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Q1 What is environment, Resources and their conservation

Answer: Environment :

Definition :- "The surroundings in which an organism - lives is called environment." Environment may be — physical (e.g. rocks), chemical (eg. H_2O) or biological (organ-isms)

Role of environment :- Environmental provides us with the very necessities of life directly or indirectly such as — food, shelter, transportation, clothing, fuel, other sources.

Resources :- The things that man requires for his survival and comfort are called resources.

Example :- oxygen, food, water, air, Land, forests, etc.

proper resource management :- proper resource management is based on the recognition that less resources use can lead to long-term economic benefits and reduced — environmental costs. There are 3-basic options that resource management be can applied to minimize resource use i.e—

- 1: preservation :-** preservation means non-use.
- 2: Conservation :-** Conservation or input reduction attempts to minimize the use of a natural resource.
- 3: Restoration :-** Restoration seeks to returns a degraded resource to its original state.

Q2 write a short note on Biogeochemical cycle.

Answer: Biogeochemical cycle:

Definition :- The flow of chemical elements and compounds between organisms and the physical environment is called - biogeochemical cycle.

Explanation :- In ecosystem both living and non-living organisms live together. Organisms fulfill all their needs from the surroundings. after their death, their bodies are decomposed into simpler compounds and all important substances are again transferred back to the environment. These materials are again used by plants and increase their growth. after that these materials are migrated to the animals bodies. these chemicals returned back to atmosphere or environment either through - excretion, respiration, or through decomposition. In this way circular processes remain continues. These are known as cycles of ecosystem or biogeochemical cycles.

Bioelement:

Definition :- The chemical-elements essential for life in living organisms are called biogenic or nutrient elements or bioelement.

Explanation :- There are 92-natural elements, out of which 16-elements are important for life called bioelements. But out of 16, six are much more important. These include - carbon, hydrogen, oxygen, nitrogen, phosphorus and sulphur. These six bioelement makeup of about 95% body mass of all

living organisms. These six elements are part of complex - biogeochemical cycle and form the complex biosphere.

Significance of biogeochemical cycle:

- 1: Biogeochemical-cycles play an integral part on the planet ^{earth}.
- 2: Biogeochemical circulate the nutrients throughout the env.
- 3: It help explain how the planet conserves matter and uses ^{energy}.
- 4: They store elements and recycle them.

Q3 Explain water cycle in detail.

Answer: water :- Introduction :- water is essential for life. It is a biological necessity for plants and animals. - water is used in various physiological and chemical processes of living organisms. The protoplasm of cell contains 70-90% water. It is an odourless, Tasteless substance that covers more than three-fourths (i.e-70%) of the earth surface.

Abiotic component :- water is a very important abiotic factor of ecosystem. It is always in the form of circulation.

Distribution of water :- water is present in different - places and in different forms i.e-

1: Salty water :- About 97% of water is in the ocean. It is unable to be used for drinking and watering crops because of the salt content.

2: Fresh water :- only about 3% of earth water is fresh which may be solid form and useable form. i.e-

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<u>i: Solid form</u> :- 2% of the earth water is in solid form, found in ice-caps and glaciers. Because it is frozen and so far away the fresh water in ice-caps is not available for use by people or plants.		
<u>ii: useable form</u> :- only 1% of all the earth water in a form to be used by humans and land animals. This fresh water is found in lakes, rivers, streams, ponds and in the ground and a small amount of water is found as vapour in the atmosphere.		
<u>water cycle <Hydrological cycle></u> :-		
<u>Definition</u> :- The circulation of water and moisture b/w living organisms, atmosphere and earth is called water cycle.		
<u>Explanation of water cycle</u> :-		
<u>1: Evaporation of water</u> :- The water is evaporated from oceans, rivers and lakes at any temperature continuously.		
<u>2: Transpiration of water</u> :- The water is removed from the body of plants in the form of vapours called transpiration.		
<u>3: Sublimation</u> :- Sublimation is a process where ice directly converts into water vapours without converting into liquid water. This phenomenon accelerates when the temperature is low or pressure is high. The main sources of water from - Sublimation are the ice-sheets and ice caps on the mountains. Sublimation is a rather slower process than evaporation.		
<u>4: condensation</u> :- <u><Formation of clouds></u> The water vapours which evaporated from the different water bodies and		

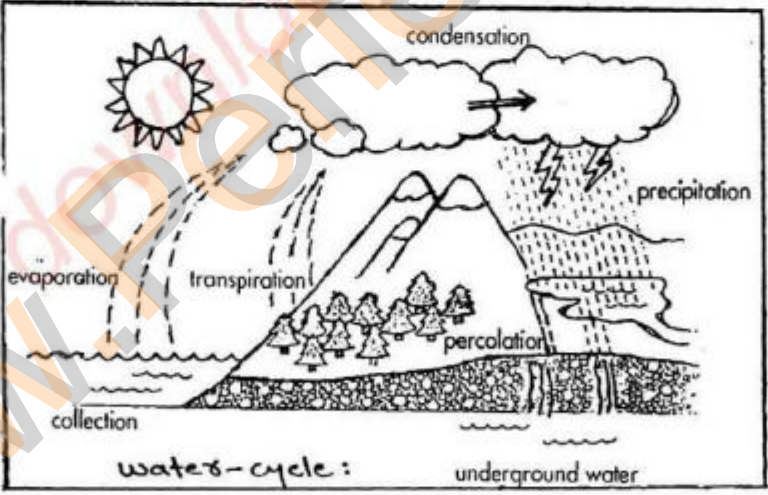
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plant transpiration are then get cool and condensed to form clouds and fogs in the sky.

5: precipitation :- <Rain fall> The clouds which are formed from water vapours, cool down precipitate the water due to wind or temperature change.

6: Runoff :- As the water pours down, it leads to runoff. Runoff is the process where water runs over the surface of earth. This runoff combines to form channels, rivers and ends up into lakes, seas and oceans. here the water enters hydrosphere

7: Infiltration :- a great amount of water is absorbed into the and form water ground channels or increase ground water table. This is called infiltration. It is called pure water and is.. ^{drinkable} a part of this water is again returned to atm; through evaporation.



water-cycle:

Q4 Describe the nitrogen cycle in detail.

Answer : Nitrogen : importance :- Nitrogen is necessary

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for the life of plants and animals because it is an — important constituent of protein, protoplasm and chlorophyll. It is required for the growth and development of the body. It is used in the formation of amino-acids and proteins. <u>Occurance :-</u> Nitrogen exist in 3-forms i.e- free form as N_2 (78%) , Reduced form as NH_3 and NH_4 , and — oxidized form as NO_2 and NO_3 . plants only absorb — nitrogen in nitrate (NO_3) form, while animals obtain nitrogen by eating plants. <u>Nitrogen cycle:</u> <u>Definition :-</u> The continuous flow of nitrogen from air to soil and from soil to organisms and then back to soil or environment is called nitrogen-cycle. — OR — “The circulation of nitrogen between organisms and their — physical environment is called nitrogen cycle.” <u>steps of nitrogen cycle :-</u> The nitrogen cycle can be — broken down into 4-types of reactions and microorganisms play important roles in these different reaction steps. i.e- <u>1: Nitrogen fixation:</u> <u>Definition :-</u> The conversion of free nitrogen (gase form) into compound form is called nitrogen fixation. <u>Methods of nitrogen fixation :-</u> Nitrogen fixation occurs due to the following 3-ways. <u>1- Atmospheric fixation :-</u> This occurs during rainy season during lightning (2/5) . about 5-8% nitrogen fixation occurs		

by this way. Lightning allows nitrogen and oxygen to combine to produce various oxides of nitrogen. These are carried by the rain into the soil where they can be used by plants.

ii- industrial fixation :- This is carried out by Haber process or ammonia synthesis.
$$\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$$

iii- Biological fixation :- Nitrogen-fixing bacteria fix 60% of nitrogen gas in the atmosphere.

Biological fixation:

Definition :- Fixation of nitrogen by living organisms is called as Biological fixation.

Explanation :- The conversion of free nitrogen into reduced form and then oxidized form with the help of nitrogen fixing bacteria is called biological fixation. It require 16-ATP — molecules and a set of enzymes



Nitrogen fixing bacteria :- All those bacteria which are — involve in nitrogen fixation are called nitrogen fixing bacteria.

Types of nitrogen fixing bacteria :- It has two types i.e—

1-Non-symbiotic nitrogen fixing bacteria :- Some bacteria and blue green algae take part in non-symbiotic nitrogen fixation in which they do not form any useful combination. They take nitrogen and change it into simpler compound. Some are used by these plants and remaining are —

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transferred to the environment or surrounding. <u>Example :-</u> Azobactor (Aerobic), clostridium (Anaerobic) Nostoc and anabaena - (blue green alga). <u>2- Symbiotic nitrogen fixing bacteria:-</u> symbiotic nitrogen - fixing bacteria form useful combination with different plants i.e. <u>i: in leguminous plants :-</u> Leguminous plants are not able to take nitrogen directly. In their root small rounded bodies are formed which contain bacteria (e.g- Rhizobia). These bodies are called nodules. These bacteria convert N_2 - into nitrates (NO_3) which are then used by plants. These bacteria get their food from plants. In this way they form a beneficial types of combination, termed as symbiosis. <u>Nodule formation:-</u> when a Rhizobium attacks on roots of leguminous plant, it causes infection in roots. The root - cells in response to infection develop a thread like structure called as infection-threads. This thread elongates (grow) and enters to other root cells forming a swelling structure called nodule. Thousands of rhizobia are enclosed in this nodule. <u>ii: In non-leguminous plants :-</u> Some bacteria are found in nodules of non-leguminous plants. i.e - <u>a: Frankia bacteria :-</u> Frankia bacteria infect the roots of Alder plant (non-leguminous plant) and form an actinorhizal nodules. <u>b: Anabaena Azollae :-</u> Anabaena is a cyanobacterium - which attack on new leaves of Azolla plant, as a result -		

nodule is formed which encloses anabaena azollae.

2: Ammonification:

Definition:- The conversion of organic form of nitrogen into ammonia (NH_3) by ammonifying bacteria is called ^{ammonification}.

Explanation:- When animals urinate or die and are buried in the soil, then the organic forms of nitrogen is converted into inorganic forms of nitrogen by ammonifying bacteria is called ammonification. A wide range of soil-fungi and bacteria called the decomposers carry out the ammonification process. The decomposers consume the organic matter and convert the nitrogen contained in dead organism into ammonium ions (NH_4^+). The ammonium is then converted again to nitrates (NO_3) by nitrify bacteria.

Chemical Reaction



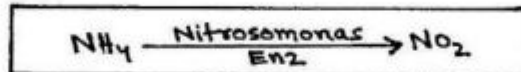
3: Nitrification: (ETEA-2012)

Definition:- Nitrification is the oxidation of ammonium compounds (NH_4) to nitrites and then to nitrate (NO_3) by the nitrifying bacteria.

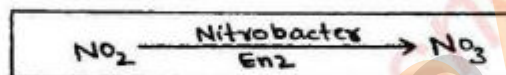
Explanation:- Nitrification process occurs in two steps each involving different bacteria i.e.-

1: In first step of nitrification, bacteria of the genus-

Nitrosomonas convert ammonium- (NH_4) ions to nitrites (NO_2) . nitrite is highly toxic to plant and animals in high concentration so it is further converted into less toxic.



2: In 2nd step of nitrification, bacteria of the genus - Nitrobacter convert nitrites (NO_2) into nitrates (NO_3) .



Nitrate (NO_3) is then absorbed by plants from soil.

Occurance:- Nitrification occurs in well drained and - aerated soil at neutral pH.

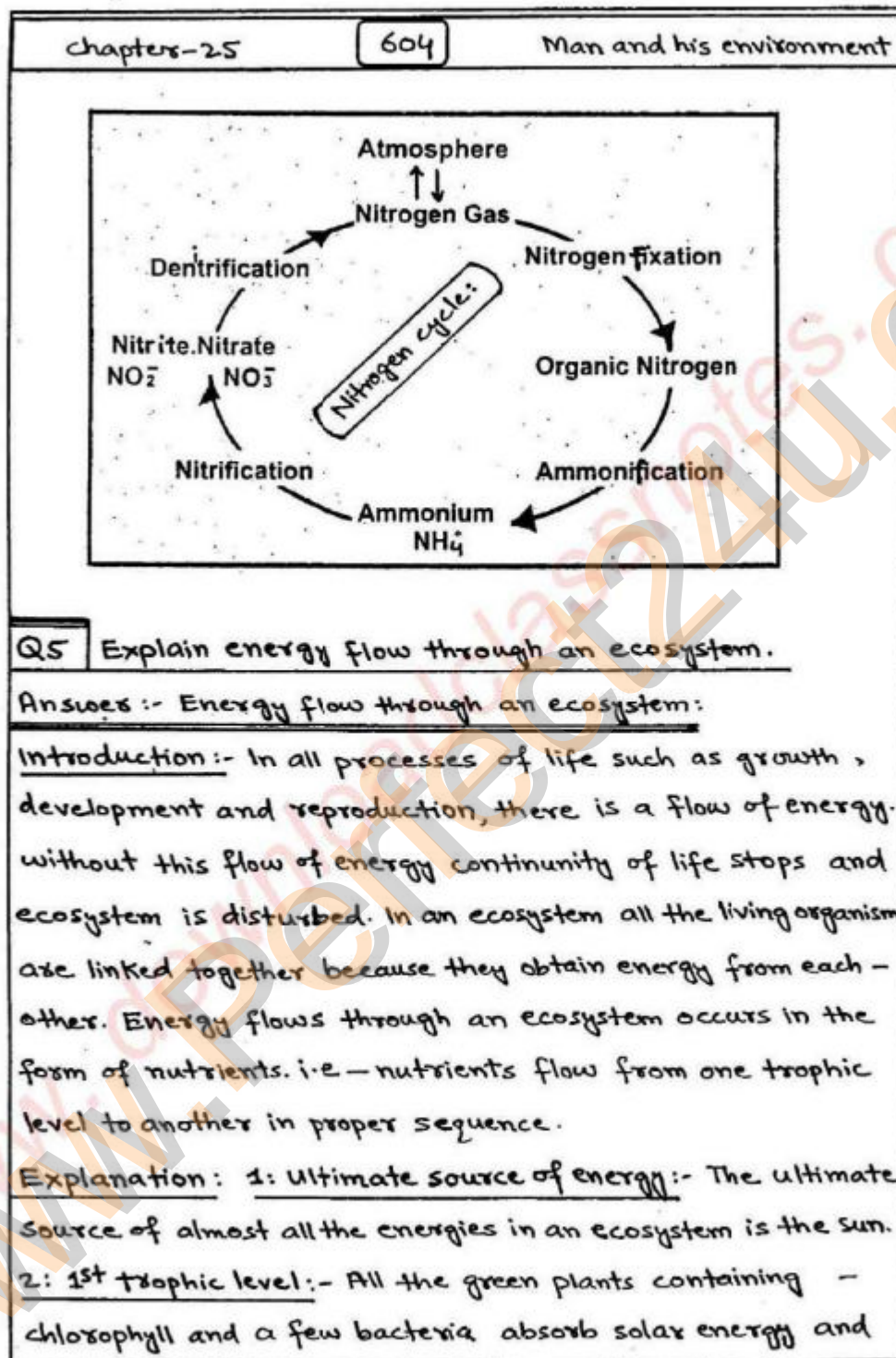
4: Denitrification:-

Definition:- The back conversion of nitrate (NO_3) to nitrite (NO_2) and then to free nitrogen (N_2) is called denitrification.

Explanation:- This process occurs in presence of bacteria called denitrifying bacteria (e.g- pseudomonas). The bacteria by itself get oxygen for respiration from breakdown of nitrates (NO_3) and the gases like nitrogen (N_2) is again escape to atmosphere. However this process reduce the soil fertility.



Occurance:- Denitrifying-bacteria carry out denitrification in extremely swampy and wet soil and in anaerobic conditions.



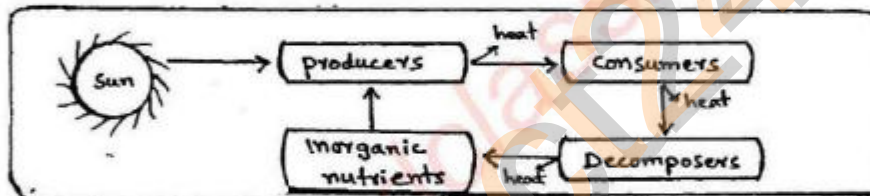
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fix it in the form of chemical energy in the molecules of glucose during the process of photosynthesis. That is why - they are called producer make 1st trophic level in ecosystem.		
3: <u>2nd Trophic level</u> :- The herbivores which are dependent completely on producers for their food and energy form the second trophic level. These organisms are called consumers.		
4: <u>3rd trophic level</u> :- consumers (predators) that eat - herbivores are called carnivores make up of 3rd trophic level in ecosystem.		
5: <u>Higher trophic level</u> :- If larger consumers or predators are present in an ecosystem and feed on herbivores and carnivores are represent the higher trophic level of an ecosystem.-or- organisms that feed at several trophic levels are classified at the highest of the trophic levels at which they feed.		
6: <u>Decomposers</u> :- Decomposers is organisms which break down the dead organisms and return nutrient or energy to the soil or atmosphere in a ecosystem which are again - available for producers to use and start cycle.		
<u>Use and flow of energy</u> :- (in a ecosystem) (ETEA-2007)		
1: about 1% of the total energy from the sun is trapped by the producers in an ecosystem. The remaining 99% of the solar energy is used to evaporate water, to heat up soil and is then lost to the outer space.		

2: As energy is transferred from one trophic level to the next, between 80% to 90% of the original energy is lost as heat and only 10% of energy is transferred to next level.

3: However a continuous flow of energy from the sun — compensates the ecosystem.

Factors that reduce energy flow :-

processes which reduce the energy transferred between — trophic levels includes — respiration, growth, reproduction, etc.



Note: the total amount of energy that comes from the sun is taken to be 100%. About 57% of this energy is absorbed in the atmosphere and scattered in space. About 36% is expended in heating water, land and also in the evaporation of water nearly, 8% of light energy strikes the plants, of which 80 to 85% is absorbed and only about 50% of it is utilized in photosynthesis.

Q6 what is productivity. Explain Gross and net productivity in different ecosystem.

Answers: productivity :-

Definition :- productivity is defined as the rate of — production of new biomass (organic matter) per unit time.

Types of productivity :- There are 2-types of productivity.

1: primary productivity :- It is the production of new — organic matter at producers level (in plants).

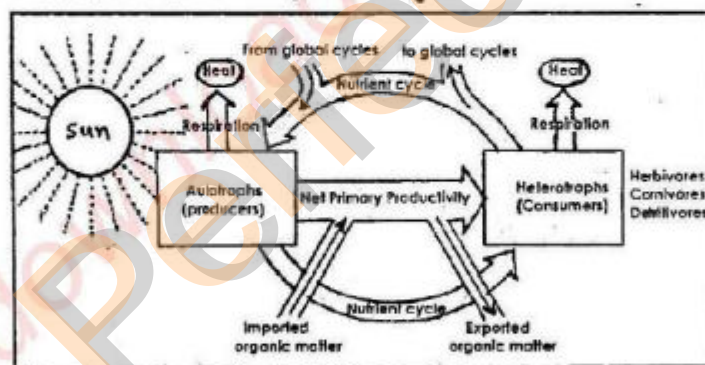
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<u>2: secondary productivity :-</u> It is the production of new organic matter at the consumer level or in animals.		
<u>Types of primary productivity :-</u> It has two types i.e.-		
i: <u>Gross primary productivity :-</u> The total amount of energy fixed by the green plants which produces during photo-synthesis is known as Gross primary productivity.		
ii: <u>net primary productivity :-</u> The amount of energy left behind after meeting the respiratory needs of the plants is net primary productivity which is expressed as the plant _{biomass} productivity in terrestrial ecosystem :-		
productivity in terrestrial ecosystem which is dependent on amount of available water, temperature duration and intensity of light. productivity increases with decreasing distance (coming close) to the equator. Inorganic nutrients such as - nitrogen, phosphorus may also affect the productivity		
<u>For example :-</u> on land, primary productivity is highest in the tropical forest while desert ecosystems have the - lowest productivity because their climates are dry and hot.		
<u>productivity in aquatic ecosystem :-</u>		
In oceans, productivity mainly depends upon the light and nutrients. In oceans primary productivity decreases with increasing depth from the surface. The availability of - nutrients both in oceans and fresh water limits or affects the productivity. light intensity is the most important factor		

In aquatic ecosystem which determines the productivity.

For example:- 1:- As light falls on surface and can -
penetrate to near surface water, so rate of productivity
is high on surface and near-surface water because -
producers are abundant here.

2: Marine primary productivity is high near coastlines and
other areas where upwelling brings nutrients to the surface
promoting plankton blooms.

3: Among aquatic ecosystems, algal-beds and coral reefs
have the highest net primary productivity while the lowest
rates occur in the open water due to lack of nutrients
in the illuminated surface layers.



Average net primary productivity
of Tropical rain forest is 25 -
times greater than desert one.

Q7 what is pyramid. Describe its different types.

Answer: Pyramid:

Definition:- An ecological pyramid is a graphical -
representation designed to show the numbers of organisms,
energy relationships and biomass of an ecosystem.

Discovery :- This concept was given by Charles Elton in 1927 and therefore called Eltonian pyramids.

Explanation :- In an ecosystem the food chain shows - different levels of nourishment. These levels are called as trophic level. These trophic levels are shown graphically by means of pyramids called ecological pyramids. In the pyramid the produce level constitutes the base of the pyramid and tertiary consumers or decomposers level makes at apex.

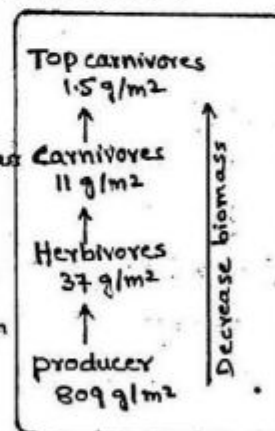
Types of pyramids :- pyramids have 3-types - i.e -

1. pyramid of Biomass:

Definition :- A 3-dimensional graph of weight of organisms in a given area over successive trophic level is called - pyramid of biomass.

Biomass :- The total amount of living - matter present in a trophic level is called biomass.

Explanation :- The receptive position of organisms within a given food chain is - called trophic level. These level start from producers and goes upto consumers and top consumers. The weight of organism is highest at lower trophic level (i.e - producer) which - gradually decrease as we go upward. Each level is - dependent on lower level and lower level determines that how much energy is available to the upper level.



For example :- The total biomass of producers is more - than the total biomass of the herbivores and the biomass of the carnivore-consumers is less than herbivores.

2: pyramid of number :

Definition :- A 3-dimensional graph of number of organisms in a given area over successive trophic level is called - pyramid of number.

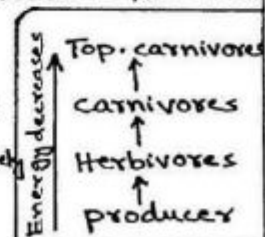
Explanation :- Each trophic level consists of number of organism. This number of organisms generally reduces as we go from bottom to top. This means that the number of organisms will be highest at 1st trophic level (producer) and decreases in next trophic levels gradually. This shape varies from ecosystem to ecosystem because the number of organisms at each level is variable. The pyramid of number is used in aquatic and grassland ecosystems.



3: pyramid of energy :

Definition :- The pyramid which shows the rate of energy flow or productivity at successive trophic levels is known as pyramid of energy.

Explanation :- pyramid of energy indicates the amount of energy available for successively higher trophic levels. In the most cases -



there is always a gradual decrease in the energy content at successive trophic levels from the producer to various consumers. This happens because during energy transfer from lower to higher levels, some energy is always lost. This pyramid is always upright and it gives the best picture of overall nature of ecosystem.

Q8 what is ecological succession. write its types.

Answers: Ecological Succession:

Definition:- The process of gradual and successive occupation of an area by different plant-communities is called succession — or — "The change in the community structure and non-living environment of an ecosystem over a period of time is also called succession."

Explanation:- Succession is a directional and non-seasonal cumulative change in the types of plant species that occupy a given area through time. It involves the processes of — colonization, establishment and extinction which act on the participating plant species. It is a kind of community relay. In this case plants and animals replace one another in a sequence.

Occurance:- Succession begins when an area is made — partially or completely devoid of vegetation because of disturbance. Some common mechanisms of disturbance are — Fire, wind storms, volcanic eruption, logging, climate change,

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Severe flooding, diseases and pest infestation. <u>pioneers and climax community</u> :- In each case the first species which initiate the succession are called as the - pioneers. While the final stable community in which population of different species remains uniform is called climax community. <u>Types on the basis of origin</u> :- on the basis of origin, - ecological succession are two types. i.e. - <u>1: primary succession</u> :- The succession which begins in an area that has not been previously occupied by any community is known as primary succession. primary succession begins from zero. It begins invading species called pioneers that established in the area. <u>2: secondary succession</u> :- The development of a new - ecosystem in area in which existing ecosystem is disrupted is called secondary succession. The secondary succession does not start from zero. The primary succession may be disturbed by fire or cultivation, etc, resulting in the elimination of the principal species. in such a case the succession developing later is called a secondary succession. <u>Types on the basis of Habitat</u> :- on the basis of location, ecological succession may be of the following types - <u>1: Hydrosere</u> :- <u><Hydrarch></u> when succession starts in - aquatic habitat or relatively shallow water, the seres (changes) are called hydroseres and the succession is called Hydrarch.		

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2: Xerosere :— Xerarch— when succession starts on a dry, bare ground or rock the seres are called xerosere and the succession is known as xerarch. It is started by pioneer species such as lichens and mosses, result in the gradual accumulation of soil which allows other plants, such as grasses and herbs, to become established.

Q9 What is xerosere. discuss its different stages.

Answer: xerosere :

Definition:— Succession that starts in dry habitats such as bare ground or rock is called xerosere.

Types of xerosere :— xerosere has two type i.e.—

- 1: Lithosere :— It is xerosere which starts on bare rock surface
- 2: psammose :— It is xerosere which start on sandy habitats.

Stages of lithosere or xerosere :—

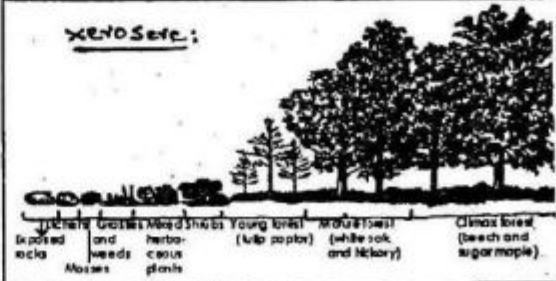
1: crustose lichen stages :— (ETEA-2018)

Meaning:— crustose means crust like because they form crust like layer over the rock surface.

pioneers :— crustose lichens are pioneers in primary succession.

Explanation :— on the bare rock surface there is — extreme deficiency of — water and nutrients. The soil is absent for the —

xerosere:



Bare rock
Lichens and mosses
Grasses and herbs
Young forest (Lup poplar)
Mature forest (white oak and Hickory)
Climax forest (beech and sugar maple)

penetration of roots. in such situations crustose lichens alone are grown. These lichens migrate to the rocks by wind-borne spores. They are attached to the substratum by their - mucilaginous cell wall. These spores or lichens absorb moisture from atmosphere. By their chemical and physical action they slowly and gradually corrode the rock-surface, which form - little soil. They also produce some acids which bring about Breakdown (weathering) of rock by loosing their particles. When these lichens die, their thali decomposed to humus. It result in the formation of a thin layer of soil on the rock surface.

suitable place for foliose lichen :- The promotes of soil building and the environment becomes suitable for growth of foliose and fruiticose types of lichens.

2: Foliose and fruiticose lichen stage :-

Meaning :- Foliose have leaf like thalli while the fruiticose lichens are small bushes.

Explanation :- As little soil is accumulated, some xeric foliose lichens are grow on the rock, and absorb moisture from - atmosphere. Foliose lichens grow rapidly and replace the - crustose lichens. Their dead remains are decomposed to humus which mixes with soil particles and help in building substratum and improving the soil moisture contents further. The lichen of this stage are - parmelia and Dermatocarpon which have large leaf like thalli (body).

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<u>Suitable place for mosses</u> :- The promotes soil building, Humus and moisture become the environment suitable for the growth of mosses.		
<u>3: Moss stage</u> :- sufficient amount of soil is accumulated in the crevices and depressions in the rock, mosses start to appear. Their spores are brought by air and get trapped by the humus.		
<u>Explanation</u> :- These mosses are xerophytic in nature. The mosses-rhizoids penetrate soil among the crevices, - secretes acids which corrode the rock. The Rhizoids also compete with lichens. These mosses form an open community. The body of mosses contains more organic and inorganic matter. By the rapid reproduction, growth, development, death and decay, a very thick layer of humus and soil is established.		
<u>Suitable place for herbs</u> :- Now this rock-surface becomes suitable for the growth of herbaceous vegetation.		
<u>4: Herb stage</u> :- The thick mat of humus and mineral particles provide a suitable habitat for the growth of herbs and grasses.		
<u>Explanation</u> :- Herbs mostly annual such as asters and evening primroses invade the rocks. Their roots penetrate deeply into rocks and secrete acids which cause further corrosion. The herbaceous plants overshadow the mosses, compete them for water, nutrients, soil, etc. The first		

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Short lived annuals, then gradually biennials and perennials herbs are appeared. The roots of these plants accelerate the process of disintegration of rocks. The soil increases in thickness. The climatic conditions also favor growth of fungi and bacteria which increase activity of decomposers. Due to the decay of various plants and parts, more - nutrients are added to the soil, as a result the soil fertility increases. <u>Suitable place for shrubs :-</u> Due to accumulation of humus and soil particles the place becomes more suitable for the growth of shrub-plants. <u>5: Shrub stage :-</u> When the rock is more or less covered with soil, due to suitable environmental conditions, shrubs - start migrating in the area. <u>Explanation :-</u> Early invasion of shrub species is slow but once a few bushes have established, birds invade this area and help in the dispersal of shrub seed. This results in denser shrub growth. The death and decay of herbaceous plants make the soil further enriched. The shrubs grow in size and number and continuously modify the soil. The soil - formation continues and its moisture contents enhance. The environment becomes mesic or moderately moist. The example of early invasion of shrub is "Rhus". <u>Suitable place for tree :-</u> Due to mesic condition, such place is now suitable for the growth of tree plants.		

6: Tree stage :- The new environment favors colonization of tree species. The kind of tree species in the new area depends upon the nature of the soil.

Explanation :- The first tree species which appear in the area are xerophytic in nature. They have much space b/w them and can tolerate less amount of water and nutrients. From the weathering of rock more soil is formed and soil-moisture is increased. Humidity also increases, now these xerophytic plants are gradually replaced by mesophytic trees. Due to mesic condition the mosses and ferns make their appearance and fungi population grows abundantly.

7: Forest or climax stage:

The succession ends up in the formation of climax community the forest. many intermediate tree stages develop prior to establishment of a climax community. It is stability is maintained by environmental conditions of that area - or - the type of forest depends upon type of climatic-conditions.

Q10 what is population dynamics. Describe the — characteristics of population.

Answer: population dynamics:

Definition :- The branch of science which deals with the study of short term and long-term changes in the size and age composition of population and the biological and

environmental processes influencing these changes.

Explanation :- Short-term and long-term changes in the size of population are mostly affected by biological and environmental processes. This actually describe that how - population is affected by birth and death rates, immigration and emigration, population decline, population aging, etc.

Characteristics of population :- population is a group of organisms (same individuals) in a specific area sharing the same resources. The population ecologist study the interaction of environment with population rather than a single individual overall population having the following characteristics.

1: population size :

Definition :- The number of individual per unit area is - called as size of population.

Explanation :- 1:- IF a population is defined in the term of some degree of reproduction isolation, then that population's size is the size of its gene pool.

2: IF population is defined in the term of some geographical - range then that population size is the number of individual in that defined area.

3: Ecologist usually prefer the later one because it is easy to do and is more practical if person wants to study impacts of population on environment and vice versa.

4: Although we can determine an average population size for

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many species, but the average is of less interest than the year to year or place to place trend in numbers.

2: population density:

Definition :- The number of individual organisms per unit area is called population-density.

Explanation :- population density varies from environment to environment. Various species definitely exist at different density in their physical environment. whereas same - species may be able to achieve one density in one environment and other in a different environment.

2: population distribution:-

Definition :- The pattern of occurrences of individual within geographical area is called population distribution.

Explanation :- There are following 3-types of distribution.

i: clumped distribution :- when the individuals of population are present in group forms in a particular area due to clumped distribution of resource in that area is called clumped - distribution of population. It may be due to attraction of organism to each other.

ii: uniform distribution :- when individuals of population are distributed in the same pattern in a particular area due to uniform distribution of resources in that area is called uniform

The diagrams show three circular areas representing a geographical region. Diagram i (clumped) shows individuals (represented by arrows) grouped together in a few clusters. Diagram ii (uniform) shows individuals spaced out evenly across the area. Diagram iii (random) shows individuals scattered in a non-uniform, non-clumped pattern.

distribution. It results in the active repulsion of organisms.

3: Random distribution :- when individuals of population are distributed in non-specific pattern in a particular area is called random distribution. It is due to minimal interaction of organisms with each other. It occurs in the absence of strong attraction and strong repulsion.

3: population growth:

Definition :- Increase in the number of individuals or size of population is called population growth.

Explanation :- population growth occur by the following 2-types

i: Intrinsic rate of population increase: (r_{max}) This is growth of population under the ideal-condition as fast as can means without limit. a population with higher r_{max} — $(rate-maximum)$ grow faster than lower r_{max} . The value of r_{max} is influenced by if life history of — individuals in population i.e— age at the beginning of — reproduction, Number of young produced and how well the young survive.

ii: Exponential growth :- Increase in number of population's individuals is called exponential growth. It occurs when the rate of increase per unit time is greater than 1. i.e— 1, 2, 4, etc. This increase occurs in the following manner.

→ 1, 2, 4, 8, 16 ——— etc. population increase by factor 2.

→ 1, 3, 9, 27 ——— etc. population increase by factor 3.

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→ 1, 5, 25, 125 -----etc. population increase by factor 5. Thus, in each case, rate of increase per unit time is greater than a factor of 1. e.g - 2, 4, 8, 16, etc.		
4: <u>Demography</u> :- Demos mean people. The study of - Structure of Human - population using statistics relating to birth, death, diseases, etc. is called demography.		
5: <u>limits on population growth</u> :- The phenomenon in which certain environmental factors do not allow population to grow ideally and limit the growth of population is called limits on population growth.		
6: <u>carrying capacity</u> :- It is denoted as K.		
<u>Definition</u> :- Every habitat can occupy by a specific number of individuals in its. This is called carrying capacity. (K).		
<u>Explanation</u> :- Ecologist defined carrying capacity - "as the maximum stable population size that particular area can support over a period of time." In such cases when the population becomes overcrowded, then the amount of - necessary substances decreases and thus the individuals can - not satisfy their needs. Carrying capacity is a property of population and is varies with over space and time. a population size reach to carrying capacity when the amount of some key resources declines per capita i.e - higher death rate and lower fecundity, etc. Thus a population size - approaches carrying capacity the rate of population growth.... decreases		

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Q11 Discuss the problems related to rapid growth in human population.

Answer: Problems due to rapid population growth:

Introduction:- population of world increase continuously - day by day which put pressure on resources like - water, Land, energy and food, etc. As the resources are limited while population rate is beyond their tolerance range, so great focus should be on the population rate. They that is why may produces the following problems.

population reports and problems :-(Due to rapid growth)-

- 1: According to united nations and world bank report 1-2 billion humans are now malnourish.
- 2: 80-millions peoples are malnourished in chain.
- 3: The world population is projected to double from about 6-billions to more than 12-billion is less than 50-years.
- 4: There is always reduction occurs in agriculture land due to over-population. where as 99% food comes from land and 1% from aquatic bodies. at present, Fertile crop land is being lost at an alarming rate.
- 5: Both human and agriculture need clean water to live, so it is very difficult to supply water to such huge number of human's and agriculture plants.
- 6: 87% of world fresh water is not recoverable as - consumed in agriculture during growing season.
- 7: about 1-hector of corn will loss water more than 5-million liters of water during one growth period.

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8: 90% of diseases occurring in developing countries result from the lack of clean water.

9: 4-billions cases of diseases are contracted from water and 6-million deaths are caused by water borne diseases every year. (20% world population live in developed countries, while 80% population live in developing countries.)

10: like wise the number of peoples living in Urban areas is doubling every 10-20 years which are may creating — environmental problems like — water pollution, air pollution, food shortage and increase diseases.

11: Rapid population also heavily rely on fossil-fuels which is again a very serious issue. This will result in air pollution destroying health of both plants and animals.

12: It will put lot of pressure on natural resources like — forest in order to get food, fuel, fodder, etc.

13: Natural habitats of animals will be diminished due to — deforestation in order to prepare soil for building, road, and agriculture. Soil will be exposed to erosion.

Q12 Explain the pakistan population planning policies & problem

Answers: pak; population planning and problem:

Introduction :- The population of our country is increases day by day. This increase is due to more birth rate (natality) than death rate (mortality). In 1950 mortality rate was 27/100. while in 1990 this rate dropped 12/100. similarity in

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this period birth rate (natality) increase to 44/100. on average family had 6.2 children on average. <u>Family planning policies of Pakistan</u>: — In order to overcome this problem different measures have been taken since 1950. The following measures have been taken to control population. 1: <u>Family planning association and NGO effects</u>: — This programme initiated efforts to control population rate. Funds were also released in order to produce family planning medicines to aware the population about the seriousness of this particular issue. This was started in 1955 and was about to complete in 1960. 2: <u>Ministry of health planning</u>: — In 1960s ministry of health started a program in which intrauterine devices were introduced in order to avoid conception. 3: <u>population program 1971</u>: — Government has restarted its family control program in 1971 after the fall of Ayub Khan's government. In late December 1971, the population was estimated at 65.2 million. 4: <u>work of population division</u>: — Focus of population division was on the socioeconomic status of women. maternal and child health care program was also initiated in 1980. World population Day is an annual event observed on July 11, every year which seeks to raise awareness of global population issues.		

Q13 What is the human impact on environment.

Answer: Human impact on environment:

Introduction :-

All Living organisms including man, interact with non-Living environment in an ecosystem. They are inseparable from each other.

For example :- Until 19th century the population was small in relation to environment, so there was no significant shortage of resources. However with the increase in population man use resources in non-significant way which result in depletion of resources as well as produce bad effects like pollution, etc.

Impact on environment :

Human impacts on environment are as under.

- 1: Human is using continuously the resources of this earth to live comfortable life. This has created an unbalance in resources and population.
- 2: Over population, deforestation, urbanization and industrialization have caused bad effects on the environment.
- 3: more sewerage enters the rivers and more gases are released into the atmosphere.
- 4: industrial wastes, toxic chemicals and solid wastes have made the air, water and land polluted.
- 5: Thus, the lack of resources and unbalance in the environment have created numerous global problems.
- 6: Finally, the depletion of resources occurs.

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Q14	what is nuclear power. write its need and drawbacks.
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Answer: Nuclear power:

Nuclear power is the amount of energy stored in the atom. This energy is released by fission and fusion reaction - which can be stored or even use in electricity generation.

Need of nuclear power:-(Importance)

- 1: Fission and fusion reaction during nuclear power reaction provides energy without releasing green house gases such as CO_2 , etc.
- 2: Nuclear generates nearly 55% of the country's clean energy by using uranium instead of burning fossil fuels.
- 3: Since nuclear power plants use so little fuel, the volume of nuclear waste is much smaller than the volume of waste from fossil fuel power plants.
- 4: Nuclear power is economically comparative with coal, and generally considered much cheaper than oil or natural gas.

Drawbacks of nuclear power:-(Disadvantages) There are several drawbacks of nuclear energy. These are as follows

- 1: safety :- This is concerns about the safety of nuclear-fission-reactors including the possibilities of radiation - releasing nuclear accidents, nuclear waste disposal and finally nuclear weapon proliferation.
- 2: Reactor accidents :- Nuclear reactor accidents are one

of the serious problems associated with nuclear energy. lot of such accidents have been faced by many countries. one of them was Chernobyl accident in Northern Ukraine. This has released about 100 curies (unit of radioactivity) radioactive materials into the atmosphere. Though health damage was not as much high but confidence of public with regards to safety of this energy became fragile.

3: Radioactive waste disposal :- just after separate from reactor wastes are transported to swimming pool storage facilities to dissipate the heat of decay of short lived isotopes as well as for isolation from environment.

The long term disposal of these waste cause major problems.

4: Impact on aquatic life :- The solid and liquid wastes of these power plants when released to aquatic ecosystem so it affects the aquatic organisms.

5: major impact on human :- Emission of radiations or wastes from the power plants may cause serious diseases such as skin cancer, bone marrow, lungs, and blood cancer. childrens are born with defects due to nuclear effect.

Do You Know?

Nuclear accident at Chernobyl was one of the worst event in the history of nuclear age.



Q15 Write the different sources of CO_2 emissions

Answer: sources of CO_2 emission:

Introduction:- There are both natural and human sources of CO_2 -emissions. Natural sources including- decomposition, ocean release and respiration. While human sources come from activities like- cement production, deforestation as well as burning of fossil fuels like- coal, oil and natural gas.

Sources of CO_2 Emission:

1: Fossil fuel combustion:- The largest human source of CO_2 emission is from the combustion of fossil fuels. This produces 87% of human CO_2 -emission. Burning of these fuels releases energy which is most-commonly turned into heat, electricity or power for transportation.

2: Electricity and heat sector:- Electricity and heat generation is the economic-sector that produces the largest amount of man-made CO_2 -emission. This sector produces 41% of fossil fuel related to CO_2 -emission.

3: Industry:- within industry-sector there are following six-industries which represent majority of energy use. They are- petroleum refining, chemical production, primary metal production, paper, food, and mineral-production. These industrial-processes result in production of CO_2 -emission.

4: Residential and commercial:- This is also the main source of CO_2 -emission like domestic use of natural gas and

oil for heating, lighting and cooling purposes which - emit too much CO_2 gas.

5: Transportation :- This is the second largest source of CO_2 -emission. Energy used in transportation is petroleum base like - gasoline, diesel and jet fuel. automobiles - account for almost two-third of CO_2 -emissions from - transportation sector and emission of CO_2 have steadily grow since 1990. other sources are boats, trains and aircraft.

6: Deforestation :- The removal of forest is called deforestation. Plants keep CO_2 -balance in environment. Due to the deforestation this balance is disturbed and cause CO_2 -amount raise in environment resulting in global-warming. So - deforestation is a significant source of CO_2 emissions globally.

Note: Correlation between rising CO_2 level and Global warming:

Biologists have developed a relationship between average levels of CO_2 in the atmosphere and average global temperatures. As CO_2 levels have increased, so have temperatures. This pattern, in which two variables change in similar ways, is called a correlation. Rising CO_2 might cause temperature to rise, rising temperature might cause CO_2 to rise, or other variables might cause both CO_2 and temperature to rise.



Carbon dioxide Emission

Q16 what is global warming. Explain green House effect.

Answer: Global warming :-

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<u>Definition</u>:- The gradual increase in the average temp; of earth surface as well as its atmosphere due to green house gases and as a result climate changes occurred. This is called global warming. <u>Explanation</u>:- Global warming is when the temperature rises as the earth heats up. It happens when green house gases such as - water vapour, Nitrous-oxides and CH_4 trap heat and light from the sun in the earth's atmosphere which increases the temperature. This increase earth temperature effects many people, animals and plants called global warming. <u>Green House effect</u>: (ETEA-2006) <u>Definition</u>:- The capacity of certain gases in the atmosphere to trap heat emitted from the earth surface, thereby - insulating and warming the earth is called green House effect. <u>Green House gases</u>:- Green House gases are those which prevent heat escape out from them. examples of green house gases are - CO_2, CH_4, CFC, nitrous oxide. <u>Explanation or mechanism</u>:- <Correlation b/w CO_2 & global warming> 1: Normally the solar radiation strikes the earth and heat it up. The heated earth re-radiates the absorbed heat energy back into the space through normal thin layer of CO_2. 2: But due to abnormal thick layer of atmospheric CO_2 acts like the glass of green house which allows the solar - radiation to enter but prevents the exist of heat waves		

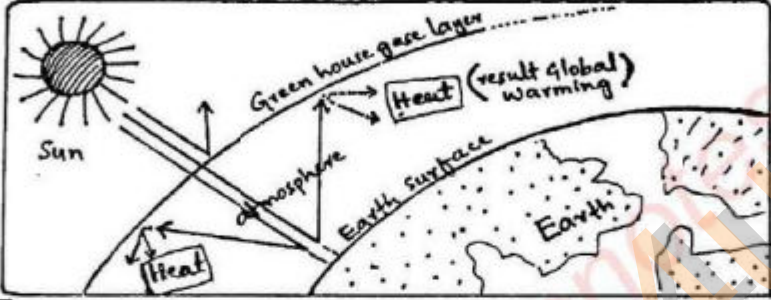
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and increase temperature and heat of atmosphere.		
3: The increasing temperature on earth due to green house - effect is now termed as global warming.		
<u>Causes of green House effect :</u>		
1: uncontrolled burning of fossil fuel such as-coal, oil, gas, release large quantities of CO_2 into air.		
2: Breathing of animal also release CO_2 in atmosphere.		
3: Over urbanization and deforestation are also responsible for green house effect or global warming.		
4: Other factors like change in cloud covers caused by increased -evaporation.		
<u>Harmful effects:</u>		
1: Due to green house effect, it is believed that global temperature may rise from 1.5°C to 4.5°C by end of the next century.		
2: The ice caps and glaciers start melting with greater speed which can cause flooding.		
3: Floods can cause soil-erosion and destruction of properties, habitats, vegetations, and human lives.		
4: Floods can cause silting and reduce life of dams.		
5: Floods can increase or rise sea level. In return it can destruct coastal areas.		
6: In short, global warming will cause destruction to all forms of life and severely imbalance all the ecosystem.		
7: Due to global warming, the temperature increase, which affects the productivity of crops.		

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8: Due to high temperature the aquatic life will also be disturbed.

9: It also cause change of season and change precipitation ... patterns.

10: It also cause Desertification.



Q17 Define Acid rain. write its causes and effects on Env;

Answer: Acid rain :- (ETEA-2013)

Definition :- Rain containing acids are called acid rain.

pH value :- Decrease in the pH of rainfall is called acid rain. The pH of rain water become low which ranges from 3-6. (5-6)

Explanation :- (ETEA-2009, 2012)

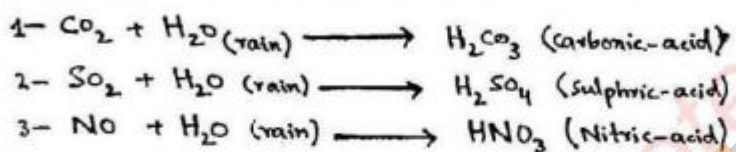
SO₂ and NO₂ in the atmosphere dissolve in rain water to form sulphuric-acid and Nitric-acid. rain containing these acids is known as acid rain.

Causes of Acid rain :

- 1: Acid rain is caused due to excessive accumulation of acidic gases such as - CO₂, NO₂, SO₂. etc.
- 2: These gases are given off by Factories and locomotives (vehicles) that run on fossil fuels such as - petrol, diesel, etc.
- 3: These gases are dumped into the atmosphere and dissolve rain water to make it acidic.

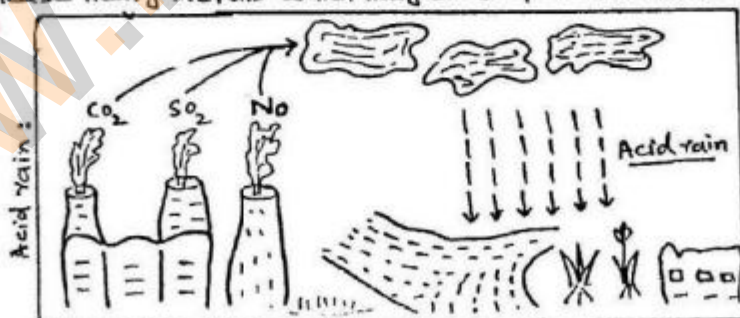
Formation of acid rain :- The acidic oxides of carbon,

nitrogen and sulphur are highly soluble in water. These gases react with rain water producing different acids, which come down with the rain water and make the rain acidic as below.



Effects of Acid rain :- Acid rain has following harmful effects.

- 1: It Increase acidity of soil which affect plants growth.
- 2: It also increase the acidity of aquatic bodies where it damage fish fauna, hydrophytes, etc.
- 3: It cause stone cancer and thus damaging buildings.
- 4: Destroys young buds and flower, etc.
- 5: causes various diseases like - skin diseases in animals.
- 6: Due to acid rain plants suffer from stunted growth and damage - bark.
- 7: chlorophyll is also destroyed so affected photosynthesis.
- 8: Acid rain washes nutrients out of soil and affect ions exchange.
- 9: destroys the necessary nutrients present in the waters.
- 10: release heavy metals which may cause potential threat to human.



Q 18 write note on ozone layer and their depletion.

Answer: Ozone layer:

Definition:- Ozone layer is a layer of atmosphere which filters most of UV-radiation and protects us from these - harmful rays of the sun.

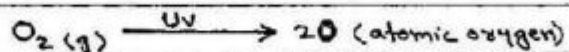
Thickness:- It extends from 10-50 km above the earth.

Colour:- In its pure form ozone gas is bluish, explosive and high poisonous. ← (ETEA-2013)

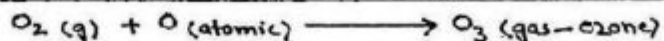
Function of ozone layer:- 1:- The main function of ozone-layer is absorption of the sun UV-radiation, thus protecting the earth including humans, animals and plants from its harmful effects.
2: Ozone is considered to be an important atmospheric - pollution liquidator. i.e- its atom attract harmful chemical substance from the atmosphere and thus providing the - creation of a new compound harmless to the environment.

Formation of ozone: (origin) Ozone is formed from oxygen in the presence of UV-radiations of sun. The - formation of ozone occurs in two steps. i.e-

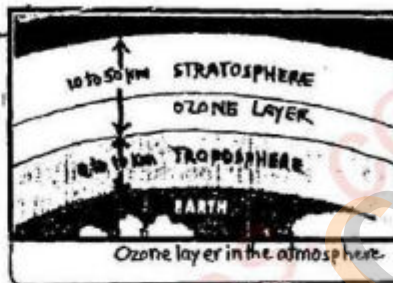
1: In the 1st step, oxygen molecule is splitted into oxygen atoms by absorbing sun U.V-radiations.



2: In second step, the atomic oxygen which is highly reactive reacts or combines with molecular oxygen to produce ozone.



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<u>Measurement unit</u> : - < Dobson unit > The measurement unit defining ozone layer thickness is Dobson - unit (DU). 100-Dobson units - indicate that the ozone layer is 1mm thick because $100\text{ DU} = 1\text{ mm}$. (ETEA-2010, 2011)		
<u>Ozone depletion</u> :- Decrease in the thickness of ozone layer due to certain gases is known as ozone depletion. -OR- "The decrease in the concentration of ozone in stratosphere below its normal or natural level is called ozone depletion"		
<u>causes of ozone depletion</u> :- The main ^{cause} of ozone depletion is CFC		
<u>Chloro fluorocarbon : (CFC)</u> :- The main cause of decline in thickness of the ozone layer is the increasing level of the gases called chlorofluorocarbon (CFC) which contain - chlorine, Fluorine and carbon. These gases are produced from the air condition refrigerators and various vehicles.		
<u>Mechanism of ozone depletion</u> :- As the CFCs rise to the atmosphere, UV-radiations break CFCs to release Fluorine - and chlorine. The fluorine and chlorine break the ozone into oxygen faster than it can be formed from oxygen. a single chlorine atom can react with UV-rays and destroy about one million ozone-molecules and convert them into oxygen.		
$\text{Cl} + \text{O}_3 \longrightarrow \text{ClO} + \text{O}_2 \xrightarrow{\text{O}} \text{Cl} + \text{O}_2$		



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<u>Harmful effects of ozone depletion:</u> (ETEA-2011)		
As the ozone layer become thinner, more UV-radiations from the sun reach to the earth. UV-radiations are generally very dangerous to human health and causing the following chronic and acute problems.		
1: These rays affects all life on earth by increasing temperature.		
2: These can also affects the weather patterns or seasonal changes.		
3: chronic skin cancers and damaging as called photoaging.		
4: 10% decrease in ozone could cause on extra 300,000 - non-melanoma and 4500 - melanoma skin cancers per year		
5: UV-B - radiation damages certain skin-cells which act as protecting shield against diseases.		
6: UV-radiation also weaken our immune-system.		
7: It damage our eyes and cause irritation and even eye-cancer which lead to blindness.		
8: Every year 16-million peoples in the world suffer from blindness due to transparency loss of their eye-lenses.		
9: According to WHO 20% cases of blindness are due to UV-exposure.		
<u>Q 19</u> Discuss the chernobyl accident-1986.		
<u>Answer:</u> chernobyl accident-1986:		
<u>Introduction :-</u> On 26-april-1986 Chernobyl accident was the most serious accident of nuclear power industry. The		

high amount of radioactive materials was released and the reactor was completely destroyed.

Explanation :- 1:- The chernobyl power complex is situated

about 130 km north of Kieve, Ukraine, consisting of four nuclear reactors, each producing 1000 megawatts of electric power.

- 2: The main cause behind this accident was flawed — designing of reactors and its operation by inexperienced and untrained personnel at reactor unit-4.
- 3: after accident the radioactive materials (about 5%) was released to air about 10-days due to which 28-people died within few weeks, due to acute radiation poisoning Syndrome.
- 4: The accident also destroy 14-reactors, killing 30 — operators and fire man.
- 5: According to UNSCEAR, it not only cause thyroid-cancer but there is no evidence of a major public health — impact attributable to radiation exposure 20-years — after this accident.
- 6: Acute radiation syndrome was also diagnosed in about 237-patient.
- 7: This accident caused serious social and economic — disruption for large populations in Belarus, Russia and Ukraine, because radioactivity was spread by the wind.
- 8: Millions of acres of forest and farmland were contamin-ated.
- 9: In addition, an subsequent years many livestock were born deformed.

10: Chernobyl Unit-2 was shut down after an 1991 fire, and Unit-1 remained on line until 1996. Chernobyl Unit -3 continued to operate until 2000, where the nuclear power station was officially decommissioned.

Q20 what is environmental resources. write the causes of resources depletion.

Answer: Natural Resources:

Definition:- The things that man requires for his survival and comfort are called as resources.

Types of resources:- Resources are 2-types. i.e-

1: Non renewable resources:- Exhaustable

Definition:- Those resources which cannot be renewed when once utilized are called non-renewable resources.

Example:- Fossil fuel (oil, natural gas, coal), diamonds, iron ore, mineral, gold, silver, platinum, rock, etc.

2: Renewable resources:- Inexhaustable

Definition:- Those resources which can be renewed and replaced when once utilized is called renewable sources.

Example:- Animals, insects, reptiles, plants, water, solar and wind energy. $\leftarrow$ (ETEA-2008, 2010)

Depletion of natural resources:- Resources: depletion is a term referring to the exhaustion of raw materials within a region. Use of resources beyond their rate of replacement

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is considered to be resource depletion. Resources depletion is most commonly used in reference to the farming, fishing, mining and fossil fuels. <u>Causes of resource depletion:-</u> common causes are below. <u>1: Human activities:-</u> Man is the main cause of resource depletion. His activities are continuously consuming natural environmental resources with the rate beyond the rate of their renewed. <u>2: Factors that cause depletion of resources:-</u> The following are the some of the factors through which man is depleting natural resources. <table border="0"><tr><td>2: over population.</td><td>1:- over consumption.</td></tr><tr><td>4: irrigation.</td><td>3:- Erosion.</td></tr><tr><td>6: Non equitable distribution of resources.</td><td>5:- Forestry.</td></tr></table> 7: cut and burn agricultural practices, currently occurring in many developing countries. 8: Technological and industrial development. 9: Mining for oil and minerals. 10: Aquifer (a layer of rock that absorb or hold water) depletion. 11: Habitat degradation leads to the loss of biodiversity. 12: Pollution or contamination of resources.			2: over population.	1:- over consumption.	4: irrigation.	3:- Erosion.	6: Non equitable distribution of resources.	5:- Forestry.
2: over population.	1:- over consumption.							
4: irrigation.	3:- Erosion.							
6: Non equitable distribution of resources.	5:- Forestry.							
Q21	What is non conventional energy sources. write its types.							
<u>Answer: Non conventional energy sources:</u> They are very vast and cannot be diminished. They are also								

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renewable energy resources. Some of these are given below.		
<u>Types :</u> 1: <u>Tidal power:</u>		
<u>Introduction :-</u> Tidal power has been used by human since — ancient times. They run their mills by using tidal energy of water tides generated by combined actions of sun moon and gravitational forces.		
<u>Explanation :-</u> Tidal power can be used for the production of electricity. It will require a dam on a bay. This dam is filled and emptied at high and low tides. The power of rising and falling tides is used in a tidal power station to generate — electricity. But this type of dam faces some problems.		
<u>2: wind power:</u>		
<u>wind :-</u> moving air or air in motion is called wind.		
<u>Explanation :-</u> The wind mills or wind turbines use wind — energy to drive generators which produce electricity. wind — costs nothing and does not cause air pollution. However, the wind mills stop when wind stops blowing. The wind mills should be installed at the places where winds are strong and steady so as to ensure continuous supply of electricity or mechanical energy.		
<u>problem with wind power :-</u> it is a cheapest source of power production but some problems are associated with it i.e — uncertainties of wind and the problem of energy storage.		
<u>3: Ocean thermal radiation:</u>		
<u>Explanation :-</u> In tropic seas, the temperature of the —		

Surface rises above 25°C , while in depth the temperature of water is only 5°C . Due to this, an ocean thermal gradient develops and heat is conducted from the region of higher to lower temperature. Technology has been developed to use this difference of temperature to run the turbine for the generation of electricity.

problem :- There are certain ecological-problems for marine life related to this method of energy production.

4: Geothermal power:

Introduction :- Volcanoes, hot springs and geysers release hot substance or heat energy from the earth. This natural heat energy trapped underground is termed as geothermal power.

Explanation :- The interior of the earth is very hot ($1000-1200^{\circ}\text{C}$) when the surface water penetrates it turns into steam which could be used for electric power generation. geothermal power is cheap and may remain available for long time. But it pollutes the environment. Substances such as—boron and oxides of sulphur are also released along with hot water or steam. Thus geothermal energy is produced due to natural radioactive decay in the core of the earth which works like a huge nuclear reactor. In some cases drilling deep into the earth enables us to exploit it, if the geothermal energy cannot reach the surface of earth.

Geothermal power plant :- Geothermal power plant is used

to convert geothermal heat into electricity.

5: Solid wastes :- Different solid wastes form a great source of environmental-pollution. These wastes can be converted into gas or oil by the following 3-scientific processes

i: Hydrogenation and pyrolysis :- In hydrogenation and pyrolysis the solid wastes are burnt in incinerators at high pressure. They produce hot gases, which can be used to generate electricity.

For example :- Burning 400-tons of wastes can generate 15000 Kilowatts of electric power.

ii: Bioconversion :- In bioconversion the wastes are digested and degraded by microorganisms (like bacteria) to produce methane gas as a fuel. Pakistan is suitable for biogas production.

6: Solar energy :-

Introduction :- Sun is the ultimate source of energy for running the whole ecosystem and also the life of all living organism. There are many ways of utilizing solar energy. Solar energy is one of the renewable resources which has been used from the early life and will be used for billion of years in future. The flow of solar energy is 1360 W per square kilometer.

Explanation :- Sun is the greatest source of energy. Some of solar energy causes evaporation of water leading to rains. Some of it is used in photosynthesis. There are three main application of solar energy i.e. -

- 1: The heating and cooling of building.
- 2: The chemical and biological conversion of organic materials
- 3: Conversion of solar energy to electricity.

Q22 What is conventional sources of energy, write its types.

Answer:- Conventional sources of energy :- These resources are found inside the earth in fixed quantities. if consumed harshly, will no more be available in future. They are — depleted on their use and they are non renewable.

Types :- Conventional sources of energy usually include — fossil fuels (coal, natural gas, oil) and nuclear power. i.e

1: Fossil Fuels :- Natural gas, coal and oil are called fossil fuels. They are called fossil-fuels because they are formed from fossilized ancient plants and animals in the deeper layers of the earth and sea. The fossil fuels supply us 95% of our energy requirement. ←(ETEA-2007)

2: Nuclear power:- The energy released by the splitting of nucleus of radioactive atoms is called nuclear energy. The — process of splitting of the atom is known as fission reaction. nuclear energy is exhaustible source of energy at present there is only one nuclear power plant in Pakistan located at Karachi which supplies only 2% of the power requirement of the country.

Advantages of conventional sources: (Benefits)

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1: <u>coal</u> :- coal can be found in lots of places in the world. It can be easily transported to the power stations and – relatively cheap energy source. 2: <u>oil and natural gas</u> :- oil and natural gas are found in lots of places in the world and easily transport and provide energy. 3: – The fossil fuels supplies us 95% of our energy requirements. 4: – construction of power plants is easy and can be done near cities. 5: <u>Nuclear fuel</u> :- Nuclear fuel does not make harmful green-house gases. you only need a very small amount of nuclear – fuel to make a lot of energy. <u>Disadvantages of conventional sources</u> :- 1: conventional resources of energy have a limited supply – because eventually the nuclear elements and fossil fuels will be used up. 2: Burning fossil fuels release significant amounts of green-House gases and contribute to acid rain. 3: The burning of fossil fuels adds excessive amount of CO_2 and CO, oxides of nitrogen and sulphur. This is the main – cause of air pollution. 4: The solid and liquid –wastes of nuclear plants are radio – active. They release radiations which cause problems. 5: Emission of radiation from the plants or wastes may cause serious diseases such as– skin cancer, bone marrow, lungs and blood cancer. etc. 6: – Release of huge amount of heat into air and water can upset terrestrial and aquatic ecosystem.		

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Q23	Discuss the role of government and NGOs for - promoting environmental Awareness.
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Answer: Role of Govt; and NGOs:

Introduction :- As for our country is concerned it has -
focused to raise living standards of its citizen by developing
them economically and having no focus on the environment
where he lives. unchecked use of hazardous chemicals ,
vehicle emissions , and industrial-activity has contributed
to a number of environmental and health problems. like other
countries of the world , pakistan is also suffering from -
pollution as a major environmental problem.

Role of pak-Government and NGOs :- Government of pak;
through environmental protection agency and by the help of
various NGOs is promoting environmental awareness in public
i.e.-

- 1: Awareness :- Enhance awareness among people in respect
of the environment and protection of nature (wild life).
- 2: Community participation :- To set up and manage with -
community participation, institutions for the protection of
environment and nature or biodiversity (wild life).
- 3: Workshops :- To arrange workshops, seminar and formal
meetings to motivate people for the human development
particularly the youth regarding the case of environment.
- 4: Env; Health programs :- To undertake activities and -

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programs for the environmental health and protection of nature in new generation and to conserve resources.

5: Educate the peoples :- To educate people about pollution related diseases, their control and environmental disasters.

6: necessary measures :- Search out such solutions which could improve environmental health and wild life (nature).

— End —

Note for Question No-4:

For Question No-4

Rhizobium contains leghaemoglobin. Leghaemoglobin functions similarly to haemoglobin, i.e. it binds to oxygen. This provides sufficient oxygen for the metabolic functions of the bacteroids, but prevents the accumulation of free oxygen that would destroy the activity of nitrogenase. Frankia and Anabaena are able to exclude oxygen by carrying out the fixation in specialized structures known respectively as a vesicle and a heterocyst. The thick walls of the vesicle and heterocyst form an oxygen diffusion barrier.

Exercise

Exercise MCQs

A Multiple Choice Questions (MCQs).

1. Which of the following requires maximum energy?
 - a) Secondary consumer
 - b) Decomposer
 - c) Primary consumer
 - d) Primary producer
2. What is the direction of energy flow in an ecosystem?
 - a) Always unidirectional
 - b) Always bidirectional
 - c) In any direction
 - d) Always down directional
3. Which one is an example of non-denitrifying bacteria?
 - a) *Pseudomonas aeruginosa*
 - b) *Thiobacillus*
 - c) *Thiobacillus denitrificans*
 - d) *Bacillus ramosus*
4. The term used to express a community in its final stage of succession?
 - a) End community
 - b) Final community
 - c) Climax community
 - d) Dark community
5. Identify in the following the term in which all the living organisms that occupy an area undergoing primary succession in the beginning stages?
 - a) Climax community
 - b) Settled community
 - c) Dense community
 - d) Pioneer community
6. In which of the following process older communities of plants and animals are replaced by newer communities?
 - a) Evolution
 - b) Deforestation
 - c) Forestation
 - d) Ecological succession
7. Exponential growth occurs when there is
 - a) A great environmental resistance
 - b) No environmental resistance
 - c) No biotic potential
 - d) A fixed carrying capacity
8. The rate at which the new individuals are added to a population in a unit time is:
 - a) Density
 - b) Natality
 - c) Mortality
 - d) Dispersion
9. The term which defines the study of the characteristics and parameters of the population is:
 - a) Demography
 - b) Population ecology
 - c) Population density
 - d) Mortality

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10. Carrying capacity is:

- The maximum number of individuals that can fit into an area
- The ability of an environment to accommodate a growing population
- The greatest number of individuals that an area can sustain over the long term
- The maximum number of species that can co-exist in an area

11. which of the following is not a greenhouse gas?

- Ozone
- Hydrogen
- Nitrous oxide
- Methane

12. A change in the community structure of an ecosystem over a period of time is

- Ecological niche
- Ecological mutation
- Succession
- Genetic drift

13. In succession lithoseres takes place on:

- Sand
- Water
- forest floor
- Bare rocks

14. What would be expected to happen if all the nitrogen-fixing organisms ceased to exist?

- There would be no significant change in numbers of animals
- The total biomass would be reduced.
- All organisms would die out.
- The nitrogen level of the atmosphere would be increase.

15. Which of the following is NOT recycled in ecosystems?

- Carbon
- Sulphur
- Energy
- Water

16. The best way to increase food production from ecosystem view point is.

- to increase cultivable land by clearing forest
- use of excessive fertilizers
- use of high quality pesticides
- use of genetically improved varieties of seeds

17. The total energy from the sun is trapped by the producers in an ecosystem is about:

- 20%
- 10%
- 5%
- 1%

18. The study of human populations and things that affect them is called:

- Angliography
- Demography
- Mammography
- Homography

Answer: (key)

1-d	2-a	3-d	4-c	5-d	6-d
7-b	8-b	9-a	10-c	11-b	12-c
13-d	14-b	15-c	16-d	17-d	18-b

Short Questions

Q1: — which is the possible path of movement of nitrogen in nitrogen cycle.

Answer: path of movement of N_2 in Nitrogen cycle:

The possible path of movement of nitrogen in nitrogen cycle are involve five main processes of nitrogen cycle through, the biosphere, atmosphere and geosphere i.e.

1: Nitrogen fixation.

2: nitrogen uptake through organism growth.

3: nitrogen mineralization through decay.

4: Nitrification and

5. Denitrification.

Q2: — what are the primary source of energy that drive the movement of matter among reservoirs.?

Answer: — See Question No-21. (write only 6: solar energy)

Q3: — Give two reasons for the low rate of energy transfer within ecosystem.

Answer: Reasons for low rate of energy transfer :-

1: most energy is not transferred because it is lost as heat

2: Some of the organisms in a trophic level escape being eaten so they die and decompose, there their energy does not pass to a higher trophic level.

3: Some processes reduce energy transfer between trophic

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levels include- respiration, growth, reproduction, etc. 4: nutritional quality of material that is consumed also influence the flow of energy. Q4: - Explain why the same area can support a greater - number of herbivores than carnivores. <u>Answer: Herbivores VS carnivores in same area:-</u> <u>Introduction:-</u> Carnivores are higher up on the food chain. so, there are naturally less because there is less food. at each successive trophic level, only 10% of the energy is passed. <u>Explanation:-</u> The scientific reason for this has to do with trophic levels. As the trophic level increases, energy is lost as biomass. Carnivores are in one of the - top-trophic levels because they are secondary or tertiary consumers, while herbivores are primary consumers. They feed directly from plants which there is a greater - abundance of because they make their own food. so that is why herbivores are more in number than carnivores in area or ecosystem. Q5: - compare the transfer of energy with the transfer of nutrients in an ecosystem.								
<table border="1"> <thead> <tr> <th>Ans:</th><th>Energy Flow:</th><th>Nutrient cycling:</th></tr> </thead> <tbody> <tr> <td>1:</td><td>It is non-cyclic and linear movement in ecosystem.</td><td>1: It is cyclic movement b/w living organisms and env;</td></tr> </tbody> </table>			Ans:	Energy Flow:	Nutrient cycling:	1:	It is non-cyclic and linear movement in ecosystem.	1: It is cyclic movement b/w living organisms and env;
Ans:	Energy Flow:	Nutrient cycling:						
1:	It is non-cyclic and linear movement in ecosystem.	1: It is cyclic movement b/w living organisms and env;						

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2: It main source is sun.	2: It main source is environment.	
3: Energy is lost during - flow b/w trophic levels.	3: nutrient recycled in an - ecosystem without any loss.	
4: Energy is transferred from one form to another during flow in an ecosystem.	4: nutrient cannot transfer to other form during - flow in an ecosystem.	
5: It is unidirectional flow	5: It is cyclic pathway or flow.	
Q6: - List the mutual benefits in the association between nitrogen fixing bacteria and the plants that they inhabit. <u>Answer :-</u> See Question No-4. (write only - symbiotic nitrogen fixing bacteria in topic of Biological fixation).		
Q7: - predict the possible results of increasing amount of greenhouse gases released into the atmosphere by human activities. <u>Answer :-</u> See Question No-16. (write only - Harmful - effects or consequence of green House effect in - Question No -16).		
Q8: - Gives the names of organisms involved in biological - nitrogen fixation. <u>Answer :- Nitrogen fixing bacteria :-</u> Two kinds of - nitrogen fixing microorganisms are recognized. i.e 1: <u>non-symbiotic</u> :- Free living or non-symbiotic bacteria including the cyanobacteria - Anabaena and nostoc and genera such as Azobacter, Beijerinckia and clostridium. 2: <u>symbiotic</u> :- mutualistic or symbiotic bacteria such		

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as Rhizobium associated with leguminous plants.		
Q9:	- write down the advantages of conventional sources of energy.	
	<u>Answer: Advantages of conventional sources of energy:</u>	
	1: coal can be found in lots of places in the world. It can be easily transported to the power stations and relatively cheap energy source.	
	2: oil and natural gas are found in lots of places in the world and easily transport and provide energy.	
	3: The fossil fuels supplies us 95% of our energy requirements.	
	4: Nuclear fuel does not make harmful green house gases. you only need a very small amount of nuclear fuel to makes a lot of energy.	
	5: construction of power plants is easy and can be done near cities.	
Q10:	- what is the cause of ozone layer depletion.	
	<u>Answer:-</u> see Question No-18. (write only causes and mechanism of ozone layer depletion in Question No-18).	
Q11:	- what are the causes of depletion of natural sources.	
	<u>Answer:-</u> see Question No-20. (write only causes).	
Q12:	- Define and give the types of ecological succession.	
	<u>Answer:-</u> see Question No-8. (write only-definition and types).	
Q13:	- How does deforestation influence the environment.	
	<u>Answer: Deforestation:</u>	
	<u>Definition:-</u> The removal of green vegetation in an unwise and unplanned manner is called deforestation.	

Effects on environment : - It cause the following effects.

- 1: Deforestation cause the loss habitat of animals.
- 2: Removal of trees also affect (change) natural climate
- 3: Due to removal of forests soil erosion occurs.
- 4: Due to removal of forest there is maximum chances of flood.
- 5: Increased greenhouse gases in the atmosphere.

Long Questions

Q1: - Explain stepwise various events of nitrogen cycle in detail

Answer :- see Question No-4.

Q2: - what do you mean by the term productivity in terms of - gross primary productivity and net primary productivity.

Answer :- see Question No-6.

Q3: - compare and contrast pyramids of number and energy

Answer :- see Question No-7 (write only pyramid of - number and pyramid of energy).

Q4: - State ecological succession with reference to primary and secondary succession.

Answer :- see Question No-8.

Q5: - Explain the main events of xerarch succession.

Answer :- see Question No-9.

Q6: - what are the main reason for increasing concentration of CO_2 and describe its long term effects on planet earth

Answer: Main reason for increasing CO_2 :- There are many lines of evidence that clearly show that atmospheric CO_2 has increased to the highest levels due to human - behaviours. observational evidence indicates that this increase is caused by humans because the rise in CO_2 levels is consistent with recent industrial trends and emissions are largely linked to the burning fossil fuels (coal, gas, oil). i.e.- over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric CO_2 .

long term effects of CO_2 :-

- 1: The increase in concentration of CO_2 causes global-warming.
- 2: an increase in the amount of CO_2 creates an over-abundance of green house gases that trap additional heat. This trapped heat leads to melting ice caps and rising ocean levels which cause flooding.
- 3: Too much CO_2 , however, can kill animals because it can decrease the amount of oxygen reaching the body.
- 4: It also responsible for acid rain ($\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$).
- 5: The increase in concentration of CO_2 can cause headache, rapid pulse-rate, sweating, difficulty in breathing, high blood pressure, dizziness, etc.

Q7:- Enlist the main components of the ozone layer. Explain its role in protecting ^{components}.

Answer:- For main of O_3 layer, see the formation

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of ozone (origin) and for - role of ozone, write the functions of ozone layer in Question No-18.

Q8: - Do you think UV-radiations are a serious human health concern.

Answer:- See Question No-18. (write only harmful - affects of ozone depletion in Q-18).

Q9: - Briefly highlight the event which lead to chernobyl - nuclear power plant disaster in 1986.

Answer:- See Question No-19.

Q10: - Describe any 3- non- conventional sources of energy.

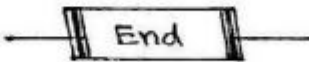
Answer:- See Question No-21. (write only 3-types).

Q11: - Describe the characteristics of a population.

Answer:- See Question No-10.

Q12: - Analyze the efforts of various government department and NGOs to educate people for the protection of - environmental resources.

Answer:- See Question No-23.

A rectangular box with the word "End" inside, flanked by horizontal lines on both sides.

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Previous Entry Test MCQ's of Biology Chapter No -25: (Man and his environment)		(a) Habitat (b) Biome (c) Community (d) Population
2005 ETEA		2008 ETEA
1. The ecological factor which does not change from place to place a) Precipitation b) temperature c) Gravity d) light		7. The association in which an organism gets advantage and the other suffers is called: (a) Symbiosis (b) Parasitism (c) Predation (d) Mutualism
2006 ETEA		8. Which one of the following does not bring about erosion of soil? (a) Carriers forming (b) Extensive ploughing (c) Moderate Grazing (d) Heavy grazing
2. Green house effects are NOT produced by the abundance of the gas called: (a) Methane (b) CO₂ (c) Nitrous oxide (d) SO₂		9. Each organism has a definite functional position different from either organism of the locally is called: (a) Community (b) Niche (c) Habitat (d) Specious
2007 ETEA		2009 ETEA
3. The largest demand of energy is generally fulfilled by: (a) Hydroelectric power (b) Nuclear energy (c) Solar energy (d) Fossil fuels		10. Food is renewable resource due to: (a) Mechanical formatting (b) Improved crop varieties (c) Continuous photosynthesis (d) Pest control
4. In an ecosystem having for tropic levels the amount of energy fixed at producer level is 23197 kcal about how much energy will be produced by the primary consumer: (a) 2317 kcal (b) 232 kcal (c) 1564 kcal (d) None of them		11. Crop rotation leads to: (a) Increase in the soil nutrient (b) More aeration (c) Soil fertility (d) All
5. In a pond ecosystem profundal zone is missing because: (a) Pond is shallow (b) Water is turbid (c) Producers are less (d) Water is turbulent		12. SO₂ is responsible for the formation of..... (a) Acid rain (b) Greenhouse effect (c) Global warming (d) Ozone depletion
6. Rabbits, pabulus, rats, grasshoppers and grasses constitute a:		2010 ETEA

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ETEA-MCQs

13. Chlorofluorocarbons (CFC) are mainly responsible for:

(a) Air pollution (b) Water pollution
(c) Acid rain (d) Ozone layer depletion

14. All of the following are nonrenewable resources of energy Except:

(a) Forests (b) Iron
(c) Petroleum (d) Natural gas

2011 ETEA

15. Ozone layer is present in the:

(a) Troposphere (b) Stratosphere
(c) Mesosphere (d) Atmosphere

16. C.F.C gases are produced from:

(a) Burning of coal
(b) Burning of charcoal
(c) Automobiles engine
(d) Refrigeration and air condition

17. The area where ultraviolet radiation is intense is the:

(a) Alpine forests (b) Boreal forests
(c) Arctic tundra (d) Alpine Tundra

2012 ETEA

18. A bacterium that converts NO_2 to NO_3 is:

(a) Rhizobium (b) Bacillus
(c) Nitrosomonas (d) Nitrobacter

19. Which one is not responsible for the formation of acid rain?

(a) CO_2 (b) SO_2
(c) CO (d) NO_2

2013 ETEA

20. Rain water becomes acidic, when the PH-value of rain water becomes:

(a) Greater than 6 (b) Greater than 6.5
(c) Less than 5.6 (d) Less than 5

21. Ozone gas is:

(a) Greenish, tasteless and light

(b) Greenish blue, bitter in taste
(c) Blue. Poisonous and explosive
(d) Purple yellow, nonpoisonous, on Explosive

2014 ETEA

22. A study of communities in relation to environment is called:

a) Social ecology b) Synecology
c) Auto ecology d) Heteroecology

23. "ARABLE" means ---

a) Not grown since long
b) Recently ploughed field
c) Watered the night before
d) Fit for cultivation

2017 ETEA

24. Identify the mismatch pair in the following.

(a) Cyanobacteria - primary producer
(b) Grasshopper - primary consumer
(c) Fungi - decomposer
(d) Zooplankton - secondary consumer

2018 ETEA

25. In nitrogen fixing bacteria, the nitrogenase complex is sensitive to:

(a) O_2 (b) CO_2
(c) NO_2 (d) NO_3

26. The first stage in development of xerosere is appearance of:

(a) Foliose lichens (b) Crustose lichens
(c) Fruticose lichens (d) Climax stage

Key: -

1.c	2.d	3.d	4.a	5.a	6.c
7.b	8.c	9.b	10.c	11.d	12.a
13.d	14.a	15.b	16.d	17.d	18.d
19.c	20.c	21.c	22.b	23.d	24.d
25.a	26.b				

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