Biomes

Biome can be defined as major ecological communities of flora and fauna, which generally extend over a large part of the earth surface and usually characterized by a distinct type of vegetation.

The main terrestrial biomes are:

1. Tundra
2. Coniferous forests/Temperate evergreen forests
3. Temperate Broadlead deciduous forests
4. Mediterranean Shrublands
5. Grasslands
6. Deserts
7. Tropical deciduous forests
8. Tropical scrubs/Thornwoods
9. Tropical rain forests

- F.E Clements and V.E shelford (1939) introduced the biome concept.
- Ecotone: boundary between two biomes.
- Bailey (1976) developed the concept of ecoregion.
- Ecoregions: Ecosystems based on a continuous geographical or landscape area across which the interactions of climate, soil and topography are sufficiently uniform to permit the development of similar types of vegetation.

Community

- A group of population of different species living together in a given area with mutual tolerance and beneficiary interactions is defined as community. The species may be plant, animal or microorganism.

ENVIRONMENTAL ISSUES

Deforestation

- It is the conversion of forest to another land use or the long-term reduction of the tree canopy cover.
- This includes conversion of natural forest to tree plantations, agriculture, pasture, water reservoirs and urban areas but excludes timber production areas managed to ensure the forest re-generates after logging.

Causes	Impact
Subsistence farming (48%)	• Physical and ecological processes, (e.g.disruption of hydrological regimes and loss of watershed protection).
Commercial agriculture (32%) Logging (14%) Fuel wood removals (5%)	• Soil and water resources, (e.g. soil erosion, loss of nutrients and increase in sediment loads in river systems) on local and global climate, e.g. albedo changes,changes in surface energy budget, and alteration of biogeo-chemical cycles (such as the global carbon cycle) leading to an increase in atmospheric CO2 and other trace gases, affect-ing the climate and caus-ing global temperature change, Diversity and abundance of terrestrial species through destruc-tion and fragmentation of habitats and the "edge effects", decreasing eco-logical complexity.

DESERTIFICATION

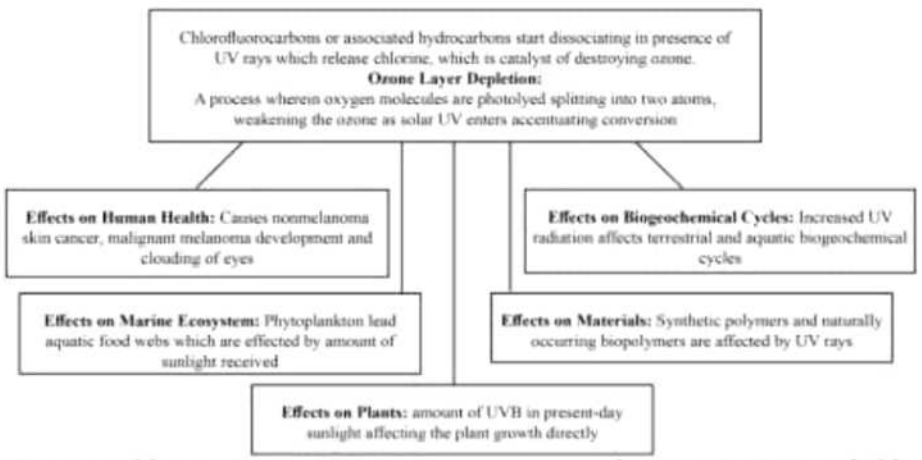
- The U.N. Convention to Combat Deser-tification (UNCCD) defines it as "land

degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities."

- This process is the result of a long-term failure to balance human demand for ecosystem services and the amount of ecosystem can supply
- The stress mounts on dry land ecosystems for providing services related to basic human existence.
- The situation worsens when combined with human factors (such as population pressure and land use patterns) and climatic factors (such as droughts).

Causes	Effects	Measures
Overgrazing	Soil becomes less usable	Afforestation and planting of soil binding grasses can check soil erosion, floods and water logging
Farming of Average Land	Vegetation is lacking or damaged	Crop rotation and mixed cropping improve the fertility
Destruction of Plants	Causes Famine in Dry Regions	Artificial bunds or covering the area with vegetation.
Incorrect Irrigation in Arid Regions	Food Loss	Salinity of the soil can be checked by improved drainage Causes a Build-up of Salt in the Soil

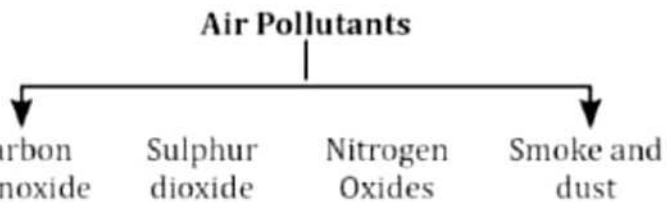
OZONE LAYER DEPLETION: CAUSES AND EFFECTS



According to UNICEF, more than 3000 children die everyday globally due to consumption of contaminated drinking water.

AIR POLLUTION

- The WHO defines air pollution as, "the presence of materials in the air in such a concentration which are harmful to man and his environment."
- Infact, pollution is the addition of foreign particles, gas and other pollutants into the atmosphere which have an adverse effect on human beings, animals, vegetation, buildings, etc.



***Air pollutants*:** The major air pollutants are

(i) **Carbon monoxide (CO):** It is produced by incomplete combustion of gasoline in motor vehicles, wood, coal, incineration and forest fires.

- It is deadly poisonous gas. It induces headache, visual difficulty, coma and death. It blocks the normal transport of oxygen from the lungs to other parts of the body.

(ii) **Sulphur dioxide (SO_2):** It is produced by petrol combustion, coal combustion, petrol refining and smelting operations.

- It hinders the movement of air in and out of lungs.
- It is particularly poisonous to trees causing chlorosis and dwarfing. In presence of air it is oxidised which is also irritant.

  $2SO_2 + O_2$ (air) ? $2SO_3$
- In presence of moisture it is converted into highly corrosive sulphuric acid.

  $SO_3 + H_2O$ (moisture) ? H_2SO_4

- It attacks marble, limestone, vegetation, paper and textiles and are injurious to human beings.

(iii) **Oxides of nitrogen:** Source - combustion of coal, gasoline, natural gas, petroleum refining, chemical plants, manufacturing explosives and fertilizers, tobacco smoke.

- Breathing of NO_2 causes chlorosis in plants and chronic lung conditions in humans leading to death. It reacts with moisture to form acids.

(iv) **Smoke, dust:**

Sources: cement works, iron and steel works, gas works, power generating stations.

Smog: It is a mixture of smoke and fog in suspended droplet form. It is of two types:

(a) **London smog or classical smog:** It is coal smoke plus fog.

- The fog part is mainly SO_2 and SO_3.
- It has sulphuric acid aerosol.
- It causes bronchial irritation and acid rain.

(b) **Photochemical smog or Los Angeles smog:** The oxidised hydrocarbons and ozone in presence of humidity cause photochemical smog.

- Hydrocarbons + O_2, NO_2, NO, O, O_3 ? Peroxides, formaldehyde, peroxyacetylnitrate (PAN), acrolein etc.
- It is oxidising in nature and causes irritation to eyes, lungs, nose, asthmatic attack and damage plants.

Acid rain: The oxides of C, N and S present in the atmosphere, dissolve in water and produce acids and lower the pH of water below 5.5.

- The acids are toxic to vegetation, react with marble and damage buildings.

- Acids corrode water pipes and produce salts with heavy metals ions viz Cu, Pb, Hg and Al.

Air Pollution is a Major Factor for the World's Leading Causes of Death

		Global burden of disease		Burden attributable to motorized road transport	
Rank	Cause	Deaths	DALYs	Deaths	DALYs
1	Ischemic heart disease	7,029,270	129,795,464	90,639	1,909,563
2	Stroke	5,874,181	102,238,999	58,827	1,148,699
3	COPD	2,899,941	76,778,819	17,266	346,376
4	Lower respiratory infections	2,814,379	115,227,062	5,670	489,540
5	Lung cancer	1,527,102	32,405,411	11,395	232,646
6	HIV/AIDS	1,460,369	81,549,177	—	—
7	Diarrheal disease	1,445,798	89,523,909	—	—
8	Road injury	1,328,536	75,487,102	1,328,536	75,487,104
9	Diabetes Mellitus	1,281,345	46,857,136	—	—
10	Tuberculosis	1,195,990	49,399,351	—	—
	All other causes	24,207,527	1,682,995,639	—	—
	Total	52,769,676	2,482,258,070	1,512,333	79,613,928

Air pollution can also pose a significant cost on GDP

	CO_2 emissions (million tons)	Deaths	% GDP
China	8287	1,233,890	9.7%-13.2%
United States	5433	103,027	3.2%-4.6%
India	**2009**	**627,426**	**5.5% -7.5%**
Russia	1741	94,558	6.9%-9.8%
Japan	1171	64,196	4.9%-7.7%
Germany	745	41,582	5.1%-7.3%
Iran	572	32,288	4.7%-6.2%
South Korea	568	23,036	4.6%-7.1%
Canada	499	7,171	2.0%-3.2%
United Kingdom	494	23,373	3.7%-5.5%
Saudi Arabia	464	8,550	3.4%-4.4%
South Africa	460	3,208	0.6%-1.0%
Mexico	444	20,496	1.9%-2.5%
Indonesia	434	63,826	2.8%-3.9%
Brazil	420	7,582	0.3%-0.7%

Greenhouse Effect

- The retention of heat by the earth and atmosphere from the sun and its prevention to escape into the outer space is known as greenhouse effect.
- Global warming is average increase in the temperature of earth due to increase in concentration of greenhouse gases.

Consequences of global warming:

(i) Rise in sea level due to increased rate of melting of glaciers and floods.

(ii) Increase in infectious diseases like malaria, dengue, etc.

Control of air pollution

It can be controlled by

1. Dissolving HCl, HF in water and, in alkaline solution.

2. Adsorbing gas and liquid molecules over activated charcoal and silica gel.
3. Chemical reactions.
4. Use of precipitators to settle charge particles.
5. Use of settling chambers under the action of gravity.
6. Use of natural gas in place of diesel, petrol, etc.

WATER POLLUTION

- The contamination of water by foreign substances which would cause a health hazard and make it harmful for all purposes (domestic, industrial or agriculture, etc.) is known as water pollution.
- The polluted water may have bad odour, bad taste, unpleasant colour, murky oily, etc.

Sources of water pollution

(a) **Domestic sewage:** Discharges from kitchens, baths, lavatories, etc.
(b) **Industrial waters:** Wastes from manufacturing processes which includes acids, alkalines, pesticides, insecticides, metals like copper, zinc, lead, mercury, fungicides, etc.
(c) **Oil:** From oil spills or washings of automobiles.
(d) **Atomic explosion** and processing of radioactive materials.
(e) **Suspended particles** (organic or inorganic) viruses, bacterias, algae, protozoa, etc.
(f) Wastes from fertilizer plants such as phosphates, nitrates, ammonia, etc.
(g) **Clay:** Ores, minerals, fine particles of soil.

Aerobic and anaerobic oxidation

The oxidation of organic compounds present in sewage in presence of good amount of dissolved

or free oxygen (approx. 8.5 ml/*l*) by aerobic bacteria is called *aerobic oxidation*.

- When dissolved or free oxygen is below a certain value the sewage is called *stale*.
- Anaerobic bacteria bring out putrefaction producing H_2S, NH_3, CH_4, $(NH_4)_2S$, etc. This type of oxidation is called *anaerobic* oxidation.

Biological Oxygen Demand (BOD)

- It is defined as the amount of free oxygen required for biological oxidation of the organic matter by aerobic conditions at 20°C for a period of five days.
- Its unit is mg/*l* or ppm. An average sewage has BOD of 100 to 150 mg/*l*.

Chemical Oxygen Demand (COD)

- It is a measure of all types of oxidisable impurities present in the sewage.
- COD values are higher than BOD values.

SOIL POLLUTION

The addition of substances in an indefinite proportion changing the productivity of the soil is known as soil or land pollution.

Sources of soil pollution

(i) **Agricultural pollutants:** Chemicals like pesticides, fertilizers, bactericides, fumigants, insecticides, herbicides, fungicides.
(ii) Domestic refuge and industrial wastes.
(iii) Radioactive wastes from research centres, and hospitals.
(iv) Soil conditioners containing toxic metals like Hg, Pb, As, Cd, etc.
(v) Farm wastes from poultries, dairies and piggery farms.
(vi) Improper disposal of human and animal excreta.

(vii) Pollutants present in air from chemical works.

Exercise

DIRECTIONS : This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct.

1. Carnivores represent
   (a) primary consumers
   (b) secondary and tertiary consumers
   (c) reducers
   (d) zooplankton
2. A non-biodegradable waste is
   (a) garbage
   (b) metallic articles
   (c) sewage
   (d) waste paper
3. In every food chain green plants are
   (a) decomposers
   (b) producers
   (c) consumers
   (d) None of the above
4. Biodegradable substances are those substances that
   (a) can be broken down by the action of bacteria or other saprophytes.
   (b) cannot be acted upon by physical processes like heat and pressure.
   (c) persist in the environment for a long time.
   (d) may harm the various members of the ecosystem.
5. Which of the following is non-biodegradable substance?
   (a) Polythene
   (b) Cotton cloth
   (c) Leaves
   (d) Vegetable peels
6. All the interacting organisms in an area together with the non-living constituents of the environment form

(a) community
(b) ecosystem
(c) atmosphere
(d) soil

7. An ecosystem consists of
(a) biotic component comprising living organisms
(b) abiotic component comprising physical factors
(c) Both (a) and (b)
(d) None of these

8. Which is abiotic component of ecosystem?
(a) Humus
(b) Bacteria
(c) Plants
(d) Fungi

9. Who coined the term ecosystem?
(a) Tansley
(b) Odum
(c) Warming
(d) Darwin

10. Which chemical has been replaced recently?
(a) Malathion
(b) Chlorofluorocarbons
(c) Chloroform
(d) Ethylene dibromide

11. Growth, reproduction and other activities of living organisms are affected by
(a) abiotic components only
(b) biotic components only
(c) both biotic and abiotic components
(d) some other factors

12. Types of ecosystems are
(a) mountains and aquarium
(b) natural ecosystems like forests, ponds and lakes
(c) artificial ecosystems like gardens and crop fields
(d) Both (b) and (c)

13. All consumers whether herbivores, carnivores or parasites depend on _____ di-

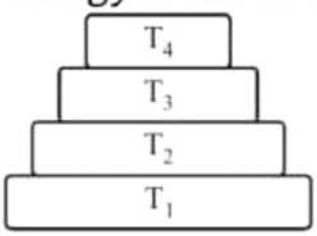
rectly or indirectly for their sustenance by feeding on other consumers

(a) producers or plants
(b) air
(c) water
(d) light

14. The micro organisms that break-down the complex organic substances of dead remains and waste products of organisms into simpler inorganic substances are called

(a) vultures
(b) decomposers
(c) omnivores
(d) None of these

15. In the given figure, the various trophic levels are shown in a pyramid. At which trophic level is minimum energy available ?



(a) T_4
(b) T_2
(c) T_1
(d) T_3

16. Disposable plastic plates should not be used because

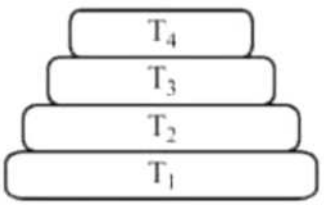
(a) they are made of materials with light weight.
(b) they are made of toxic materials.
(c) they are made of biodegradable materials.
(d) they are made of non-biodegradable materials.

17. Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as

(a) eutrophication
(b) pollution

(c) biomagnification
(d) accumulation

18. In the given figure the various trophic levels are shown in a pyramid. At which trophic level is maximum energy available?



(a) T_4
(b) T_2
(c) T_1
(d) T_3

19. The decomposers in an ecosystem
(a) convert inorganic material to simpler forms.
(b) convert organic material to inorganic forms.
(c) convert inorganic materials into organic compounds.
(d) do not breakdown organic compounds.

20. All green plants and certain blue green algae make their food by making organic compounds like sugar and starch from inorganic substances using the radiant energy of the Sun in presence of chlorophyll. The process is
(a) respiration
(b) photosynthesis
(c) oxidation
(d) sustenance

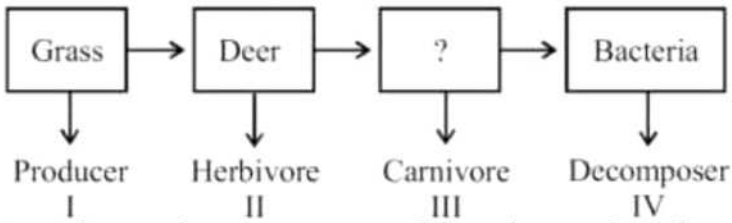
21. Interdependence of organisms on other organisms for their sustenance is described by
(a) ecosystem
(b) biosphere
(c) food chains
(d) heterotrophs

22. Each step or level of the food chain forms a
(a) trophic level
(b) food web
(c) layer
(d) crust

23. Interactions among various components of the environment involves _____ from one component of the system to another.

(a) flow of hereditary information
(b) flow of food particles
(c) flow of energy
(d) flow of oxygen

25.



Carnivore is represented by the animal
(a) Cow
(b) Buffalo
(c) Lion
(d) None

26. Which of the statement is incorrect?
(a) All green plants and blue green algae are producers.
(b) Green plants get their food from organic compounds.
(c) Producers prepare their own food from inorganic compounds.
(d) Plants convert solar energy into chemical energy.

27. In the given food chain, suppose the amount of energy at fourth trophic level is 3 kJ, what will be the energy available at the producer level ?
Grass → Grasshopper → Frog → Snake → Hawk
(a) 3 kJ
(b) 30 kJ
(c) 300 kJ
(d) 3000 kJ

28. Excessive exposure of humans to UV-rays results in
(i) damage to immune system
(ii) damage to lungs
(iii) skin cancer
(iv) peptic ulcers
(a) (i) and (ii)
(b) (ii) and (iv)

(c) (i) and (iii)
(d) (iii) and (iv)

29. How many trophic levels are usually present in a food chain?
(a) One
(b) Four
(c) Numerous
(d) Five

30. In a terrestrial ecosystem, green plants capture 1% of the energy of sunlight that falls on their leaves and convert it into
(a) food energy
(b) muscular energy
(c) electrical energy
(d) potential energy

31. How much energy is transferred from one level of consumers to the next?
(a) All of it
(b) Only organic matter is transferred
(c) 10% of the energy received by it
(d) 50% of the energy received by it

32. The energy transferred from one level to the next higher level
(a) can be transferred back to the previous level
(b) cannot be transferred back to the previous level
(c) is consumed by it in doing body functions or lost to the environment
(d) both (b) and (c)

33. Carefully observe the diagram(s) given below

Leaves

Banana peel

Flower

Paper

Which type of waste is represented by figures shown above?

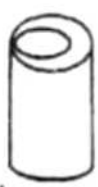
(a) Biodegradable
(b) Non-biodegradable
(c) Both (a) and (b)
(d) None

34. Carefully observe the diagram(s) given below

Lead batteries

Paint

Plastic bag



Aluminium container

Which type of waste is represented by following figure ?

(a) Non-biodegradable
(b) Bio-degradable
(c) Both
(d) None

35. In the following groups of materials, which group (s) contains only non-biodegradable items ?
    (i) Wood, paper, leather
    (ii) Polythene, detergent, PVC
    (iii) Plastic, detergent, grass
    (iv) Plastic, bakelite, DDT

(a)(iii)
    (b) (iv)
    (c) (i) and (iii)
    (d) (ii) and (iv)

36. Which group of organisms are not constituents of a food chain ?
    (i) Grass, lion, rabbit, wolf
    (ii) Plankton, man, fish, grasshopper
    (iii) Wolf, grass, snake, tiger
    (iv) Frog, snake, eagle, grass, grasshopper
    (a) (i) and (iii)
    (b) (iii) and (iv)
    (c) (ii) and (iii)
    (d) (i) and (iv)

37. The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about
    (a) 1%
    (b) 5%
    (c) 8%
    (d) 10%

38. Our food contains varying amounts of pesticide residues because of
    (a) biological magnification
    (b) the chemicals supplied during agricultural processes are retained by the fruits and seeds through soil and water
    (c) chemical reactions between spices and other cooking materials
    (d) Only (a) and (b)

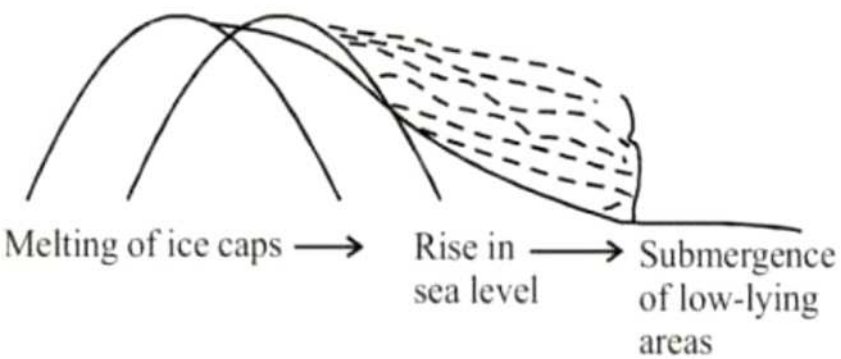
39. Which of the following steps is not relevant to formation of ozone?
    (a) Ozone is a poisonous gas.

(b) UV radiations from sunlight split and oxygen molecule into atomic oxygen.
(c) Oxygen molecule combine with the atomic oxygen to form ozone.
(d) Ozone is formed at the higher levels of the atmosphere.

40. Preservation of the Ozone layer
(a) is important because it helps in stopping harmful UV radiations
(b) is endangered by CFCs
(c) Both (a) and (b)
(d) is not necessary as it will give us more of oxygen

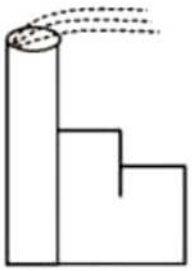
41. Disposal of garbage can be made eco-friendly
(a) segregating it into biodegradable and non-biodegradable bins.
(b) treating the biodegradable waste separately into some useful forms.
(c) treating the industrial waste and sewage before disposing them into water bodies.
(d) All of these.

42. Carefully observe the diagram(s) given below



Cause of following effects is
(a) global warming
(b) ozone depletion
(c) acid rain
(d) None

43. Carefully observe the diagram(s) given below



Which type of air pollutants is released from the chimney ?

(a) CO_2
(b) CH_4
(c) Smoke
(d) NO_2

45. This is an inverted pyramid
(a) Pyramid of number in a grassland
(b) Pyramid of energy in pond system
(c) Pyramid of biomass in a grassland
(d) Pyramid of biomass in pond ecosystem

46. In an ecosystem, one of the following occurs as abiotic compounds
(a) Flow of energy
(b) Cycling of materials
(c) Consumers
(d) Both (a) and (b)

47. Decomposers are
(a) Animalia and Monera
(b) Protista and Monera
(c) Fungi and Plantae
(d) Bacteria and Fungi

48. Greater use of disposable packaging materials is affecting the environment because
(a) they are more convenient to use.
(b) they are increasing non-biodegradable waste.
(c) they are hygienic and non-toxic for humans.
(d) All of these

49. While on an excursion, you like to have tea in a
(a) disposable paper cup
(b) kulhad of clay
(c) disposable plastic cup

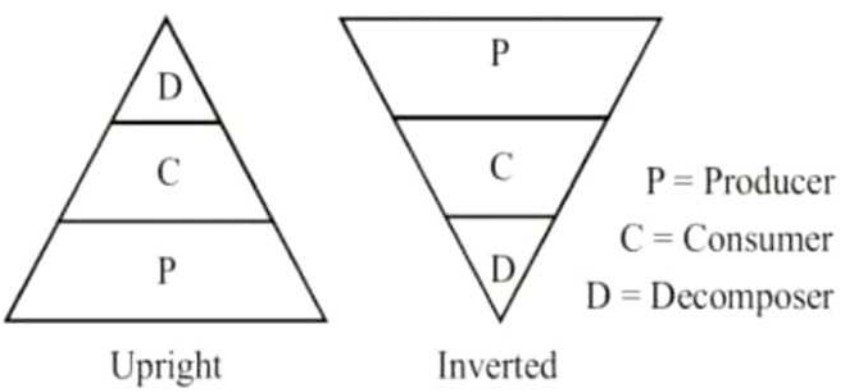
(d) any one that is available

50. In an ecosystem, there were grass, plants, rats, dogs, deer, horses and lions. Will it sustain?
(a) No, it has producers, consumers but no decomposers
(b) Yes, it has producers and consumers
(c) No, dogs will not get their favourite food cat
(d) Yes, it has got all the levels required for transfer of energy

51. The food chain, in which micro organisms breakdown the energy rich compounds is called
(a) ecosystem
(b) detritus food chain
(c) parasitic food chain
(d) predator food chain

52. The sequence of species through which the organic molecules in a community pass is
(a) pyramid of energy
(b) nutrient cycle
(c) food chain
(d) food web

53. Carefully observe the diagram(s) given below



Which type of pyramid best represents the pyramid of energy ?

(a) Upright
(b) Inverted
(c) Both
(d) None

54. ☐ → Zooplanktons → Fish larva → Small fish → Large fish

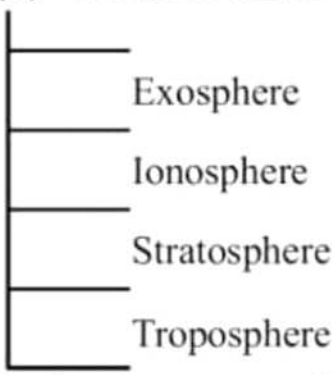
1st trophic level in the aquatic food chain is represented by

(a) phytoplanktons
(b) trees
(c) grasses
(d) hawks

55. Food webs are prominent in an ecosystem because

(a) one consumer is not dependent on a single kind of food from the same food chain
(b) interlinking of food chains lead to formation of food webs
(c) Both (a) and (b)
(d) None of these

58.



O_3 is concentrated in which layer of atmosphere

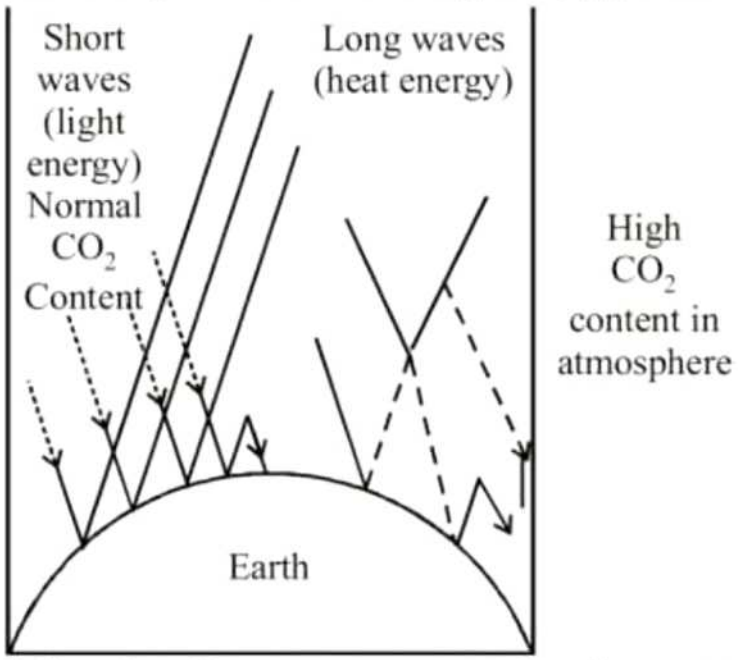
(a) Troposphere
(b) Exosphere
(c) Stratosphere
(d) None

59. Suggest the correct sequence of various autotrophic levels likely in the food chain involving plants, birds, lions, snakes and ants.

(a) Plants, birds, snakes, lions and ants
(b) Plants, ants, birds, snakes and lions
(c) Plants, birds, lions, snakes and ants

(d) Plants, snakes, ants, birds, lions

60. Carefully observe the diagram(s) given below



Following figure represents the phenomenon

(a) Acid rain
(b) Greenhouse effect
(c) Ozone depletion
(d) None

Hints & SOLUTIONS

1. (b) 2. (b) 3.(b)

4. **(a)** The substances which get decomposed by the action of bacteria or some other saprophyte or some physical processes under atmospheric conditions are biodegradable substances.

5. **(a)** Polythene is a non-biodegradable substance as it not affected by bacteria.

6. **(b)** All the living and non-living organisms interact with each other in an ecosystem.

7. **(c)** Biotic component comprising living organisms and Abiotic component comprising physical factors constitute an eco-system.

8. **(a)**

9. **(a)**

10. **(b)**

11. **(c)** Continuous interaction between living and non living things affects the growth, reproduction and other activities of the living organisms.

12. **(d)** Both natural ecosystems like forests, ponds and lakes or artificial ecosystems like gardens and crop fields are habitat to several living organisms.

13. **(a)** Herbivores eat plants and get eaten by carnivores. Parasites feed on plants, herbivores and carnivores.

14. **(b)** Decomposers are the micro organisms that break-down the complex organic substances of dead remains and waste products of organisms into simpler inorganic substances, which get mixed with soil as minerals.

15. **(a)**

16. **(d)**

17. **(c)**

18. **(c)**
19. **(b)**
20. **(b)** All green plants and certain blue green algae do photosynthesis in presence of sunlight and chlorophyll.
21. **(c)** Food chains represent the interdependence of organisms for their fulfilling their energy needs.
22. **(a)** Each step or level of the food chain forms a trophic level.
23. **(c)** Various components of the environment involves the flow of energy.
24. **(c)**
25. **(c)**
26. **(b)**
27. **(d)**
28. **(c)**
29. **(d)** Trophic levels correspond to positions on a food chain therefore producers always belong to the first trophic level and decomposers to the last trophic level, consumers that directly eat the producers belong to the second trophic level and so on. There is no limit regarding the number of trophic levels on a chain, since many orders of consumer can exist.
30. **(a)** Green plants capture 1% of the energy of sunlight that falls on their leaves for carrying out photosynthesis. Rest of the energy is used to warm or evaporate water, carrying out various other natural phenomenons or even get reflected by shining snow.
31. **(c)** 10% of the energy received by one level is passed on to the next level. Rest of the energy is consumed by it for carrying out its body functions like growth, respiration, movement etc.
32. **(b)** The energy transferred from a lower level to the higher level only and not vice versa
33. **(a)**

34. **(a)**
35. **(d)**
36. **(c)**
37. **(a)**
38. **(d)** Biological magnification is the process in which the chemicals supplied as fertilizers or pesticides during agricultural processes enter into the plants along with water through their roots. These are retained by the fruits and seeds which are consumed by humans or animals.
39. **(a)** 'Ozone is a poisonous gas' is a property and not its formation.
40. **(c)** Ozone layer helps in stopping harmful UV radiations from the Sun to enter the earth's atmosphere. Excess amount of chlorofluorocarbons (usually from refrigeration appliances) in the atmosphere is found to endanger the ozone layer.
41. **(d)**
42. **(a)**
43. **(c)**
44. **(b)**
45. **(d)**
46. **(d)**
47. **(d)**
48. **(b)** Disposable packaging materials are usually made from non-biodegradable substances.
49. **(a)** Disposable paper cups are biodegradable. Clay gets mixed with soil only after a long time.
50. **(d)** As the energy is passed along the food chain much of it is either used or lost. Therefore there is a limit to the number of organisms in a food chain. The top carnivore is usually the third or fourth consumer. Decomposers are often left off food web, but if included they mark the end of a food chain.
51. **(b)**
52. **(c)**

53. **(a)**
54. **(a)**
55. **(c)** A consumer does not depend on a single organism for fulfilling its energy requirements. It may eat the organism from a different food chain, thus interlinking them to form food webs.
56. **(a)**
57. **(b)**
58. **(c)**
59. **(b)** Plants are producers, ants eat plants, birds eat both plants and ants, snakes will eat the birds and the lion preys on them.
60. **(b)**

Chapter 6 Why Do We Fall Ill (Causes & Cure of Diseases)

- Tissues and organs carry out different functions like lungs help in breathing, kidney filters urine and brain thinks. All these functions of our body are interconnected. If one fails others get affected. To carry out these functions we need energy in the form of food. Anything that disturbs the proper functioning of cells, tissues and organs will result in the lack of proper activity of the body or unhealthy body.
- **The significance of health:** The word health gives us an idea of "being well". It is used to indicate our body's well functioning or sometimes it tells about our social attitude. Health is a state of physical, mental and social well being.
- **Personal and Community Issues Both Matter For Health:** Our social environment also affects the health of each individual. The system of public cleanliness plays a vital role in well being of an individual. Proper garbage disposal system and drainage helps us to keep ourselves healthy. Social equality and harmony are also necessary for good health of people.
- **Distinction between "Healthy" and "Disease-free" condition:** The word disease literally means being uncomfortable due to a particular cause. Poor health does not always mean that we are suffering from a particular disease.
- **Disease and its causes :** In case of any disease, the functioning or appearance of one or more systems of the body changes which give, rise to symptoms of the disease. With the help of these symptoms and lab tests, the physician diagnoses the disease.
- **Types of diseases**
  - **(i) Acute diseases:** Disease that last for only very short period of time is called acute disease. *E.g.* Common cold.
  - **(ii) Chronic diseases:** The diseases which last for a long time as much as lifetime are chronic dis-

ease *E.g.* Elephantiasis. Chronic diseases have very drastic long-term effects on people's health as compared to acute diseases.

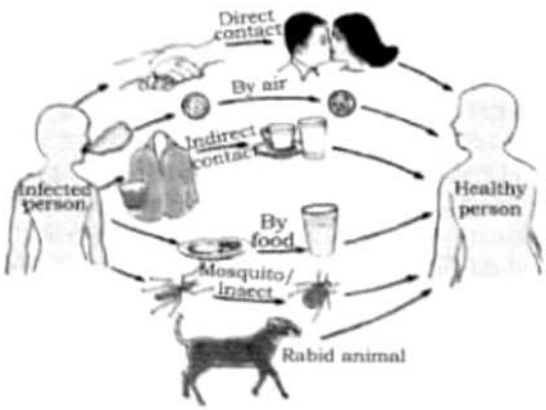
- **Causes of diseases :**
  - **(i) Immediate cause:** The micro-organism, bacteria or virus causing a particular disease is the immediate cause.
  - **(ii) First level cause:** It occurs due to personal unhygienic conditions like drinking unclean water, food etc.
  - **(iii) Second level cause:** It may be due to lack of good nourishment as poor household cannot afford healthy food.
  - **(iv) Third level cause:** Poverty or lack of public services.
  - **(v) Contributory cause:** Genetic differences of an individual also contributes to the disease sometimes.
- **Immediate causes of disease are of two types :**
  - **(i) Infectious causes:** Diseases where microbes are immediate causes are called infectious diseases. Microbes can spread in a community and thereby spread the disease.
  - **(ii) Non infectious causes:** The causes are internal and non-infectious. *E.g.* Cancer is caused due to genetic abnormalities.
- **Infectious diseases and agents:** Disease causing organisms include viruses, bacteria, fungi, protozoans, worms etc.

Micro-organisms	Diseases
Viruses	Common cold, Influenza, Dengue fever, AIDS
Bacteria	Typhoid, Anthrax, Cholera, Tuberculosis
Fungi	Skin infections
Protozoan	Malaria, Kala-azar
Worms	Elephantiasis

- All these organisms have many common biological characters. As a result drugs that are effective

against one member of group is likely to be effective against many other members of the group. But it will not work against a microbe belonging to a different group. Many antibiotics work against many species of bacteria rather than working against one. Antibiotics are not effective in viral infections.

- **Means of spread :** Infectious diseases are also called communicable diseases. Disease causing microbes could spread through air, water, sexual contact, casual physical contact (like handshakes, hugs, wrestling etc), blood-to-blood contact, and from infected mother to her baby. Mosquitoes are vectors and they also help in spreading many diseases like malaria.



Methods of transmission of diseases

- **Organ-specific and Tissue-specific manifestations:** After entering the body, different microbes go to different organs or tissues. When they enter from air via nose they go to the lungs. For example, the bacterium that cause tuberculosis enter through mouth and then goes to stomach or liver. The sign and symptoms of a disease depends on the tissue or organ on which the microbes target.
- **Inflammation:** In case of any infection our immune system activates many cells of the infected tissue to kill the microbes. This process is called inflammation. Due to this process there are local effects such as swelling, pain, and fever.
- **Principles of treatment:** There are two ways of treatment –
  - **(i)** To reduce the effects of the disease
  - **(ii)** To kill the cause of the disease.

(iii) Use an antibiotic that blocks the bacterial synthesis pathway. It is difficult to make anti-viral medicines than making anti-bacterial medicines because viruses have few biochemical mechanisms of their own. They enter our cells and use our machinery for their life activities.

- The term antibiotics was coined by **Waksman**. The first antibiotic **penicillin** was extracted form fungi **Penicillium notatum by Alexander Flemming 1944**.
- **Principles of prevention:** Prevention of diseases is better than their cure. Two ways of prevention are general, and specific ways of prevention.
  - **(i) General ways:** General ways involve preventing exposure. For air-born microbes we can prevent exposure by avoiding overcrowded places. Safe drinking water prevents from water-borne microbes. For vector-borne infections we can provide clean environment. Our immune system also plays an important role in killing off microbes.
  - **(ii) Specific ways :** In case of any infection for the first time our immune system responds against it specifically. Next time when the same microbe enters our body the immune system responds with greater vigour which eliminates the infection more quickly than the first time. So, immunisation is done to prevent diseases.

DISEASES CAUSED BY PROTOZOA

	Disease	Affected organ	Parasites	Carrier	Symptoms
1	Malaria	RBC & Liver	Plasmodium	Female Anopheles	Fever with shivering
2	Sleeping sickness	Brain	Trypanosoma	Tse-Tse flies	Fever with severe sleep
3	Diarrhoea	Intestine	Entamoeba histolytica	–	Mucous & diarrhoea with blood
4	Kala-azar	Bone marrow	Leishmania donovani	Sandfly	High fever
5	Giardiasis	Small intestine	Giardia lamblia	–	Diarrhoea, abdominal pain
6	Amoebiasis	Large intestine	Entamoeba histolytica	–	Abdominal pain, diarrhoea