
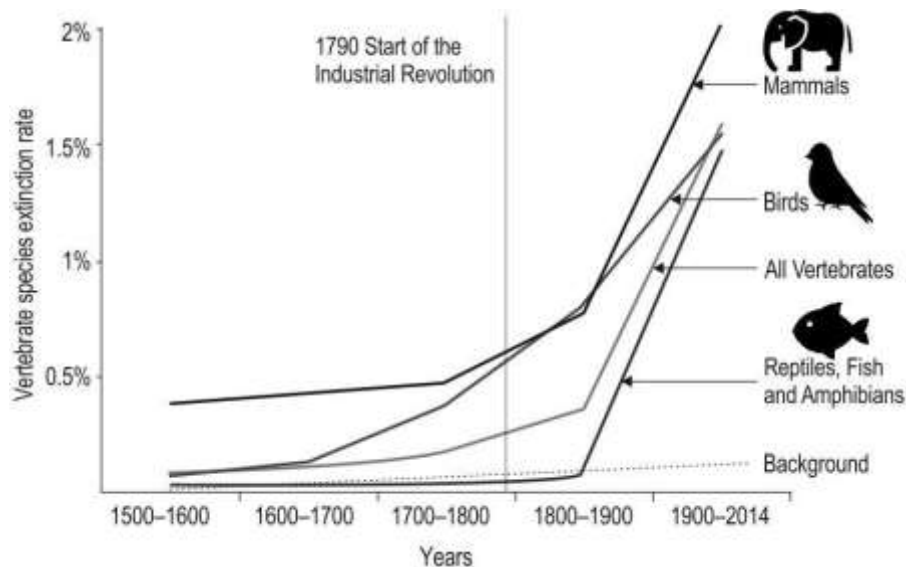


## 19. NATURAL RESOURCES

Q.No	Question	Marks
<b>Multiple Choice Question</b>		
Q.161	<p>Here is a solar light installed on the roof of a house in New Delhi (latitude of <math>28.70^{\circ}</math> N and longitude of <math>77.10^{\circ}</math> E)</p>  <p>Towards which direction is the solar panel likely to be tilted for maximum conversion of solar energy to electricity in a day?</p> <p>A. North B. South C. East D. West</p>	1
Q.162	<p>The graph below shows the extinction rates of different vertebrate species from the year 1500- 2014.</p> <p><i>(Note: The extinction rate is the percentage of species that would go extinct over a period of time.)</i></p>	1



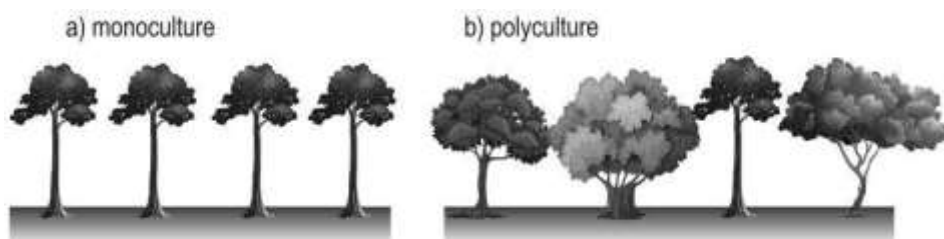
Based on the graph, which of the following is TRUE?

- A. Species flourished before the industrial revolution.
- B. Most species were extinct between the year 1500 to 1600
- C. There was an increase in the number of species between the years 1800 to 2014
- D. Reptiles, fish and amphibians are always fewer in number as compared to other vertebrates.

Q.163

Here is a schematic diagram of trees growing in monoculture (trees of the same species growing together) and polyculture (trees of different species growing together).

1

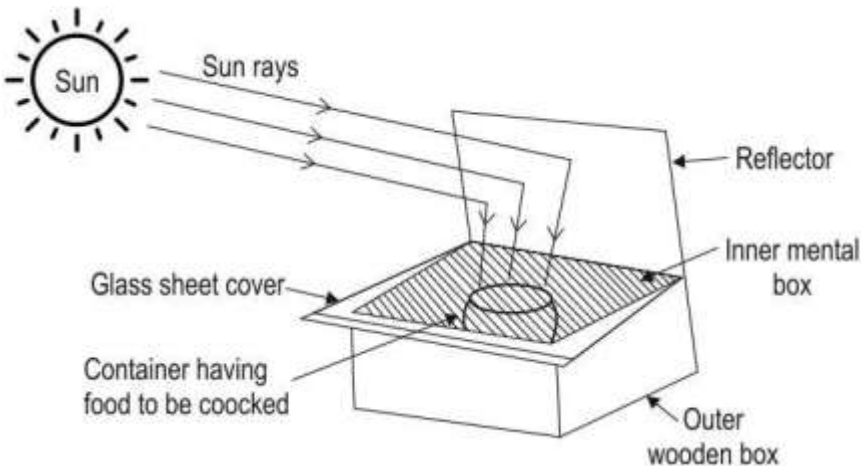


In monoculture, the trees have a uniform canopy while in polyculture the trees have a species-specific canopy.

But now the forest areas are cleared to grow a single type of crop such as teak year after year for the production of teakwood.

What can such a type of practice do?

- A. Reduce global warming
- B. Promote biodiversity
- C. Amplify global warming
- D. Impede biodiversity

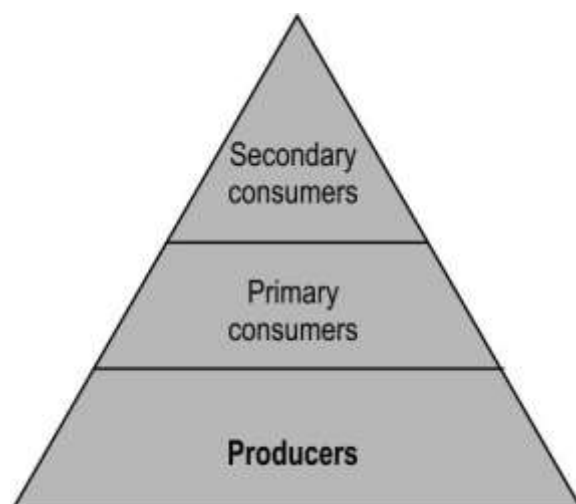
Q.164	<p>Shown below is a labelled diagram of a solar cooker.</p>  <p>Which is MOST likely the correct reason for covering the solar cooker with a thick glass sheet?</p> <p>A. To reflect sunlight better  B. To reflect harmful uv rays  C. To prevent heat from escaping  D. To prevent the absorption of heat</p>	1
Q.165	<p>Compostable plastics are biodegradable in conditions conducive to composting. Other biodegradable plastics degrade when buried in the soil (in landfills or anaerobic digestors).</p> <p>Which of the following statements is likely to be true?</p> <p>P) Compostable is always biodegradable.  Q) Biodegradable is not always compostable.</p> <p>A. Only P  B. Only Q  C. Both P and Q  D. Neither P nor Q</p>	1
Q.166	<p>Diclofenac is a drug that is administered to cattle that undergoes the process of biological magnification.</p> <p>Which of the following is likely to have the highest amount of the drug in it?</p> <p>A. Cheetah  B. Vultures  C. Goats  D. Foxes</p>	1

### Free response question/Subjective Question

Q.167

The diagram below represents a pyramid of numbers for a food chain.

3



(a) Why do successive trophic levels in this taper as we move from bottom to top?

(b) What is the average proportion of energy expected to be transferred from one trophic level to the next?

(c) Cite an example of an inverted pyramid of numbers.

Q.168

On an overnight train journey Varun found tea being served in various kinds of cups as shown below:

2



**Earthen cup**



**Plastic cup**

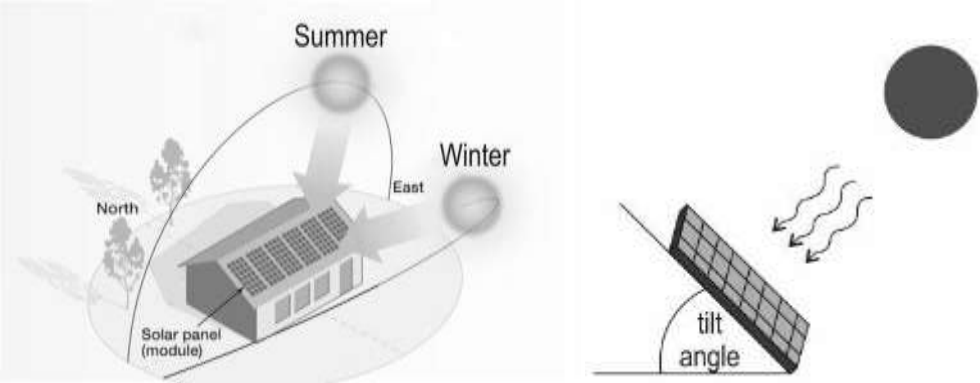


**Paper cup**



**Ceramic cups**

(a) Which kind of tea cup is most harmful for the environment and why?

	(b) Which one of the tea cups is made from the most environment friendly material and why?	
Q.169	<p>The 10% law of energy transfer between trophic levels talks of only 10% of the energy being transferred from one trophic level to the next.</p> <p>In what form is this energy transferred from one trophic level to the next?</p>	1
Q.170	<p>Solar cell panels are used to generate electricity using solar energy. The energy output of the solar cells is maximum when sunlight falls perpendicular to the solar panels.</p> <p>Given below is a schematic diagram of a setup of solar panels on a roof and a diagram showing the tilt angle.</p>  <p>(a) In which hemisphere is this setup likely to be located?</p> <p>(b) If the setup is located closer to the equator, how would the tilt angle change?</p>	2
Q.171	<p>Ritu bought two sets of single-use disposable cups. One of them is made of Styrofoam (thermocool), which is obtained from petroleum products. The other one is made of sugarcane waste.</p> <p>Which of them is likely to remain in the environment or landfill longer? Why?</p>	1
Q.172	<p>India has adopted Bharat Stage (BS) Emission Standards since 2000, modelled on Euro norms. The Bharat Stage emission standards regulate tailpipe emissions of air pollutants including particulate matter (PM), oxides of Nitrogen (NO<sub>x</sub>) as well as carbon monoxide (CO), and hydrocarbons (HC).</p> <p>Bharat stage standard III (BS III) was introduced in the year 2010, and Bharat stage standard IV (BS IV) was introduced in the year 2017.</p> <p>Here is a comparison of petrol and diesel emission norms.</p>	4

**PETROL EMISSION NORMS**

Norm	CO	HC	NOX	HC+NOX	PM
BS-III	2.30	0.20	0.15	–	–
BS-IV	1.00	0.10	0.08	–	–
Euro-VI	1.00	0.10	0.06	–	0.005

**DIESEL EMISSION NORMS**

Norm	CO	HC	NOX	HC+NOX	PM
BS-III	0.64	–	0.50	0.56	0.05
BS-IV	0.50	–	0.25	0.30	0.005
Euro-VI	0.50	–	0.06	0.17	0.005

All figures in g/km Source: Indian Emissions Regulations/ARAI

(a) How can the use of fuel non-compliant with emission standards contribute to global warming and toxicity to the environment?

(b) Can a diesel vehicle purchased in the year 2014, with an engine that has passed BS III be used in the year 2020? Justify

(c) Petrol cars fitted with particulate filters are among the cleanest cars. How does this satisfy the petrol emission norm?

Q.173

An image of a water reservoir belonging to the Dholavira civilization (3000 BCE to 1700 BCE) is given below.



(a) How would this water reservoir system have helped in water conservation?

(b) Give two examples of how water stored in the ground can help to reduce water pollution.

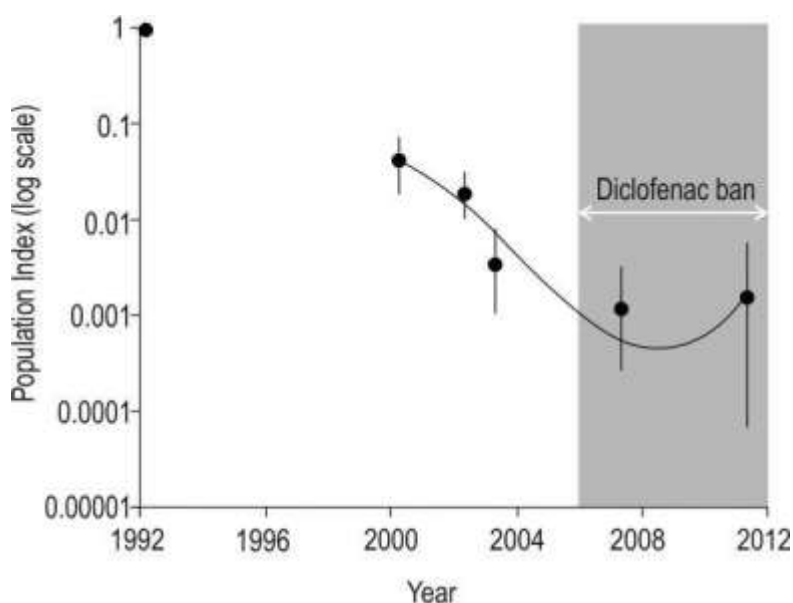
3

Q.174

The drug Diclofenac was administered to the cattle as an anti-inflammatory drug to ease pain and aches. When these animals died, the carcasses of dead cattle that were administered the drug were disposed off in the wastelands.

The graph given below gives information on the effect of the drug Diclofenac on the population of vultures.

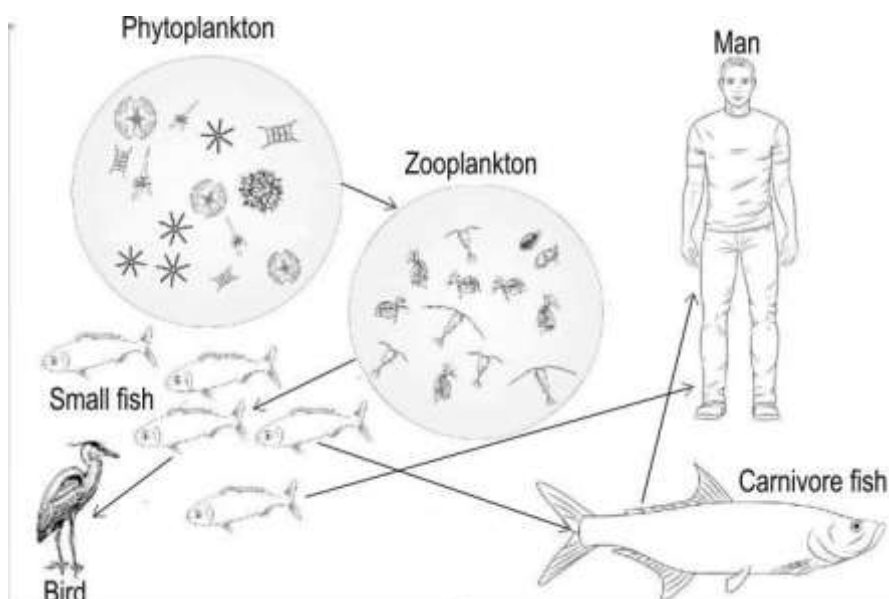
2



- (a) How did the usage of such drugs impact the population of vultures?
- (b) What could be the effect on the vultures after the ban of the drug Diclofenac?

Q.175 A food web consists of many interrelated food chains. It represents the feeding relationship between many food chains. An aquatic food web is represented in the image given below.

2



Consider that a dam is constructed across the river where this aquatic food web exists. The small fishes in the river generally travel upstream to lay eggs which was not possible after the construction of the dam.

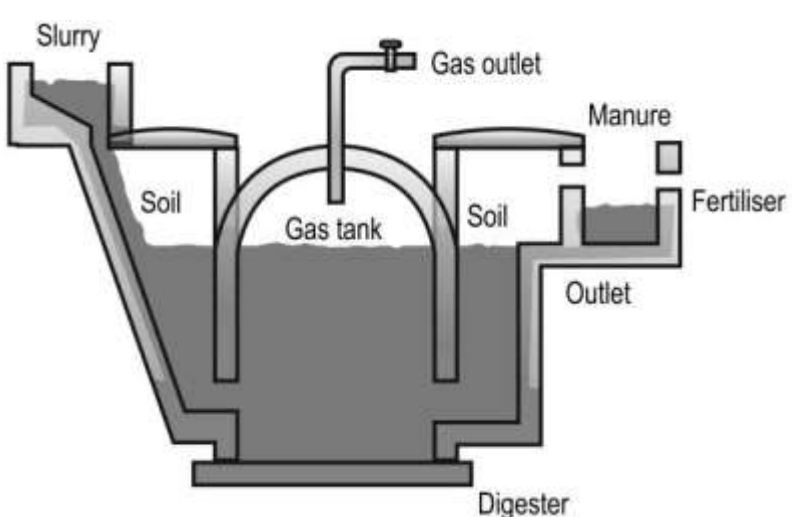
The population of which organism is MOST likely to increase due to the construction of the dam? Justify.

Q.176 Ratan stays in New Delhi, which is at a latitude of  $28^{\circ}$  N. He wants to design a house such that maximum sunshine is obtained throughout the day.

2

	<p>What direction should his windows face for maximum availability of sunlight during the daytime?</p> <p>Justify your answer.</p>											
Q.177	<p>Both biogas and coal are fuels that can be used for energy production.</p> <p>Write one advantage that biogas has over coal.</p>	1										
Q.178	<p>In a solar furnace, the temperature at the focal point may reach 3,500 °C (6,330 °F), and this heat can be used to generate electricity, melt steel and so on.</p> <p>(a) Which commonly used solar equipment works on a similar principle as that of the solar furnace?</p> <p>(b) Describe two features of the equipment mentioned in answer (a) that enable it to gather and trap heat.</p> <p>(c) Which of the places are best suited to use solar furnaces to generate electricity?</p>	4										
Q.179	<p>Most of the plastic articles that we use in our daily life are made from chemicals obtained from petroleum. After use, most of this plastic ends up as waste in landfills or the oceans. Nowadays, many products are made of plastic obtained from natural, plant-based products such as corn starch.</p> <p>What is likely to be the main difference between these two types of plastics?</p>	1										
Q.180	<p>Straws made from palm leaves are organic. These single-use drinking straws are made of dried leaves that naturally fall to the ground.</p> <p>Paper straws are made of food-grade paper and water-based adhesive or glue. Both paper straws and palm leaf straws are biodegradable.</p> <p>(a) State an advantage of palm leaf straws over paper straws.</p> <p>(b) Why can single-use palm straws be recycled again?</p>	2										
Q.181	<p>Tina is trying to make responsible choices by following the 5R's of waste management.</p> <p>She has categorised her activities in the table given below.</p> <table><tr><th></th><th>Activity</th></tr><tr><td>Reduce</td><td>use public transport</td></tr><tr><td>Reuse</td><td>discoloured water bottle used to keep water in the refrigerator</td></tr><tr><td>Recycle</td><td>a broken cup used as a planter</td></tr><tr><td>Repurpose</td><td>old tyres made into stools</td></tr></table>		Activity	Reduce	use public transport	Reuse	discoloured water bottle used to keep water in the refrigerator	Recycle	a broken cup used as a planter	Repurpose	old tyres made into stools	3
	Activity											
Reduce	use public transport											
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	<p><b>Refuse</b>      carry steel straw to drink tender coconut or juice outside</p>	
	Which of the activities is placed under the wrong heading? Where should it be placed and Why?	
Q.182	<p>Forests and sanctuaries are usually rich in biodiversity and are biodiversity hotspots.</p> <p>Can man-made lakes be considered biodiversity hotspots? Justify the statement.</p>	1
Q.183	<p>In a national park, domestic animals from the nearby villages were sent to graze regularly. Over a period of time, the population of big cats or carnivores in the national park were found to decline.</p> <p>What is likely to have led to a decrease in the number of big cats in this national park?</p>	2
Q.184	<p>Small ponds, created by building check dams across streams, dry up a few months after the rainy season. This is due to loss of water by evaporation and by seepage into the soil.</p> <p>Loss of water by which of these methods could actually be beneficial to farmers in the dry season? Justify your answer.</p>	2
Q.185	Nuclear power plants are typically constructed away from densely populated urban areas. Mention any TWO reasons why.	2
Q.186	<p>Here's a schematic diagram of a biogas plant.</p>  <p>(a) What is the main product obtained at the end of the process of digestion?</p> <p>(b) State one modification that can be made in the biogas plant which will prevent the generation of the major product identified in (a). Justify your answer.</p>	2

Q.187	<p>(a) Even though nuclear energy doesn't produce excess greenhouse gases like other sources of energy, it is not considered a clean form of energy. Justify the statement.</p> <p>(b) In TWO points explain how nuclear reactions help in the production of energy in nuclear reactors.</p>	3
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## Answer Key and Marking Scheme

Q.No	Answers	Marks
Q.161	B. South	1
Q.162	A. Species flourished before the industrial revolution.	1
Q.163	D. Impede biodiversity	1
Q.164	C. To prevent heat from escaping	1
Q.165	C. Both P and Q	1
Q.166	B. Vultures	1
Q.167	<p>(a) because the number of organisms in each level keeps reducing at successive trophic levels</p> <p>(b) 10%</p> <p>(c) 1 mark any correct answer such as:</p> <ul style="list-style-type: none"> <li>- an ecosystem with parasites</li> <li>- an ecosystem of saprophytes</li> </ul> <p>[Accept any other valid answer]</p>	3
Q.168	<p>(a) 0.5 marks each for name and reason:</p> <ul style="list-style-type: none"> <li>- plastic</li> <li>- because plastic is non-biodegradable</li> </ul> <p>(b) 0.5 marks each for name and reason:</p> <ul style="list-style-type: none"> <li>- earthen cups</li> <li>- because they are made from naturally occurring material</li> </ul>	2
Q.169	chemical energy	1
Q.170	<p>(a) This setup is likely to be located in the Northern Hemisphere.</p> <p>(b) If the setup is located closer to the equator, the tilt angle would decrease.</p>	2
Q.171	(a) 0.5 marks for each of the following:	1

	<ul style="list-style-type: none"> <li>- Styrofoam is likely to remain in the environment or landfill longer.</li> <li>- Styrofoam is not biodegradable.</li> </ul>	
Q.172	<p>(a) 1 mark for each point</p> <ul style="list-style-type: none"> <li>-A non-compliant fuel when burnt releases oxides of sulphur, nitrogen and carbon dioxide in high amounts. All three are greenhouse gases, and high environmental concentration leads to increased global warming.</li> <li>-Besides global warming, oxides of Nitrogen and Sulphur are toxic to the environment by causing acid rain.</li> </ul> <p><i>(accept any other valid answers)</i></p> <p>(b) The vehicle can be used only if it fulfils the BS-IV diesel emission norms.</p> <p>(c) Particulate filter would filter the particulate matter. Cars that have a particulate filter eliminate particulate emissions into the environment.</p>	4
Q.173	<p>(a) Water reservoir system helps in recharging groundwater. As water seeps into the ground, it recharges the wells and other groundwater sources.</p> <p>(b) 1 mark for each point</p> <ul style="list-style-type: none"> <li>- As it is not stagnant open water, there won't be a breeding ground for mosquitoes in the water.</li> <li>- This water will not come in direct contact with human and animal waste.</li> </ul>	3
Q.174	<p>(a) The usage of drugs like Diclofenac impacted the population of vultures as the vultures fed on the carcass of the cattle, the drug administered in the cattle affected the vultures, thus causing their death.</p> <p>(b) The ban on the drug Diclofenac, would possibly increase the population of vultures</p>	2
Q.175	<p>1 mark for each of the following:</p> <ul style="list-style-type: none"> <li>- The population of zooplankton may increase.</li> <li>- If small fish cannot lay eggs, their rate of reproduction will decline over time, leading to lower consumption of zooplankton.</li> </ul> <p><i>[Accept any other valid answer.]</i></p>	2
Q.176	<p>Ratan's house windows should face South.</p> <p>As Delhi is at 28° N latitude, the sun will always be towards the south of Delhi, and the sunlight will enter the windows facing south throughout the day.</p>	2

Q.177	- Biogas is 75% methane, and burns without creating smoke or particulate matter.	1
Q.178	<p>(a) Solar cooker uses a similar principle as that of a solar furnace.</p> <p>(b) 1 Mark for each point:</p> <ul style="list-style-type: none"> <li>- A solar cooker has mirrors that reflect light falling on it to a single focal point.</li> <li>- A solar cooker has blackened inner surfaces in the wooden box of the solar cooker to absorb radiations from the beam of sunlight.</li> </ul> <p>(c) The places that are best suited to use solar furnaces to generate electricity are the ones that receive steady sunlight throughout the year.</p> <p>(accept any other valid answer)</p>	4
Q.179	<p>-The plastic made from chemicals obtained from petroleum will be non-biodegradable. The plastic obtained from natural, plant-based products is biodegradable. [1 mark]</p> <p><b>OR</b></p> <p>Only the plastics obtained from natural products is biodegradable. [1 mark]</p> <p>(Marks to be given for any other valid answer.)</p>	1
Q.180	<p>(a) The palm leaves are easily available and can be used directly in making palm-leaf straws. To make paper straws, the paper needs to be manufactured first which involves the usage of a lot of water and chemicals that lead to pollution.</p> <p>(b) Since palm leaves are made from a natural source, they are biodegradable and can be recycled.</p>	2
Q.181	<p><i>(1 mark for each point)</i></p> <ul style="list-style-type: none"> <li>- A broken cup used as a planter is misplaced under the recycle column.</li> <li>- This has to be placed under the repurpose column.</li> <li>-It is a new product, but it is not melted/remoulded, it is just used for a different purpose.</li> </ul>	3
Q.182	<p>- Yes.</p> <p>- The man-made lakes have an ecosystem with many species of animals and plants in them. The range of different life forms represents a biodiversity hotspot.</p>	1

	<i>(No marks are to be awarded without justification)</i>	
Q.183	<p>1 mark for each of the following:</p> <ul style="list-style-type: none"> <li>- Due to cattle grazing in the national park, the other wild herbivores would not get sufficient food/plants to graze on, which is likely to cause a decline in their population.</li> <li>- A decline in the herbivore population directly impacts the population of big cats or carnivores.</li> </ul>	2
Q.184	<ul style="list-style-type: none"> <li>- Seepage of water into the soil could be beneficial in the dry season. [1 mark]</li> <li>- Seepage of water into the soil recharges the ground water which can be used in the dry months. [1 mark]</li> </ul>	2
Q.185	<p><i>[1 mark each for any two of the following points]</i></p> <ul style="list-style-type: none"> <li>- Minimizes the risk of radiation exposure in densely populated areas.</li> <li>- Facilitates more efficient evacuation plans in case of emergencies.</li> <li>- Mitigates noise disturbances to nearby residents.</li> <li>- Nuclear plants require extensive land building facilities and safety buffers.</li> </ul> <p><i>[Accept any other valid answer]</i></p>	2
Q.186	<p>(a) Methane is the main product obtained at the end of the process of digestion.</p> <p>(b)</p> <ul style="list-style-type: none"> <li>- Modification: Adding an inlet of air into the digester will prevent the generation of methane. <i>[0.5 marks]</i></li> <li>- Justification: Methane is produced by anaerobic bacteria in the absence of air, so adding an inlet of air will allow air to enter, thus, eliminating the anaerobic condition inside the digester. <i>[1 mark]</i></li> </ul>	2
Q.187	<p>(a) Nuclear energy produced does not pollute with greenhouse gases like other sources of energy but used/spent fuel continues to release harmful radiations which results in environmental contamination.</p> <p>(b) 1 mark each for the following points:</p> <ul style="list-style-type: none"> <li>- In nuclear fission, the nucleus of a heavy atom such as uranium/plutonium/thorium is bombarded with low-energy neutrons and gets split into lighter nuclei.</li> </ul>	3

	- An enormous amount of energy is released during the process which is used in the production of steam and the generation of electricity.	
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