

Our Environment

Answer the following questions based on the given information.

Hydrogen gas is an excellent fuel. It has a high calorific value and produces only water as the product of combustion. It is considered to be a potentially important, non-polluting energy source of the future.

Hydrogen is labelled with different 'colours' based on the method by which it is produced, as given below:

- green hydrogen: manufacturing process does not produce carbon dioxide
- blue hydrogen: manufacturing process produces carbon dioxide but it is separated and stored
- grey hydrogen: manufacturing process produces carbon dioxide which is released into the air

Q: 1 Hydrogen is labelled 'brown' if the manufacturing process releases both carbon dioxide and carbon monoxide to the air.

In what way is the manufacturing process of brown hydrogen WORSE than that of grey hydrogen for the environment?

- 1** It releases into the atmosphere a gas that directly causes a greenhouse effect.
- 2** It releases into the atmosphere carbon which was stored for millions of years.
- 3** It releases into the atmosphere a gas that is toxic to human beings.
- 4** It releases into the atmosphere gases that cause acid rain.

Q: 2 What is the ratio of average amount of energy absorbed by producers to the average amount of energy absorbed by the primary consumers?

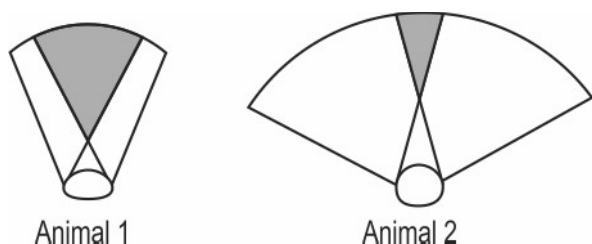
- 1** 1:2
- 2** 2:1
- 3** 1:10
- 4** 10:1

Q: 3 Which of the following describes the flow of energy and nutrients, respectively, through the ecosystem?

- 1** bidirectional and cyclic
- 2** unidirectional and cyclic
- 3** cyclic and bidirectional
- 4** cyclic and unidirectional

Answer the two following questions based on the information given below.

Shown here is the extent to which two different animals can see in either direction without turning their heads. In animal 1, the eyes are placed towards the front of the head and in animal 2, the eyes are placed on either side of the head.



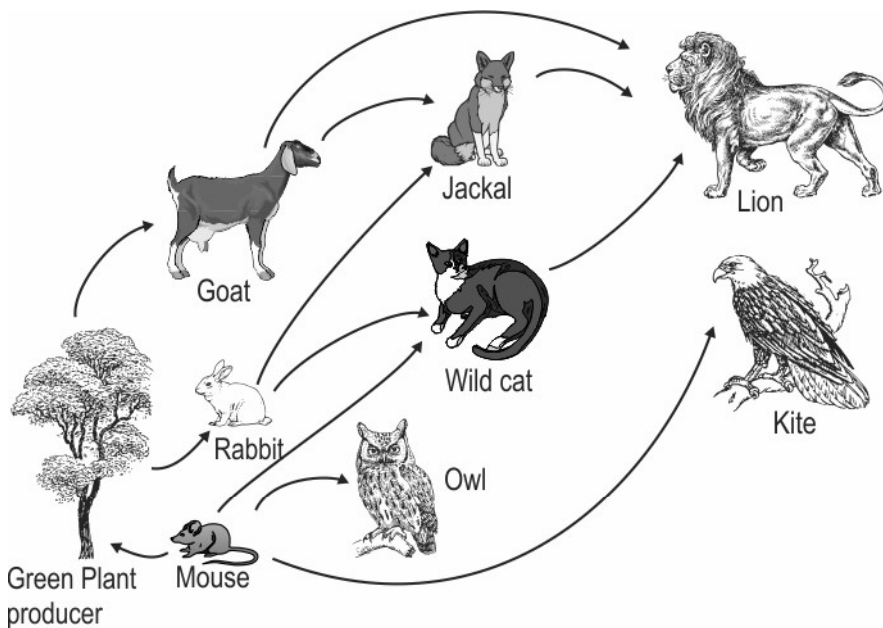
Since the placement of eyes in the two animals is different, their vision is also slightly different.

In the figures above, the grey part represents the parts that can be seen by both eyes at a time, whereas the white parts represent those parts that can be seen only by one eye at a time.

Animal 2 can see a broader area at any time compared to animal 1. Animal 1 can distinguish depths better compared to animal 2.

Q: 4 Based on this, which of the two animals is most likely to be a predator and why? [2]

Q: 5 Observe the following food web. Classify the animals into two groups - one that would need to have vision as Animal 1 and another as Animal 2 in the diagram above. [1]



Q: 6 [1]

bone	metal can	paper sheet	plastic bottle
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Arrange the four objects given above according to the time they take to get biodegraded (LEAST time TO MOST time).

Q: 7 Answer the following questions about transfer of materials in the ecosystem. [3]

(a) Mention TWO ways by which energy is lost from the trophic levels in the ecosystem.

(b) A lot of harmful chemicals enter our body through different sources like food. Since human beings are at the top of the food chain/ trophic structure, maximum concentration of such chemicals is found in human beings. What is this phenomenon known as?

Q: 8 The stratosphere is very dry and rarely allows clouds to form. In the extreme cold of the polar winter, however, stratospheric clouds of different types may form. These clouds are called Polar Stratospheric Clouds (PSCs). **[5]**

Scientists recently discovered that polar stratospheric clouds, long known to play an important role in Antarctic ozone destruction, are occurring with increasing frequency in the Arctic. These high-altitude clouds form only at very low temperatures help destroy ozone in two ways: (1) They provide a surface which converts benign forms of chlorine into reactive, ozone-destroying forms, and (2) they remove nitrogen compounds that moderate the destructive impact of chlorine. In recent years, the atmosphere above the Arctic has been colder than usual, and polar stratospheric clouds have lasted into the spring. As a result, ozone levels have been decreasing.

(Information credit: NASA)

- (a) How is ozone formed in the outer atmosphere?
- (b) Ozone is being continuously destroyed due to extreme low temperatures. However, ozone formation is also a continuous process. Why is there a depletion in the ozone layer still?
- (c) What can be a positive effect of global warming on the depletion of the ozone layer?
- (d) How does ozone layer depletion impact human health?

Q: 9 Lions have no known natural predators. **[1]**

Based on energy transfer in a food chain, what could be the most likely reason for the above statement?



The table below gives the correct answer for each multiple-choice question in this test.

Q.No	Correct Answers
1	3
2	4
3	2



Q.No	Teacher should award marks if students have done the following:	Marks
4	Animal identified correctly as Animal 1.	1
	Reason shared correctly: Animal 1, because it will be able to judge the distance and the movement of the prey accurately.	1
5	Animal 1: lion, jackal, kite, wild cat and owl Animal 2: mouse, goat, rabbit	1
6	paper sheet, bone, metal can, plastic bottle	1
7	(a) 1 mark for each correct answer such as: - as heat - in maintaining life processes - utilised in growth and storage	2
	(b) biological magnification or biomagnification	1
8	(a) 1 mark for each correct step of the process: - The higher energy UV radiations in the higher levels of atmosphere split apart some molecular oxygen (O_2) into free oxygen (O) atoms. - These atoms then combine with the molecular oxygen to form ozone.	2
	(b) because the rate of destruction is higher than the rate of formation	1
	(c) Rise in polar temperature might restrict the formation of PSCs and reduce the depletion of the ozone layer.	1
	(d) Removal of ozone layer allows harmful UV radiations to enter and cause diseases like skin cancer.	1
9	Lions generally occur at the tertiary or quaternary levels in a food chain and energy available after that trophic level is not sufficient for sustenance.	1

