Natural Resources

This set of questions contains all the possible concepts which could be asked in the examination

Q.1 What are the main resources on the Earth ?

The main resources on the Earth are the land, the water and the air.

Q.2 Describe the 4 spheres of the earth?

The area near the surface of the earth can be divided up into four inter-connected "geo-spheres:" the lithosphere, hydrosphere, biosphere, and atmosphere.

The names of the four spheres are derived from the Greek words for stone (litho), air (atmo), water (hydro), and life (bio).

(i) ***Lithosphere:*** The solid, rocky layer covering the entire outer crust of the Earth is called the lithosphere.

(ii) ***Hydrosphere:*** Hydrosphere is the total amount of water on a planet. The hydrosphere includes water that is on the surface of the planet, underground, and in the air. It includes the oceans, seas, lakes, ponds, rivers and streams. The hydrosphere covers about 75% of the surface of the Earth and is the home for many plants and animals.

(iii) ***Atmosphere:*** The Earth's atmosphere is a thin layer of gases that surrounds the Earth. It composed of 78% nitrogen, 21% oxygen, 0.9% argon, 0.03% carbon dioxide, and trace amounts of other gases. This thin gaseous layer insulates the Earth from extreme temperatures; it keeps heat inside the atmosphere and it also blocks the Earth from much of the Sun's incoming ultraviolet radiation.

(iv) ***Biosphere:*** Biosphere is the life-supporting zone of the Earth where the atmosphere, the hydrosphere and the lithosphere interact and make life possible, is known as the biosphere. The biosphere is composed of all living organisms. Plants, animals, and one-celled organisms are all part of the biosphere.

Q.3 What are the biotic and abiotic components of the biosphere ?

Biotic component are the living organisms of the ecosystem. These are obtained from the biosphere and are capable of reproduction. Examples of biotic factors are animals, birds, plants, fungi, and other similar organisms.

Abiotic factors refer to non-living physical and chemical elements in the ecosystem. Abiotic resources are usually obtained from the lithosphere, atmosphere, and hydrosphere. Examples of abiotic factors are water, air, soil, sunlight, temperature, light, minerals etc.

The Breath of Life : AIR

Q.4 What is the composition of earth's atmosphere?

Air is a mixture of **nitrogen** (78%), **oxygen** (21%), **carbon dioxide** (0.03%), a small amount of carbon monoxide, helium, Argon, hydrogen, other gases and water vapour.

Q.5 In what way is the atmosphere of the earth different from the atmosphere on Venus and Mars?

Mars and Venus have essentially the same types and percentages of gases in their atmosphere. However, they have very different atmospheric densities. On Venus and Mars the major component of atmosphere is carbon dioxide which constitutes up to 95-97% of the atmosphere.

- **Venus** has an extremely dense atmosphere. As the concentration of is more, the surface temperature and atmospheric opacity increases which thereby increases the strength of the greenhouse effect on a planet until its oceans boil away.
- **Mars** has almost no atmosphere; therefore the amount of is not sufficient to supply a warming effect and the surface temperatures of Mars are very low.
- **Mars is much further away from the Sun than is Venus.**

While on earth, carbon dioxide constitutes only a small fraction of the atmospheric gases i.e., it constitutes only 0.03% of atmospheric gases. The main gases on earth are **nitrogen** (78.08%) and **oxygen** (20.95%). Presence of oxygen in high concentration makes it easy to breathe for living organisms.

And this difference in the concentration of oxygen and carbon dioxide differentiates atmosphere on earth from that on Venus and Mars

---

Q.6 What is the role of atmosphere in maintaining temperature of the earth fairly steady?

Our atmosphere behaves like a **green house** that absorbs the radiations that enter inside it and doesn't allow all the radiations to escape from this green house.

During daytime, it absorbs most of the harmful radiations like the ultraviolet rays coming from the sun. Dust particles, water vapour and clouds reflect back excessive heat into the space. This allows only right amount of heat and light to reach the earth the earth. Atmosphere prevents sudden increase in temperature during daytime. Air being a bad conductor of heat, slows down the escape of heat from the surface of the earth into outer space during night time. In this way, the atmosphere keeps the average temperature of the earth fairly constant during daytime and even during the course of the whole year.

Q.7 What is the importance of atmosphere for the existence of life?

Atmosphere is essential for life for several reasons. Some of these reasons are:

(i) Oxygen that is required for the survival of every living organism is present in the atmosphere.

(ii) Atmosphere works as an insulator; it keeps the average temperature of the earth fairly constant during the day and night by preventing escape of heat into outer space.

(iii) Atmosphere also acts as protective blanket for the Earth. It absorbs most of the harmful radiations such as ultraviolet (UV) radiations coming from the Sun. It results in the Earth receiving just the right amount of heat and sun's rays, which helps in the climate control and allows the living organisms to exist.

Q.8 Which of the following is not a part of biotic community?

Algae, Water, Fish, Bacteria?

Water is not a part of biotic community.

Q.9 What causes winds?

An **uneven heating** of the earth's surfaces causes winds. The air above land gets heated faster and being light, it starts rising up. As the air rises, a region of low pressure is created. As a result, the air from the surrounding areas and from the top of the water bodies rushes into this area. The movement of air from one region to another creates wind.

Q.10 During summer, if you go near the lake, you feel relief from the heat. Why?

During summer, the temperature is high. Due to this high temperature, land and water in the lake gets heated. But, since land gets heated faster than water, the air over land would also be heated faster than the air over water bodies. Heated air being light starts rising up. As the air rises, a region of low pressure is created over the land. As a result, the air from the surrounding areas and from the top of the water bodies rushes into this area because air moves from high pressure area towards low pressure area. This wind contains moisture and thus makes us cool and gives us relief.

Q.11 Why does moon have very cold and very hot temperature variations,(eg. From –190°C to 110°C) even though it is at the same distance from the Sun as the Earth is?

Moon doesn't possess atmosphere. Atmosphere acts as a temperature buffer on earth as air is a bad conductor of heat. This does not happen on moon. Moon gets heated up as the sun's rays falls on its surface and cools drastically when there is no sunlight.

Q.12 How does the presence of the Himalayas change the flow of a wind blowing from Allahabad towards the north?

The south-western summer monsoons occur from June through September.

- The Thar Desert and adjoining areas of the northern and central Indian subcontinent heats up considerably during the hot summers.
- This causes a low pressure area over the northern and central Indian subcontinent.

This causes a low pressure area over the northern and central Indian subcontinent.

- To fill this void, the moisture-laden winds from the Indian Ocean rush in to the subcontinent.
- These winds, rich in moisture, are drawn towards the Himalayas.
- The Himalayas act like a high wall, blocking the winds from passing into Central Asia, and forcing them to rise. As the clouds rise their temperature drops and precipitation occurs.

Q.13 Why do people love to fly kites near the seashore?

People love to fly kites near the seashore because in coastal areas during daytime, the air above land gets heated faster and starts rising creating a low pressure above the land surface. The low pressure zone is filled in by cooler air from the ocean surface. This gives rise to the sea breeze. This sea breeze helps in the flying of kites to great heights.

Q.14 What are the effects of air pollution?

Air pollution can affect human health as well as animal and plant health. It also affects climate, buildings, metals, clothes etc.

The various effects of air pollution are-

(i) Dust and smoke particles cause **bronchitis, asthma and lung diseases**. Inhalation of sulphur dioxide and nitrogen oxide causes eye irritation and **respiratory ailments**.

(ii) Suspended particles like unburnt carbon particles or hydrocarbons formed during incomplete combustion of fossil fuels, in the atmosphere **lowers visibility** especially during cold weather.

(iii) Inhalation of polluted air containing dust, cement dust, asbestos dust, pollens etc. may cause sneezing and allergy. Continuous inhalation of these pollutants can cause asthma and tuberculosis (T.B)

(iv) **Acid rain** increases the acidity of the soil, there by affecting land plants and animals. It also increases acidity of the water in water bodies thereby affecting aquatic life. It also damages photosynthetic tissues and kills aquatic animals. Acid rain also corrodes metals, statues, monuments, painted surfaces, slate, stone and marble**.**

(v) **Ozone** layer is being **depleted** by air pollutants.

(vi) Causes ***global warming***

Q.15 What are the factors that affect the movement of air?

The various other factors also influence movement of air are-

i) Uneven heating of atmosphere in different regions of the earth.

ii) The rotation of the Earth

iii) The presence of mountain ranges in the paths of the wind

iv) Topography of the region (sand, land, water etc) through which air/wind passes.

Q.16 How are clouds formed?

A large amount of water evaporates and goes into the air some amount of water vapour also get into the atmosphere because of various biological activities. This air also gets heated. The hot air rises up carrying the water vapour with it. As the air rises, it expands and cools. This cooling causes the water vapour in the air to condense in the form of tiny droplets around dust and other suspended particles in the air. When billions of these droplets come together they become a visible cloud.

Q.17 How is rain formed?

Rain occurs as a result of three process of the water cycle

(i) Evaporation: When water from all water bodies are heated during the day, a large amount of water **evaporates** and goes into the air. When air gets heated up, it rises up carrying thewater vapour along with it.

(ii) Condensation: As the air rises, it expands and cools. This cooling causes the water vapour in the air to **condense** in the form of tiny droplets. When the air holds lots of water droplets, clouds form.

(iii) Precipitation: If a lot of water droplets gather in the clouds, the clouds become heavy. Gravity causes the water droplets to fall as rain.

Sometimes, when the temperature of air is low enough, precipitation may occur in the form of snow, sleet or hail.

Q.18 What factor decides the rain patterns? Which are the winds that bring about rain in most parts of India?

i)Rainfall patterns are decided by the prevailing wind patterns

ii) a) South-west monsoons.

b) North-east monsoons.

Q.19 How is prediction of weather possible?

Weather of a place is determined by many elements like speed and direction of wind, temperature, air pressure, rainfall, relative humidity and oceanic features. All these information's are collected by meteorological department through remote sensing and weather forecasting satellites which are then transformed into a weather report. This collective information helps us to predict the weather of a place.

Q.20 What is meant by air pollution?

Air pollution is defined as the presence of a contaminant in the atmosphere in a concentration large enough to injure human, plant and animal life. The presence of gaseous pollutants such as oxides of sulphur, nitrogen and carbon, hydrocarbons and particulate pollutants such as dust, smoke, mist spray and fume causes air pollution.

Q.21 What is combustion?

The **burning** of a substance **in air** is called combustion. In chemistry, combustion or burning means reacting with oxygen. It is a form of oxidation. Combustion reactions are almost always **exothermic** (i.e., they give off heat). For example, when wood burns, it must do so in the presence of oxygen and a lot of heat is produced, therefore it is exothermic.

Q.22 Name two gases given out by burning of fossil fuels, which dissolves in rain to form acid rain.

Although fossil fuels are mainly composed of carbon, it contains impurities such as sulphur and nitrogen atoms. As the fuel gets burnt the **sulphur** and **nitrogen** combines with oxygen to from sulphur dioxide (SO_2) and nitrogen oxide respectively which gets released into the air. Some of these gases (especially nitrogen oxides and **sulphur dioxide) react with the tiny droplets of water in clouds to form sulphuric** acid and **nitric acid**. The rain from these clouds then falls as very weak acid - which is why it is known as "acid rain"

Q.23 Mention any three human activities that you think would lead to air pollution.

Human activities which are responsible for adding more pollutants in the air are :

1. Excessive use of fossil fuels i.e., coal and petroleum. Because burning of these fossil fuels adds carbon particles to the atmosphere which causes smog. It produces huge amount of carbon monoxide and carbon dioxide as well.

2. Felling down of trees

3. Establishment of a number of industries which release carbon monoxide, sulphur dioxide, oxides of nitrogen, hydrocarbons, heavy metals, etc.

All these are responsible for deterioration of air quality

Q.24 Why do not lichens occur in Delhi, whereas they commonly grow in Manali or Darjeeling?

Lichens are bio-indicators of air pollution. They are sensitive to sulphur dioxide (SO_2) which occurs in sufficient quantity in the atmosphere of Delhi due to large number of vehicles, factories using fossil fuels etc. Moreover, Delhi occurs in semi-arid area where atmospheric moisture is low. In Manali and Darjeeling, the atmosphere is humid and sulphur dioxide pollution is comparatively low.

Q.25 (i) Define the term ‘Smog’.

(ii) Name two types of diseases caused by regularly breathing the polluted air.

(i) The presence of suspended particles in air during cold season causes the formation of smog.

(ii) Regularly breathing the polluted air affects the respiratory system of living beings and causes bronchitis, pneumonia, asthma and lung cancer.

Q.26 What factors decide the sustainability of life forms in a region?

i) The availability of water

ii) Temperature

iii) Nature of soil

Q.27 Why does Mathura refinery pose problem to the Taj Mahal ?

Mathura oil refinery and other industries of the neighbouring towns which burn fossil fuels are responsible for the discolouration of Taj Mahal. These industries release soot particles and gases like **sulphur dioxide and nitrogen oxides** into the atmosphere. The **soot particles** turn the colour of the marble to yellow and the gases react with water to form acid rain which corrodes the marble of the monument. This phenomenon is also called "**marble cancer**".

Q.28 What is meant by marble cancer?

The **slow corrosion** or eating up of marble of a monument by acid rain is called **marble cancer**.

Water : A Wonder Liquid

Q.29 (i) Why is water so necessary for all living organisms? Mention any two points in support of your answer.

(ii) Water is known as 'A Wonder Liquid'. Justify this statement by giving any two reasons.

(i) Water makes up about **70 per cent of body weight** and plays a vital role in the **metabolic reactions** taking place within the body.

Water is required for many purposes like drinking, cooking, cleaning, crop irrigation, navigation, generation of hydro-electricity and industrial needs.

(ii) Water, as you know, is the most essential component of life. It is essential for the **sustenance of life**. Life is impossible without water. It acts as a universal solvent, thus providing a medium for reactions to take place

---

Q.30 Why do terrestrial life forms require fresh water?

Terrestrial life forms require fresh water because their bodies **cannot tolerate** and **cannot excrete** the high amounts of dissolved salt in saline water.

Q.31 Why should not the fertilisers and pesticides be used in large amount?

Fertilisers and pesticides should not be used in large amount because-

- Too much of it can be **leached out** of the soil into groundwater, or eroded from the surface into rivers and thereby polluting the water bodies.
- Certain pesticides used in excess can actually **contaminate** the crop upon which they are applied and could poison livestock or people.
- They are **non- biodegradable** by nature.

Q.32 When water is said to be polluted?

When there is any change in the **physical**, **chemical** or **biological quality** of **water** makes it unsuitable for living organisms or for use, it is said to be polluted.

Q.33 Write in detail what happens when water gets polluted

When water gets polluted, then following events happen:-

(a) Undesirable substances get added to water-bodies which may cause cholera.

(b) Desirable substance may get removed from water-bodies and dissolved oxygen in water which is important for aquatic life and endangering aquatic life.

Q.34 What are the major sources of fresh water in the city/town where we live?

Rivers and lakes are the major sources of fresh water in the city/town where we live.

Q.35 A few years ago, after Ganesh Chaturthi celebrations, lakhs of dead fishes were found near sea shore of Juhu in Bombay. Similarly, after immersion of idols of God and Goddess at other festivals, such as Durga Puja, water of rivers and sea becomes highly polluted. That causes suffocation of aquatic animals like fishes.

Answer the following questions based on above information:

(a) What is the cause of high water pollution?

(b) What are your suggestions to avoid this pollution?

(c) What values students depict by giving positive suggestions?

a) Idols which are immersed in river or sea are made of Plaster of Paris and painted with toxic chemicals paints which contain lead, iron, arsenic, etc. Accessories used during the worship that are dumped along with the idol are non biodegradable. All these cause high water pollution.

(b) (1) Idols to be immersed should be made of naturally occurring clay instead of Plaster of Paris which doesn't occur naturally. Idols made out of naturally occurring clay dissolve within hours of immersion in water, Plaster of Paris idols may take anywhere between several months to years to fully dissolve.

(2) Immersing the idol in a water tank constructed by the government, instead of directly into natural water bodies.

(3) Use of toxic colour to paint idols should be banned.

(c) - Protecting the environment from pollution

- **Awareness** about the environmental issues faced by our country

- **Preservation of biodiversity** of aquatic beings.

Q.36 What is eutrophication ?

The **excessive growth of phytoplankton** in water bodies because of discharge of sewage and detergents in it brings about a reduction in dissolved oxygen which affects other aquatic organisms. This is called **eutrophicatio**n.

Q.37 How addition of undesirable substances and change in temperature affect the water life?

The poisonous things like pesticides can kill the fish or other water creatures. The nutrients in fertilizers cause rapid growth of algae, also known as an algal bloom.The **algal bloom** causes the deficiency in oxygen in the water bodies while the change in temperature will affect **breeding and development** of young ones of aquatic organism.

Q.38 Why does water need conservation even though large oceans surround the land masses?

Water conservation is important because we need water for many essential activities. About three-fourth of Earth consists of water, but only 1% of it is freshwater. It is this freshwater which we can utilise for daily use. As water resources are not judiciously used, these are getting depleted. This will lead to the time when there will be no water. If water conservation is carried out seriously, this will help to preserve wildlife water habitats and the need of building dams, etc. It will also help to ensure water availability for future generations.

Q.39 There is a small pond in a village near the crop fields. The farmers use various manures and fertilizers in the field to enhance crop production. Recently, people observe large scale dying of fishes in the pond. Unable to find any solution, the farmers meet your father for his advice. Your father takes an appointment with the Fishery Officer of the area and discusses the issue with him.

(a) What may be the reasons for dying of fishes in the pond?

(b) What suggestion will your father give to the farmers?

(c) What value is shown by your father?

(a) Fertilizer pollution does not make fish grow bigger, for example. Fertilizers, whether they are artificial or organic, can cause serious problems if they contaminate freshwater and marine ecosystems. The nutrients in fertilizers cause rapid growth of algae, also known as an algal bloom. Algal blooms cover the surface of the water so sunlight does not penetrate as far down as it typically would, reducing the ability of underwater plants to perform photosynthesis and produce oxygen. Dying algae feed microorganisms, which deplete more oxygen. This leads to the death of most of the fishes.

(b) The farmers will be advised to use composted organic wastes instead of fertilizers. In this way we can put a check on environmental pollution as well as increase the crop yield.

(c) He has good knowledge about environmental awareness.

Q.40 Which non-living component of the Earth determines biodiversity of an area?

Water is the non-living component of the Earth that determines the biodiversity of an area.

Q.41 What is capillary water? Can plants draw capillary water from soil?

Capillary water is the water that remains in the soil after the water drains; it permits plants to survive through periods of drought.

Capillary water is held in the capillary pores (micro pores). Capillary water is retained on the soil particles by surface forces. It is held so strongly that gravity cannot remove it from the soil particles. The molecules of capillary water are free and mobile and are present in a liquid state. Capillary water is, therefore, known as **available water**. Trees 'drink' from capillary water. Their instrument to drink from the capillary water is the primary root.

Q.42 What is algal bloom?

Algal bloom is a rapid increase or accumulation in the population of algae in an aquatic system. Algal blooms may occur in freshwaters as well as in marine environments.

Harmful algal blooms can:

- Produce extremely dangerous toxins that can sicken or kill people and animals
- Create dead zones in the water
- Raise treatment costs for drinking water

Q.43 What are the sources of water pollution?

The main sources of water pollution are;

i) ***Sewage and other wastes***: Sewage is the waste water from homes, animal houses or food producing plants. Sewage includes human excreta, paper, cloth pieces, soap and detergents etc, wastes of rural areas, towns and cities are dumped into ponds, lakes, rivers etc. due to large amounts of dumped waste, water loses its self purifying ability and thus becomes unfit for human consumption

ii) ***Industrial effluents***: Effluents from breweries, tanneries , dying textiles, paper and pulp mills, sugar mills etc., contain a variety of inorganic and organic and organic pollutants such as oils, greases, plastics , plasticizers, DDT, acids, alkalies, dyes etc., are flown into rivers. These cause water pollution.

iii) ***Agricultural discharges:*** These include chemicals of fertilizers and pesticides. These chemicals along with wastes are washed off through rainfall, drainage and irrigation etc, and eventually enter into lakes, rivers etc, thereby disturbing the natural ecosystem. Fertilizers used on crops, seep into ground water making it unfit for human consumption.

iv) ***Industrial wastes:*** Heat and radioactive substances are the pollutants of thermal and nuclear plants. Nuclear power plants are located close to water bodies. The waste water released from these industries affects the aquatic life causing death.

Q.44 How do forests play an important role in maintaining water cycle?

Forests play an important role in maintain the water cycle.

i) The roots of plants/ trees bind the soil tightly and help in the percolation of water in the soil and thus add to the water table.

ii) Water is absorbed back by roots and is in turn lost into the atmosphere by transpiration.

iii) These vapours condense and form clouds.

iv) When clouds become heavy with water droplets it precipitates in the form of rain, snow, sleet etc

Thus, plants maintain water cycle by passing moisture from soil to the atmosphere by transpiration.

Mineral Riches in the Soil

Q.45 What is humus? What is its function in the soil?

(a) **Humus** is a dark coloured colloidal material that constitutes the organic components of the soil. It is formed by the decomposition of plant and animal remains.

(b) Humus is the major factor in deciding the soil structure because:

Humus usually **increases the ability of the soil to resist erosion**.

First, it enables the soil to hold more water. Even more important is its effect in promoting soil granulation and thus maintaining large pores through which water can enter and percolate downward. Humus provides a reservoir for the plant nutrients available in the soil for balanced plant growth.

Q.46 What is called the crust of the earth?

The outermost layer of our Earth is called the **crust** and the minerals found in this layer supply a variety of nutrients to life-forms.

Q.47 State some factors which decide, the plant that will flourish on a particular soil.

The ***nutrient content of a soil***, the ***amount of humus*** present in it and the ***depth of the soil*** are some of the factors that decide which plants will thrive on that soil. The quality of the topsoil is an important factor that decides biodiversity in that area.

Q.48 What is meant by soil pollution?

Removal of useful components from the soil and addition of other substances, which adversely affect the fertility of the soil and kill the diversity of organisms that live in it, is called **soil pollution**.

Q.49 How will you define soil erosion?

Soil erosion is defined as the wearing away of topsoil under the effect of wind or running water. Topsoil is the top layer of soil and is the most fertile because it contains the most organic, nutrient-rich materials.

Q.50 Why does soil erosion normally occur in bare areas?

Soil erosion normally occur in bare areas because there are **no roots** to bind the soil in bare areas and it becomes easy for the strong winds and rains to carry away the nutrient rich top soil. Moreover, in barren areas, the top soil is loose and thus, is easily carried away by strong wind or water.

Q.51 How soil is formed?

Soil is formed from parent rock material over millions of years by a process called **weathering**.

In this process, rocks at or near the surface of the earth are broken down into small particles due to physical factors such as sun, wind, rain, etc., and it is called **physical weathering**.

The small particles of rocks are then converted into fine particles of soil by the help of plants, animals, and micro-organisms, this is called **biological weathering.**

Q.52 Why step farming is common on hills?

Step farming is practiced in *hills* to check soil erosion through water currents on the slopes. Step farming is more commonly known as **terracing**. The mountain is made into steps which slow down the speed of rain water preventing damage to crops. Moreover, it allows farmers to cultivate crops on steep slope, and thus provides more usable land

Q.53 Suggest one reason to prevent soil erosion.

The simplest and most natural way to prevent erosion control is through **planting vegetation**.

Plants act as protective shields to the soil lessening the impact of rainfall, wind, excessive watering and ice melt. The plants will **establish root systems**, which in turn will help stabilize the soil and prevent it from becoming prone to soil erosion. Some popular soil erosion prevention plants are wild flowers, crop veggies, small trees and herbs. Plants which crawl up and spread instead of growing upwards are also great soil erosion prevention plants.

Q.54 What is the composition of soil?

Soil is not just a group of mineral particles but has biological or living matter in it. Soil is made up of

i) ***Mineral nutrients***- basic particles formed by weathering of rocks. Mineral nutrients depend on the rock they are formed from.

ii) ***Humus***- Decomposed remains of organic materials. It could be dark brown or black and form the top soil.

iii) ***Living organisms***- Many kinds of bacteria, fungi, algae , earthworms, insects, protozoans and larvae are present in the soil.

iv) ***Water***- Forms a film, around the soil particles. Displaces air spaces present in the soil.

v) ***Air***- Fills fine spaces between the soil particles.

Q.55 A priest of temple collected dried garlands, holy old books and some statues. He asked his son to throw them in the river. But instead of throwing, he buried them in the soil.

Read the above passage and answer the following questions

(a) In the situation above, who wins your support: the priest or the son? Justify your answer by giving two reasons.

(b) What are the values reflected in the behavior of son?

(a) The son wins our support because instead of polluting the water, he buried them in the soil which will be decomposed by microorganisms.

(b) Behaviour of the son reflects his concern over environmental pollution.

Q.56 What is the advantage of terrace farming?

Terrace cultivation, or terrace farming, is one of the oldest types of land and water resource management for large-scale farming. Essentially, the main purpose of terracing land for farming is to **reduce the velocity of water runoff** and thereby prevent soil erosion. It also allows us to plant on steep slope and provides **more usable land**. In this way, mountain land is also used.

Q.57 How does water help in the formation of soil?

Water helps in the formation of soil in two ways-

1. Water could get into the cracks in the rocks formed due to uneven heating by the Sun. If this water later freezes, it would cause the cracks to widen.

2. Flowingwater wears away even hard rock over long periods of time. Fast flowing water often carries big and small particles of rock downstream. These rocks rub against other rocks and the resultant abrasion causes the rocks to wear down into smaller and smaller The water then takes these particles along with it and deposits it further down its path. Soil is thus found in places far away from its parent-rock.

Q.58 How does sun help in the formation of soil?

The Sun heats up rocks during the day so that they expand. At night, these rocks cool down and contract. Since all parts of the rock do not expand and contract at the same rate, this results in the formation of cracks and ultimately the huge rocks break up into smaller pieces.

Q.59 How does wind help in the formation of soil?

In a process similar to the way in which water rubs against rocks and wears them down, strong winds also erode rocks down. The wind also carries sand from one place to the other like water does.

Q.60 How do living organisms influence the formation of soil?

Living organisms also influence the formation of soil.

1. The lichen which grows on the surface of rocks release certain substances that erode the rock surface into powder and form a thin layer of soil. Other small plants like moss, now can grow on this surface and cause the rock to break up further.

2. The roots of big trees sometimes grow into cracks in the rocks and as the roots grow bigger, the crack is forced bigger resulting in the breaking of rocks into small pieces.

Q.61 Lichens are called pioneer coloniser of bare rock. How can they help in formation of soil?

A bare rock consists of solid surface or very large boulders and there is no place for rooting plants to colonize. The thalli of lichens can adhere to the surface of rock and absorb moisture from atmosphere. Therefore, these colonize the bare surfaces of rocks first. These lichens produce acids which corrode the rock and their thalli collect windblown soil particles with them that help in formation of a thin film of soil. When these lichens die their thalli are decomposed to add humus. This promotes soil formation.

Q.62 How do the rivers from land, add minerals to sea water?

Water is capable of dissolving large number of substances. As water flows over the rocks that contain soluble minerals, some of them get dissolved in the water. Thus rivers carry many nutrients from land to sea. These salts stay in the sea because no water flows out of the sea.

Q.63 How can we prevent the loss of top soil?

The uppermost layer of soil is very fertile and rich in humus. The main threat to top soil is soil erosion. Soil erosion is loss of soil due to wind or water flow.

Loss of top soil can be prevented by stopping soil erosion by following methods:

(i) Afforestation

(ii) Strip cropping

(iii) By following crop rotation to maintain the fertility of soil.

(iv) Proper drainage and irrigation arrangements.

Q.64 Why is replenishment of soil essential? Describe two natural ways of soil replenishment.

Some nutrients of the soil get depleted by growing the same crop year after year in the same field. So, replenishment of soil is essential to keep it fit for further cultivation.

Two natural ways of soil replenishment are-

(i) Crop rotation.

(ii) By leaving the **agricultural land uncultivated** (fallow) for one or two seasons so as to allow the soil to regain its richness.

Q.65 Why is humus considered to be the major factor in deciding the soil structure? What is the role

of earthworms in increasing the quantity of humus?

(i) Humus is a major factor in deciding the soil structure because it causes the soil to become more porous and allows water and air to penetrate deep underground.

(ii) Earthworms feed on the humus and increase its fertility.

Q.66 What is the role of soil in agriculture?

The soil refers to the loose surface of the earth's crust. Soil is the medium for growth of all plants. It provides physical supports and nutrients and also the sufficient quantities of air and water for growth of plants.

Q.67 What is strip- cropping?

Strip-cropping means planting of crops in rows or strips to check flow of water and soil pollution.

Q.68 What is meant by weathering?

Conversion of rocks into soil by physical or biological means is called **weathering.**

Q.69 The heaps of solid wastes are a menace. Give two reasons.

The heaps of solid wastes are a menace because-

(i) The solid wastes release harmful gases into the environment which pollute the air of surrounding areas.

(ii) The solid wastes litter in the surrounding areas choking the sewage system

(iii)The unpleasant smell coming out of the wastes also pollute the environment.

Q.70 Soil formation is done by both abiotic and biotic factors. List the names of these factors by classifying them as abiotic and biotic?

Soil formation by biotic and abiotic factors:

Soil formation occurs due to five important factors. Differences in soil particles within and between regions are a result of the interaction between these factors.

(i) **Abiotic factors:** Rocks (parent material), rain, temperature, slope and elevation, time, etc.

(ii) **Biotic factors**: Vegetation, microbes, soil organisms, animals and human beings

Biogeochemical Cycles

Q.71 What is biogeochemical cycle ?

A **biogeochemical cycle** or **nutrient cycle** is the cyclic flow of nutrients between the biotic (biosphere) and abiotic (lithosphere, atmosphere, and hydrosphere) compartments of Earth. The plants and animals that live and then die are the ***bio*** part; the earth that they decompose into comprises the ***geo*** part; and the process by which organic matter returns to the chemical elements in the earth is explained by the ***chemical*** part.

There are four biogeochemical cycles **namely carbon cycle, oxygen cycle, nitrogen cycle and phosphorous cycle,** and each of them returns to the earth important elements that are required in living organisms.

Q.72 What are the main substances of biogeochemical cycles?

The main substances of biogeochemical cycles are **carbon, oxygen, nitrogen, phosphorus, calcium,** and **water** etc**.**

Q.73 What is water cycle?

The **Water Cycle** (also known as the **hydrologic cycle**) is the journey water takes as it circulates from the land to the sky and back again.

Q.74 Name the two chemicals present in the living organisms having carbon, hydrogen and oxygen as main constituents. State their main function.

Proteins and **Nucleic acid** contain carbon, hydrogen and oxygen.

The ***main role of nucleic acids*** is to store information that is used to make proteins. Nucleic acids come in two main forms: deoxyribonucleic acids, also known as DNA, and ribonucleic acids, also known as RNA. The main function of DNA is to store the genetic information that cells in the body need to function. RNA, on the other hand, plays an important role in converting the information from DNA into proteins.

The ***role of proteins*** in cell is that are responsible for doing most of the work that occurs in cells. They also are needed to maintain the structure of cells and are critical for the function and regulation of all of the body's tissues.

Q.75 Why can't the living organisms use atmospheric nitrogen directly?

Although the majority of the air we breathe is nitrogen(N_2), most of the nitrogen in the atmosphere is unavailable for use by organisms. This is because the strong triple bond between the N atoms in N2 molecules makes it relatively inert. In fact, in order for plants and animals to be able to use nitrogen, N2 gas must first be converted to more a chemically available form such as ammonium (NH4+), nitrate ($NO3^-$), or organic nitrogen (e.g. urea -(NH2)2CO).

Q.76 Name the reservoir for the nutrient elements in (a) gaseous cycles (b) Sedimentary cycles.

(a) Air or oceans (b) Earth's crust.

Q.77 How can you say that rivers carry many nutrients from the land to the sea?

Water is capable of dissolving a large number of substances. As water flows through or over rocks containing soluble minerals, some of them get dissolved in the water. Thus rivers carry many nutrients from the land to the sea, and these are used by the marine organisms

Q.78 Name the forms in which Nitrogen is present in living things:

(i) Nitrogen is a constituent of many molecules essential to life like proteins, nucleic acids (DNA and RNA) and some vitamins.

(ii) Nitrogen is found in other biologically important compounds such as alkaloids and urea too.

Q.79 Arrange the following steps in order of their sequence of occurrence in Nitrogen cycle starting from nitrogen gas:

Ammonification, Nitrification, Denitrification, Nitrogen fixation

Nitrogen fixation, Ammonification Nitrification, Denitrification.

Q.80 Where are the nitrogen fixing bacteria found in the plants? Name the free living nitrogen fixing bacteria.

These 'nitrogen-fixing' bacteria may be free-living or be associated with some species of dicot plants. Most commonly, the nitrogen-fixing bacteria are found in the roots of legumes (generally the plants which give us pulses) in special structures called root-nodules.

Free-living (non-symbiotic) bacteria, cyanobacteria (or blue-green algae) ***Anabaena*** and ***Nostoc***.

Mutualistic (symbiotic) bacteria such as ***Rhizobium***, associated with leguminous plants.

Q.81 What is nitrification?

Nitrification is the biological oxidation of ammonia into nitrates . Nitrification is a two stage process and each stage is performed by a different group of bacteria. The 2 stages are-

- Bacteria of the genus**Nitrosomonas** oxidize NH_3 to **nitrites** (NO_2^-).

- Bacteria of the genus **Nitrobacter** oxidize the nitrites to **nitrates** (NO_3^-).

These two groups of autotrophic bacteria are called **nitrifying bacteria**.

Q.82 Why nitrogen cycle is called perfect cycle in biosphere?

Nitrogen cycle is known as perfect cycle in biosphere because the amount of nitrogen remains constant throughout the entire cycle and no nitrogen is lost. Hence, it follows the law of conservation of matter. While in other biogeochemical cycles, there is either loss of energy or loss of matter.

Q.83 What is the fate of nitrogen gas that goes inside the lungs along with oxygen during breathing?

Although most of Earth's atmosphere is composed of nitrogen, the human body cannot utilize this gas, so it is simply exhaled.

Q.84 What is meant by nitrogen fixation?

The process of conversion of atmospheric nitrogen into nitrogenous compounds and making it available for plants is called as **nitrogen fixation**. The organisms which fix nitrogen to plants are called as **nitrogen fixers**.

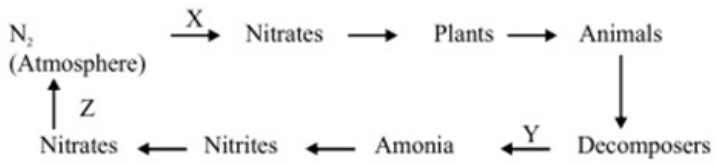
Q.85 What is ammonification?

The process of conversion of nitrogen containing proteins of dead and decayed plant and animal matter into ammonia by microorganisms like bacteria and fungi is called **ammonification**. The proteins of dead animals and plants are broken down by bacteria present in the soil, which converts them into ammonium ions. Animal urine contains urea; this urea is converted into ammonia in the soil by the process of ammonification.

Q.86 (a) How does energy enter in the biosphere?

(b) Name one natural and one man-made process by which CO_2 returns to the atmosphere.

(c) In the following biogeochemical cycle, name and define the processes marked as X, Y, and Z.



(a) (i) Energy enter the biosphere in the form of solar energy from the Sun.

(b) Natural Process: Respiration.

Man-made Process: Burning of fuel (coal and petroleum).

(c) X — ***Nitrogen Fixation*** — A process in which atmospheric nitrogen is assimilated into organic compounds in living organisms.

Y — ***Nitrification*** — A process in which nitrogen in the form of ammonia in plants and animals wastes is oxidized first to nitrites then nitrates.

Z — ***Denitrification*** — It is the process of reduction of nitrates into gaseous nitrogen of the atmosphere. It is caused by denitrifying bacteria e.g., Pseudomonas aeruginosa

---

Q.87 What is the function of decomposers in biogeochemical cycles?

Decomposers play an important role in the biogeochemical cycling of nutrients in the environment as they are responsible for the **breakdown and return of nutrients** back to the environment in their native state.

Q.88 What are the various forms of carbon found on earth?

Carbon is found in various forms on the Earth. It occurs in the elemental form as diamonds and graphite. In the combined state, it is found as carbon dioxide in the atmosphere, as carbonate and hydrogen-carbonate salts in various minerals, while all life-forms are based on carbon-containing molecules like proteins, carbohydrates, fats, nucleic acids and vitamins. The endoskeletons and exoskeletons of various animals are also formed from carbonate salts.

Q.89 Describe carbon-cycle in the biosphere.

(i) Carbon Cycle

In the abiotic environment, carbon is present in four forms:

(a) As carbon dioxide in the atmosphere or air (about 0.03 – 0.04%),

(b) As dissolved carbon dioxide or carbonic acid and bicarbonates in water or hydrosphere,

(c) As fossil fuels like coal, petroleum and natural gas, and

(d) As carbonates and graphite in the rocks.

The basic movement of carbon is from the atmosphere-

During photosynthesis, plants take in carbon dioxide from the atmosphere to synthesize organic compounds. These organic compounds enter the food chain as food and reach animals in successive trophic levels.

Q.90 Name the gases which produce greenhouse effect.

Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs).

Q.91 Name some of damaging effects of the ultraviolet rays on the animal and plant life on earth.

The ultraviolet rays cause:

(a) It causes sunburn on human skin and cataracts in our eyes.

(b) Increases plants' susceptibility to disease.

(c) Induces skin cancer by causing mutation in DNA and suppressing certain activities of the immune system

(d) In plants, UV impairs photosynthesis in many species

Q.92 The AC of your car was not working properly for last couple of days. You took the car to a nearby garage and asked the mechanic to refill the refrigerant. After checking, the mechanic advised you to repair the leak in the AC. You were in a hurry and hence, decided to postpone the repairing part and asked the mechanic to refill the refrigerant only. However, your father did not agree to refill the refrigerant in a leaked system.

(a) What value is shown by your father?

(b) How can you and your family help in protecting the ozone layer?

(c) How is ozone produced in the atmosphere?

(a) The father displays the responsibility of a responsible citizen in protecting the environment from pollution.

(b)(i) Ensure that refrigerant you recover from air conditioners, refrigerators or freezer during servicing is not "vented" or released to the atmosphere.

ii) Buy products (aerosol spray cans, refrigerators, fire extinguishers, etc.) that are labelled '**ozone friendly**" or "**CFC free**".

(c) Ozone is produced naturally in the stratosphere when highly energetic solar radiations strikes molecules of oxygen and cause the two oxygen atoms to split apart. If a freed atom collides with another oxygen atom, it joins up forming ozone.

Q.93 Do we ever come across phenomenon of greenhouse effect in daily life?

Yes, we do come across this phenomenon in our daily life. One example of the greenhouse effect that most of us experience in everyday life is the warming of a car's interior when the vehicle is left out in the sun.

Q.94 What is the greenhouse effect?

The **greenhouse effect** is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse gases thereby warming the Earth enough to support life.

Q.95 Name the compound, which is responsible for the depletion of ozone layer in the atmosphere.

Chlorofluorocarbons (CFCs).

Q.96 State one use of ozone.

a) Ozone is known to be natures most **powerful disinfectant** and **oxidant** and can even kill microbial contaminates like E-coli, Candida, Listeria, Staph, Salmonella, Giardia and Cryptosporidium more effectively than dangerous conventional disinfectants like chlorine or bleach.

b) Ozone **destroys** virtually all **airborne and water type pollutants**.

c) **Preventing** damaging**ultraviolet light** from reaching the Earth's surface, to the benefit of both plants and animals.

Q.97 What is ozone hole?

The **ozone hole** is not technically a "hole" where no ozone is present, but is actually a region of exceptionally depleted ozone in the stratosphere over the Antarctic that happens at the beginning of Southern Hemisphere spring (August–October).

Q.98 Name the two acids that are present in acid rain.

Under normal condition, there is plenty of carbon dioxide in the air. When it combines with water, it becomes carbonic acid, or H_2CO_3.

In industrial areas, nitrous oxides gas, or chlorine gas or sulphurous gas are released into the atmosphere, when these gases combine with water from the rain, it will turn to **nitric acid** (HNO_3), **chloric acid** (HCl) or **sulfuric acid** (H_2SO_4) respectively.

Q.99 Justify Dust is 'pollutant'.

Dust remains present in the air as suspended particles. It can cause allergy and other respiratory diseases. It also affects plant growth by covering the stomata on the leaf surface and blocking them thereby reducing the exchange of gaseous substances. It acts as a carrier of toxic compounds like heavy metals.

Q.100 A motor car with its glass totally closed is parked directly under the Sun. The temperature inside the car becomes very high. Explain.

This is because of greenhouse effect. Infrared radiations emitted by the sun pass through the glass and heats the interior of the car. The radiation emitted by the upholstery and inner parts of the car cannot pass out of the glass, so the heat trapped inside the car raises the temperature of the interior.

This is because glass is transparent to infrared radiations released from the Sun, having smaller wavelength than that emitted by the interior of the car, which have longer wavelength to which glass is opaque.

Q.101 Ishita went to her grandmother's home in her holidays. In grandmother's home, she noticed that the marbles used in balcony and on approach road from the gate to car garage has become yellow. Her grandmother told the problem started after establishing of a petroleum refinery in their locality.

Read the above passage and answer the colourisation of marble?

(a) What is the connection of refinery to yellow colourisation of marble?

(b) State other harmful effects of air pollution.

(c) What values you have learnt from the given passage?

(a) Smoke released by the refinery contains oxides of nitrogen and sulphur. These gases dissolve in rain water causing acid rain. The acid rain contains traces of acids which affected the marble floor. This acid rain leads to the erosion of white marble. The colour of floor is also affected by acid rain i.e. it becomes yellowish.

(b) Harmful effects of air pollution are —

(i) Air pollution affects the respiratory system of living beings and causes bronchitis, pneumonia, asthma and lung cancer.

(ii) Burning of fossil fuels like coal and petroleum releases oxides of nitrogen and sulphur. Not only the inhalation of these gases is dangerous, they also dissolve in rain to produce acid rain. Acid rain destroys the small plants and crops.

(c) From the given passage, I have learnt that factories and industries in an area play major role in air pollution. These should be far from human inhabited areas. I have learnt the value of concern and care for environment from this passage.

Q.102 What are aerosols? How are these dangerous?

Aerosols are certain chemicals like fluorocarbons released in the air either naturally or by human activities in the form of mist or vapour. Fluorocarbons deplete the ozone layer in the atmosphere are emitted by jet aeroplanes, deodorant sprays etc.

Q.103 How is ozone layer formed?

Ozone is formed from oxygen in a reversible reaction. Ozone in the earth's stratosphere is created by ultraviolet light striking oxygen molecules containing two oxygen atoms (O2), splitting them into individual oxygen atoms (atomic oxygen); the atomic oxygen then combines with unbroken O2 to create ozone, O3. The ozone molecule is also unstable and when ultraviolet light hits ozone it splits into a molecule of O2 and an atom of atomic oxygen, a continuing process called the ozone-oxygen cycle, thus creating an ozone layer in the stratosphere, the region from about 10 to 50 km (32,000 to 164,000 feet) above Earth's surface.

Q.104 Name a pollution free source of energy.

Solar, Wind, Hydro, and Nuclear are all emission free, and therefore do not produce "pollution" but all energy sources will create waste.

Q.105 What is meant by biological magnification?

The increase in concentration of harmful, non -biodegradable chemical substances in the body of living organisms throughout the trophic levels of a food chain is called **biological magnification**

Q.106 (i)We are lucky that ozone is not stable near the earth's surface.

(ii) The combustion of fossil fuels increases the amount of suspended particles in air

Near the earth's surface, ozone is an air pollutant. It can cause many health problems to humans such as lung damage, chest pain, cough, throat irritation, asthma and skin cancers. It is also harmful for crop production, forest growth and wildlife.

(ii) Combustion of fossil fuels leads to the emission of carbon particles and oxides of certain harmful gases such as sulphur and nitrogen into the air.

Q.107 Why do we consider carbon dioxide as a pollutant though is necessary for plants?

Carbon is considered as a pollutant because carbon dioxide is a green house gas and its excess amount in the atmosphere results in global warming. It increases the overall temperature of the earth resulting in changes in the earth's climate. Besides this, higher concentration of carbon dioxide may also cause suffocation, hard breathing and choking problems.

Q.108 What are the two forms of oxygen found in the atmosphere?

The two forms of oxygen found in the atmosphere are-

i) **Diatomic** (a molecule containing two atoms of oxygen) molecular form with chemical formula O_2

ii)**Triatomic**(a molecule containing three atoms of oxygen) molecular form with chemical formula O_3

Q.109 List any two consequences of global warming.

The consequences of global warming are-

(i) Over-use of fossil fuels for domestic, industrial and other purposes.

(ii) Increasing fast rate of releasing large volume of carbon dioxide in the air

Previous Year's Questions

1 Mark Questions

Q.1 What is smog?

[CBSE (CCE), 2012]

Smog is a combination of smoke and fog. This is formed due to the condensation of fog on the carbon particles present in the smoke that is produced due to the combustion of domestic fuels and industrial fuels like coal and petroleum. It lowers the visibility during the winter season and is an indication of air pollution.

Q.2 Name the free living nitrogen fixing bacteria.

[CBSE (CCE), 2012]

Free-living (non-symbiotic) bacteria, cyanobacteria (or blue-green algae) Anabaena and *Nostoc.* Mutualistic (symbiotic) bacteria such as *Rhizobium,* associated with leguminous plants.

Q.3 State two factors responsible for weathering of rocks.

[CBSE (CCE), 2012]

Two factors responsible for weathering of rocks are:

(a) Climate conditions- It includes the meteorological elements effect on rocks such as moisture, temperature, and wind and air pressure

(b) Topography and vegetation- Topography directly effects weathering by exposing rocks to the temperature or sun and wind. The elevated areas will be affected more and low level areas will be affected less

(c) Composition-There are certain elements which are included in rock composition. Some rocks will weather quickly and some slowly e.g. acidic rocks weather more quickly than basic ones. Surface covered by the vegetation are protected from weathering but bare surfaces are weathered to great extent.

Q.4 Mention the two processes in which oxygen is used up from the atmosphere and the only process in which it is returned to the atmosphere.

[CBSE, 2011]

(i) Respiration and Combustion

(ii) Photosynthesis

Q.5 Write the two biotic components of the biosphere.

[CBSE (CCE), 2011]

The biotic components of biosphere are plants, animals and microorganisms.

Q.6 How is CO_2 fixed in the atmosphere?

[CBSE (CCE), 2011]

It is fixed in many ways:

(a) During the process of respiration in humans and animals, carbon dioxide released into the atmosphere as a by-product

(b) Decomposition is the largest source through which carbon is returned to the atmosphere as carbon

(c) Weathering of rocks.

(d) By burning the fossil fuels

(e) From Volcanic eruptions

2 Marks Questions

Q.7 What is biosphere?

[CBSE, 2011]

The life-supporting zone of the earth where the atmosphere, the hydrosphere and the lithosphere interact and make life possible is known as the biosphere. It accommodates several types of living organisms which remain dependent on natural resources. The biosphere ranges between 6km above sea level and 10km below sea level.

Q.8 Name two ways of preventing water pollution.

[CBSE (CCE), 2011]

(a) By using natural fertilizers and pesticides as far as possible, or if not, do not overuse them or over-water gardens and lawns. This will help in reducing the pollutants that get into water systems due to runoffs.

(b) Refrain from throwing litter into streams, lakes, rivers, seas or any water body.

Q.9 Name any four carbon containing molecules which are essential for living beings.

[CBSE, 2011]

(i) Nucleic acids (such as DNA, RNA)

(ii) Proteins

(iii) Lipids and

(iv) Carbohydrates

Q.10 Name the two gases given out by burning of fossil fuels, which dissolves in rain to form acid rain.

[NCT, 2008]

Sulphur dioxide (SO_2) and oxides of nitrogen (NO_x).

Q.11 State in brief the role of photosynthesis and respiration in carbon-cycle in nature.

[NCT, 2007]

The role of photosynthesis and respiration in Carbon cycle in nature are as follows:

(a) Plants convert the carbon inatmosphericcarbon dioxide into carbon-containing organic compounds, such as sugars, fats, and proteins.

(b) Cellularrespiration (in plants and animals)requires oxygen (which is the by-product of photosynthesis) and it produces carbon dioxide, which is used in photosynthesis.

In this way, photosynthesis and cellular respiration are linked in the carbon cycle.

3 Marks Questions

Q.12 What are the two forms of oxygen found in atmosphere? What is their importance?

In atmosphere, oxygen is found as [CBSE (CCE), 2012]

Diatomic molecular form with chemical formula O_2 known as oxygen.

Triatomic molecular form with chemical formula O_3 known as ozone.

The presence of oxygen in the air (atmosphere) is very essential for the following:

1. The life processes such as respiration, in all living organisms.

2. Combustion of fuels. Otherwise, fire would not have been possible

The presence of ozone in the air (atmosphere) is very essential for the following:

1. Ozone is a gas in the atmosphere that protects everything living on the Earth from harmful ultraviolet (UV) rays from the Sun.

Q.13 What is soil? How is it formed? State the major factors that decide the structure of a soil. What role does it play?

[CBSE (CCE), 2012]

Soil is a mixture of broken rocks and minerals, living organisms, and decaying organic matter called *humus*. Humus is dark, soft and rich in nutrients. Soil also includes air and water.

Soil is formed by the following actions:

(a) Action of sun: The sun causes the heating of rocks during the day which causes them to expand. Then, these rocks cool down during night time leading to their contraction. Since, all parts of the rocks do not expand and contract at the same rate; it results in the formation of cracks on the rocks. Finally, these huge rocks break down into smaller pieces.

(b) Action of wind: Strong winds and storms also erode the rocks. The strong wind carries small rock pieces and sand from one place to another like water.

(c) Action of living organism: Roots of plants break down the rocks. Similarly, Lichens grow on the surface of rocks. These lichens release certain chemical that causes the rock surface to powder down to form a thin layer of soil.

(d) Action of water: (i) Water gets into the cracks in the rocks, when this water freezes, it causes the cracks to widen. (ii) Flowing water wears away even hard rocks over long periods of time. Fast flowing water often carries big and small particles of rock downstream. These rocks rub against other rocks and the resultant abrasion causes the rocks to wear down into smaller and smaller particles, resulting in the formation of soil.

The type of soil is decided by the average size of particles found in it and the quality of the soil is decided by the amount of humus and the microscopic organisms found in it.

The *nutrient content of a soil*, the *amount of humus* present in it and the *depth of the soil* are some of the factors that decide which plants will thrive on that soil. The quality of the topsoil is an important factor that decides biodiversity in that area.

Q.14 Our earth is covered with approximately 75% water; still there is an urgent need to conserve water, why?

[CBSE (CCE), 2012]

Water covers nearly 75% of the earth but most of the earth's water is salty or permanently frozen. Ninety - seven percent of all the water on the earth is salt water which is not suitable for drinking. Only three percent of all the water is fresh water, and only one percent is available for drinking water. The other two percent is locked in ice caps and glaciers. Fresh water is found in ice, lakes, rivers, streams and underground.

With all the people on Earth relying on such a small percentage of all the water on Earth, it only makes sense that we must preserve and conserve our water. Moreover, most of the sources of water supply are contaminated by industrial waste or sewage making it all the more necessary to conserve water.

Q.15 (a) What causes wind?

(b) List any two methods of preventing soil erosion.

[CBSE (CCE), 2012]

(a) The air above land gets heated faster and being light, it starts rising up. As the air rises, a region of low pressure is created. As a result, the air from the surrounding areas and from the top of the water bodies rushes into this area. The movement of air from one region to another creates wind.

(b) Soil erosion can be prevented by avoiding over-grazing, by constructing proper drainage canals around the fields.

Q.16 What is greenhouse effect? List two greenhouse gases. State the ultimate effect of increase in greenhouse gases in the environment.

[CBSE (CCE), 2012; MSE, 2004; KVS, 2007]

The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-

radiated by greenhouse gases thereby warming the Earth enough to support life.

Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs).

The rapid increase in greenhouse gas concentrations in the atmosphere has led to the **enhanced greenhouse effect**, which is when too much heat is trapped on Earth, resulting in an overall increase in global temperatures. Rising temperatures on Earth have produced severe changes in weather patterns, such as hotter summers, colder winters and stronger storms, like hurricanes and tornadoes. Increasing global temperature will also lead to a rise in sea levels as the glaciers and polar ice caps melt.

Q.17 (a) List two ways by which carbon dioxide is 'fixed' in the environment.

[CBSE, 2012]

(b) Name two diseases caused due to an increased content of pollutants in the air produced due to the burning of fossil fuels.

[CBSE, 2011]

(a) Carbon dioxide is fixed in the two following ways:

(i) By the process of photosynthesis in plants.

(ii) Many marine animals use carbonates dissolved in sea-water to make their cells.

(b) Diseases caused due to an increased content of pollutants in the air produced due to the burning of fossil fuels are- ophthalmic problems, skin injuries, gastro-intestinal, cardio-vascular and respiratory diseases and some types of cancer.

Q.18 What is the role of the atmosphere in climate control?

[CBSE, 2011]

The atmosphere plays an important role in temperature control. Atmosphere covers the Earth, like a blanket. Air is a bad conductor of heat. The atmosphere keeps the average temperature of the Earth fairly steady during the day and even during the course of the whole year. It also prevents the sudden increase in temperature during the daylight hours. Moreover, during the night, it slows down the escape of heat into outer space.

5 Marks Questions

Q.19 (a) What are the consequences of Global warming?

(b) Draw a labelled diagram to show water cycle in nature.

(c) Why is water essential to life?

[CBSE (CCE), 2012]

(a) Harmful effects of global warming:

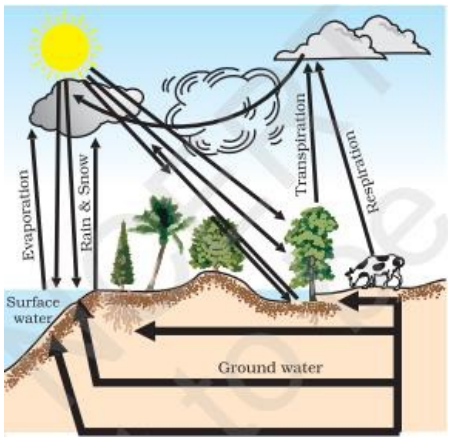
(i) Warmer waters and more hurricanes: As the temperature of oceans rises, so will the probability of more frequent and stronger hurricanes.

(ii) Increased probability and intensity of droughts and heat waves: Although some areas of Earth will become wetter due to global warming, other areas will suffer serious droughts and heat waves.

(iii) Polar ice caps melting: The ice caps melting are a four-pronged danger. It will raise sea levels.

(iv) More floods: Flooding represents one of the most dangerous hazards to human settlements and As the climate changes, a warming of the seas creates 'thermal expansion'. This is where warm water begins to take up more space than cool water, making the sea's surface level increase.

(b)



(c) Organisms need water because it plays a vital role in the reaction that takes place within organism's cells and body. It acts as a universal solvent, providing a medium for the chemical reactions to occur. Substances are also transported from one part of the body to the other in dissolved state. Therefore, it is not necessary for organisms to maintain a distinct level of water within their bodies to stay alive.

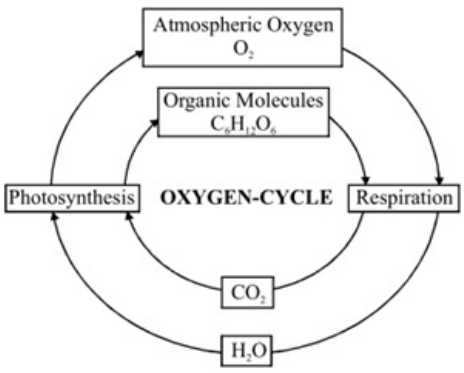
Q.20 (a) What makes biosphere dynamic but stable system?

(b) Draw a labelled diagram to show the oxygen cycle in nature.

[CBSE (CCE), 2012]

(a) Biosphere has biotic (living) and abiotic (non-living) components. The biotic or living components include plants, animals and microbes living on the earth. Abiotic components are land water and air. A constant interaction between the abiotic and biotic components of the biosphere results in the transfer of food and energy, which makes it a dynamic but stable system.

(b) Oxygen cycle in Nature: -



Q.21 (a) Difference between biodegradable and non biodegradable substances.

(b) How is acid rain causing harm to Taj Mahal?

(c) What is smog?

[CBSE (CCE), 2011]

(a) Biodegradable and non-biodegradable substances-

Biodegradable	Non-biodegradable
Biodegradable wastes decompose naturally in the environment.	Non- biodegradable wastes do not decompose naturally.
The wastes are made up of natural ingredients.	The wastes are made up of synthetic materials.
They are safe for the environment.	They are harmful to the environment and create pollution.
Micro-organisms work on it.	Micro-organisms do not work on it.
Example – vegetable wastes, tea leaves, waste papers, wood crumbles	Example – plastic bags, cans, disposable bottles.

(b) **Taj Mahal** is situated in Agra. The air in this place contains serious levels of sulphur and nitrogen oxides. This is due to the large number of power plants and industries set up around this area. All these led to acid rain. Acid rain reacted with the marble (calcium carbonate) of Taj Mahal and makes it yellow

in colour.

(c) Smog is a combination of smoke and fog. This is formed due to the condensation of fog on the carbon particles present in the smoke that is produced due to the combustion of domestic fuels and industrial fuels like coal and petroleum. It lowers the visibility during the winter season and is an indication of air pollution.

Q.22 (a) What is soil erosion? Give two methods of reducing it.

(b) Name two biologically important compounds that contain both oxygen and nitrogen.

(c) Why is water essential for life?

[MSE, 2008]

(a) The top layer of the soil that contains humus and living organisms in addition to the minerals is called the Topsoil. The removal and thinning of the fertile topsoil from its original place to another place with the help of certain agents such as strong winds, running water etc is called soil erosion.

Methods of reducing soil erosion-

- By constructing proper drainage canals around the fields.
- Intensive cropping and maintain soil fertility.

(b) Two biologically important compounds that contain both oxygen and nitrogen are

Proteins (their basic units are amino acids which are made up of an amino group with nitrogen and a carboxylic acid with oxygen in them)

Nucleic acids- both DNA and RNA are compounds with a ribose and phosphate groups with oxygen and the nitrogen bases with nitrogen

(c) Organisms need water because it plays a vital role in the reaction that takes place within organism's cells and body. It acts as a universal solvent, providing a medium for the chemical reactions to occur. Substances are also transported from one part of the body to the other in dissolved state. Therefore, it is not necessary for organisms to maintain a distinct level of water within their bodies to stay alive. Moreover, we need water for many activities such as drinking, cooking, washing, agriculture, etc.