
- A. The type of plant being studied
  - B. The intensity of the light
  - C. The temperature of the air
- a. A only
  - b. B only
  - c. B and C only
  - d. A, B and C

19. A group of students is investigating the impact of increased carbon dioxide emissions on ocean acidification. What experimental approach should they take?
- Studying the growth of algae in freshwater ecosystems.
  - Measuring the carbon content in soil samples from different locations.
  - Monitoring changes in coral reef health over time.
  - Conducting experiments to test the effect of elevated CO<sub>2</sub> levels on the pH of seawater.
20. A group of scientists is conducting an experiment to demonstrate the greenhouse effect in a controlled environment. What should they do to replicate this effect?
- Increase the concentration of oxygen in the atmosphere.
  - Introduce cold air into a closed chamber.
  - Shine visible light through a glass container filled with carbon dioxide.
  - Measure the rate of photosynthesis in a plant.
21. A higher secondary environmental science club is researching the role of forests in mitigating climate change. What experiment should they perform to illustrate the carbon sequestration capacity of trees?
- Measuring soil moisture content in a forested area.
  - Analysing the population of deer in a local forest.
  - Comparing the growth rates of different tree species.
  - Monitoring changes in carbon storage in a forested area over time.
22. Agricultural runoff is a concern in a region known for its fertile farmlands. What is the primary environmental issue associated with excessive agricultural runoff?
- Promotion of healthy algae blooms, enhancing the aquatic food chain.
  - Introduction of excess nutrients, leading to algal blooms and oxygen depletion.
  - Increased sedimentation, improving the riverbed habitat for aquatic organisms.
  - Reduction in water temperature, benefiting cold-water fish species.
23. A coastal community is experiencing declining fish stocks, affecting the livelihoods of local fishermen. What practical steps can the community take to promote sustainable fishing practices?
- Implementing size and catch limits for fishing
  - Encouraging the use of dynamite fishing for higher yields
  - Increasing fishing efforts to compensate for declining stocks
  - Ignoring the issue as fish stocks will recover naturally

24. In a laboratory experiment, scientists compared the decomposition rates of identical biodegradable plastic samples immersed in seawater and freshwater. The resulting graph, shown below, presents the collected data. What conclusions can be drawn from this experiment?



- a. Biodegradable plastics decompose at the same rate in both seawater and freshwater.
- b. Biodegradable plastics do not decompose in either seawater or freshwater.
- c. Biodegradable plastics decompose faster in freshwater due to lower salinity.
- d. Biodegradable plastics decompose faster in seawater due to higher microbial activity.
25. In a coastal city, citizens are concerned about the decreasing number of mangrove forests. What role do mangrove forests play in protecting marine ecosystems, and how can their depletion harm marine life?
- a. Mangroves prevent erosion and provide habitats; their depletion can lead to loss of breeding grounds for fish and increased coastal erosion
- b. Mangroves absorb excess nutrients; their depletion can lead to overgrowth of marine plants and decreased oxygen levels in water
- c. Mangroves reduce ocean acidity; their depletion can lead to coral bleaching and loss of biodiversity
- d. Mangroves filter pollutants; their depletion has no significant impact on marine life
26. Imagine you are a marine biologist. In your research, you find that various marine species, including fish and shellfish, ingest microplastics present in their habitat. Additionally, you observe that these microplastics can absorb toxins from the surrounding environment. Based on your findings, what can be concluded about the impact of microplastics on marine organisms and why is it a concern for human health?
- a. Microplastics provide nutrition for marine organisms but do not impact human health
- b. Microplastics enhance the growth of beneficial algae, supporting fisheries
- c. Marine organisms absorb toxins from microplastics, which enter the human food chain when humans consume seafood
- d. Microplastics dissolve harmlessly in the digestive systems of marine organisms, posing no threat to human health
27. Farmers in a particular region have been facing challenges due to soil erosion. Which practical method would be most effective in preventing soil erosion in their agricultural fields?

- a. Planting cover crops and contour ploughing
- b. Increasing the use of chemical fertilisers
- c. Deep ploughing to loosen the soil
- d. Planting weeds on the fields

**28.** During a study a significant increase in the population of carnivores, such as wolves and cougars, in the forest was observed. During the same period, a shift in the plant community, with various plant species thriving was noted.

Based on these observations, how might the increase in the population of carnivores impact the biodiversity in the forest ecosystem?

- a. A decrease in plant diversity due to reduced herbivore population.
- b. A decrease in biodiversity as carnivores directly compete with herbivores for resources.
- c. An increase in invasive plant species due to reduced herbivore pressure.
- d. An increase in biodiversity by controlling herbivore populations and promoting the survival of various plant species.

**29.** You are an environmental consultant hired to assess the impact of a proposed housing development on a nearby forested area. What should be your primary concern when evaluating the potential consequences of this development?

- a. The economic benefits the housing development could bring to the local community.
- b. The availability of utilities and infrastructure for the housing development.
- c. Analysing the potential loss of habitat and ecosystem services.
- d. Identifying ways to expand the forested area to accommodate the development.

**30.** A group of students is conducting a field study in a forest ecosystem to understand the impact of human activities.

What type of data collected by the students would provide insights into the overall health and biodiversity of the forest ecosystem?

- a. Data on the number of humans observed in the forest.
- b. Data on tree diversity, soil quality, and wildlife presence.
- c. Data on the average temperature and rainfall in the forest.
- d. Data on the economic value of the forest resources.

**31.** In a tropical rainforest, a team of ecologists, conducts a comprehensive study of the ecosystem. During their research, they observe a group of large fruit-eating bats that mainly feed on fruits of a specific tree species. When these bats feed on the fruits, they disperse seeds across the forest floor, leading to the growth of new trees.

Based on their observations, why are these fruit-eating bats considered keystone species in this rainforest ecosystem?

- a. They are the largest species in an ecosystem
- b. They have a disproportionately large impact on their ecosystem
- c. They have the highest reproductive rates
- d. They are the most abundant species in an ecosystem



- 32.** A national park is experiencing an overpopulation of herbivores, leading to overgrazing and degradation of native plant species.  
Which approach would be most effective in managing the overpopulation of herbivores and restoring the balance in the ecosystem?
- Introducing predators to control the herbivore population.
  - Conducting controlled burns to promote the growth of new plants.
  - Importing more herbivores to create competition for resources.
  - Installing fences to separate herbivores from sensitive areas.
- 33.** In an experiment, researchers compare the environmental impact of two vegetable farming methods. Which data would be most relevant to assess their sustainability?
- The total weight of vegetables produced by both methods.
  - The amount of synthetic pesticides used in each method.
  - The biodiversity of insects and animals observed in the fields.
  - The carbon footprint and water usage associated with each farming method.
- 34.** An individual is looking to make eco-friendly seafood choices at a grocery store. What practical guidance can you provide for this?
- Choose seafood labelled as "organic" for the most environmentally friendly option.
  - Select seafood certified by reputable organisations indicating sustainable and responsible sourcing.
  - Prefer seafood with the highest price, assuming it indicates higher quality and eco-friendliness.
  - Opt for seafood labelled as "wild-caught" without considering specific certifications for sustainability.

**Direction for questions 35 to 37:**

Consider the case study given below and answer the following question:

**Case Study: Clean Water Access in Rural Communities**

In a remote village, residents lacked access to clean water and proper sanitation facilities. With the help of a local NGO, a community-driven initiative was launched. Clean water sources were identified, and a water treatment plant was constructed. Additionally, awareness programs were conducted to educate the villagers about water purification methods and the importance of personal hygiene. Over time, the incidence of waterborne diseases decreased, demonstrating the transformative power of clean water and sanitation.

- 35.** A few years after the clean water initiative, the incidence of waterborne diseases starts to rise again. What proactive measures could the community take to investigate the cause and address the situation effectively?
- Conducting regular water quality tests and analysing the results
  - Shutting down the water treatment plant
  - Ignoring the issue, assuming it's temporary
  - Increasing the dosage of water purification chemicals without testing

36. If you were a project manager for this initiative, which of the following factors would you consider when selecting an appropriate water source for the community?
- A. Proximity to the village
  - B. Economic impact on local businesses
  - C. Availability of funding
  - D. Water quality
- a. A and D only
  - b. B, C and D only
  - c. A, C and D only
  - d. A, B, C and D
37. Based upon your understanding of waterborne diseases, which of the following were most likely prevalent in the remote village before the implementation of the clean water initiative?
- a. Malaria and dengue fever
  - b. Typhoid fever and tuberculosis
  - c. Cholera and dysentery
  - d. Influenza and common cold

**Direction for questions 38 to 40:**

Consider the case study given below and answer the following question:

Case Study: Climate Change and Food Security in a Vulnerable Region

Background:

In a coastal region known for its agriculture and seafood industry, climate change has become a significant concern. Rising sea levels, increasing temperatures, and erratic rainfall patterns are impacting food security. The community heavily relies on both crops and fish as primary food sources.

Over the past decade, the region has experienced the following changes:

- Rising Sea Levels
- Erratic Rainfall Patterns
- Ocean Warming
- Increased Storm Events

The local community is actively seeking solutions to adapt to these changes while maintaining food security and livelihoods.

38. Considering the rising sea levels in the coastal region, what is a potential consequence for the agriculture sector if no adaptation measures are taken?
- a. Decreased soil fertility due to salinisation
  - b. Increased crop yields due to more water availability
  - c. Enhanced growth of salt-tolerant crops
  - d. Expansion of agricultural land due to floods
39. Local farmers are considering switching to drought-resistant genetically modified (GM) crops to combat the effects of erratic rainfall. What ethical concern might arise from this choice?

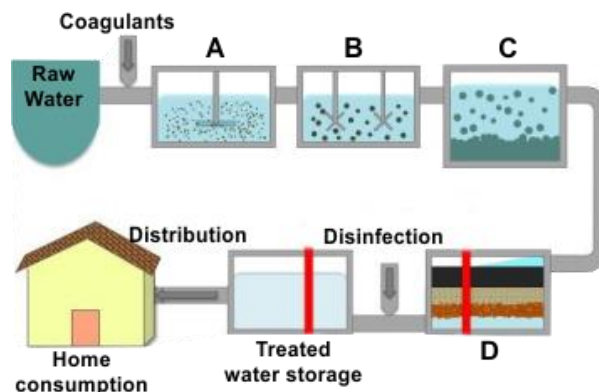
- a. Increased agricultural productivity and reduced water usage.
- b. Enhanced resilience against changing climate patterns.
- c. Dependence on GM seed providers and loss of traditional crop varieties.
- d. Promotion of sustainable farming practices.

40. The community is exploring aquaponics—a system combining fish farming and hydroponic crop cultivation. How might aquaponics address both disrupted fish populations and saltwater intrusion?

- a. By utilising saltwater-resistant fish species, mitigating the effects of saltwater intrusion.
- b. By recycling water between fish tanks and crops, reducing water usage and addressing disrupted fish populations.
- c. By introducing predatory fish species to control unwanted marine life and protect farmlands.
- d. By using specialised crops that can grow in saline conditions, ensuring food security.

## Green Challenger (Each Question is 6 Marks)

41. Study the schematic diagram of a water treatment process provided below. Based on your understanding of water treatment, accurately identify the steps labelled A, B, C, and D.



- a. A: Coagulation, B: Flocculation, C: Sedimentation, D: Filtration
- b. A: Coagulation, B: Filtration, C: Sedimentation, D: Flocculation
- c. A: Sedimentation, B: Flocculation, C: Coagulation, D: Filtration
- d. A: Coagulation, B: Sedimentation, C: Filtration, D: Flocculation

42. In a scientific experiment, four water samples collected from different sources undergo testing for pH, bacteria levels, and oxygen levels. Analysing the provided table, which water source appears most likely to be contaminated or polluted?

Water Source	pH Level	Bacteria Level	Oxygen Level
Source A	7.5	Low	9 mg/L
Source B	6.8	Moderate	10 mg/L
Source C	6.5	High	20 mg/L
Source D	7.1	Low	8 mg/L

- a. Source A
- b. Source B
- c. Source C
- d. Source D

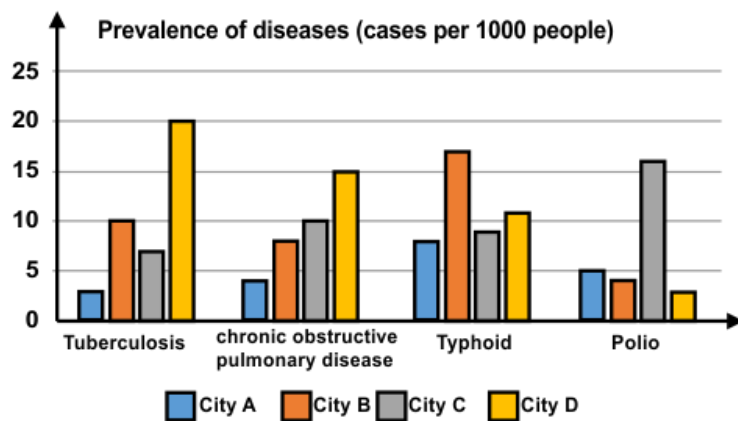
43. Suppose you are conducting a data analysis to identify a significant advantage of offshore wind farms compared to onshore wind farms. Below is a sample data table containing relevant information for both types of wind farms. Based on your understanding, which of the following options is most accurate?

Wind Farm Type	Average Annual Electricity Output (MWh)	Average Maintenance Costs (USD)	Turbine Efficiency (%)
Offshore	1,20,000	5,00,000	45
Onshore	85,000	3,50,000	38

- a. Offshore wind farms have lower energy generation potential due to the wind patterns over the ocean.
- b. Offshore wind farms face fewer space constraints and can harness stronger, more consistent winds.
- c. Onshore wind farms are more expensive to build and maintain.
- d. Onshore wind farms can impact marine ecosystems, including wildlife and fisheries.

44. Study the graph showing the prevalence of different types of diseases in Cities A, B, C, and D. Based on your interpretation, which of the following statement(s) is/are most likely to be true?

- A. City A might have substantial green spaces, mitigating pollution effects.
- B. City B and C with the lowest number of respiratory diseases might have a robust public transportation system, reducing vehicular emissions.
- C. City D most likely has a coal power plant near it, contributing to the high prevalence of respiratory problems.



- a. A only
- b. A and B only
- c. A and C only
- d. A, B and C

45. A recycling facility is testing the efficiency of its sorting machinery. They run a set of recyclable materials through different sorting machines and compare their ability to separate different types of recyclables.

What is the primary purpose of the recycling facility's experiment?

- A. To discourage recycling in the community
- B. To evaluate the cost-effectiveness of the sorting machinery
- C. To assess the environmental impact of recycling
- D. To determine the efficiency of different sorting machines.

- a. A only
- b. B only
- c. D only
- d. A, B and D

46. Chris is a senior student working on an environmental club project. He collects empty plastic bottles from his schoolmates and places them in the recycling bin. The club is organising a weekly recycling pickup to ensure the materials are processed correctly.

What action is Chris taking to promote waste reduction through recycling?

- A. Throwing plastic bottles in the trash
- B. Increasing plastic bottle production
- C. Placing plastic bottles in the recycling bin and organising regular pickups
- D. Encouraging the disposal of plastic bottles in public spaces

- a. A only
- b. C only
- c. A and B only
- d. A, B and C

47. Arya's experiment shows that the carbon dioxide concentration in the air is higher in the deforested area than in the forest.

What does this suggest about the impact of deforestation on the carbon cycle?

- A. Deforestation releases carbon dioxide into the atmosphere.
- B. Deforestation reduces the amount of carbon dioxide that is absorbed by plants.
- C. Deforestation contributes to climate change.

- a. A only
- b. B only
- c. B and C only
- d. A, B and C

48. Researchers conducted an experiment to study the impact of ocean acidification on marine life. They recorded the growth of coral reefs under different pH levels. The results are shown in the table below. What can be concluded from the data?

pH Level	Coral Reef Growth (cm/year)
7.8	2.5
8	3
8.2	3.5
8.4	4

- a. Coral reef growth increases with higher concentrations of  $H^+$  ions.
- b. Coral reef growth increases with higher concentrations of  $OH^-$  ions.
- c. Coral reef growth is highest at a balanced concentration of  $H^+$  and  $OH^-$  ions.
- d. There is no correlation between the concentrations of  $H^+$  and  $OH^-$  ions and coral reef growth.

- 49.** You are a wildlife conservationist working in a tropical rainforest. You observe that an indigenous community living in the forest is engaging in unsustainable hunting practices, leading to a decline in several species. Which of the following practical approaches would be most effective in addressing this issue?
- A. Relocating the indigenous community to a different area
  - B. Providing the community with alternative sources of income and food
  - C. Establish protected areas or wildlife reserves where hunting is prohibited
  - D. Introduce non-native species in the forest for hunting
- a. A and B only
  - b. A, B and C only
  - c. B and C only
  - d. A, B, C and D
- 50.** Consider the following statements and choose the correct option:
1. Rising global temperatures can lead to shifts in agricultural zones, impacting the types of crops that can be grown in certain regions.
  2. Local food choices often support regional farmers, reducing the environmental impact of transportation.
  3. Sustainable farming practices, such as organic and local farming, increase the carbon footprint associated with food production.
  4. Genetically Modified Organisms (GMOs) always lead to higher yields and reduced environmental impact.
- a. Statements 1 and 2 are correct but statements 3 and 4 are incorrect.
  - b. Statements 1 and 2 are incorrect but statements 3 and 4 are correct.
  - c. Statements 2 and 4 are incorrect but statements 1 and 3 are correct.
  - d. Statements 1 and 3 are incorrect but statements 2 and 4 are correct.

## Answer Key

1.	a	2.	d	3.	d	4.	b	5.	a	6.	b	7.	d
8.	d	9.	a	10.	c	11.	d	12.	a	13.	c	14.	c
15.	b	16.	b	17.	b	18.	d	19.	d	20.	c	21.	d
22.	b	23.	a	24.	d	25.	a	26.	c	27.	a	28.	d
29.	c	30.	b	31.	b	32.	a	33.	d	34.	b	35.	a
36.	c	37.	c	38.	a	39.	c	40.	b	41.	a	42.	c
43.	b	44.	c	45.	c	46.	b	47.	d	48.	b	49.	c
50.	a												