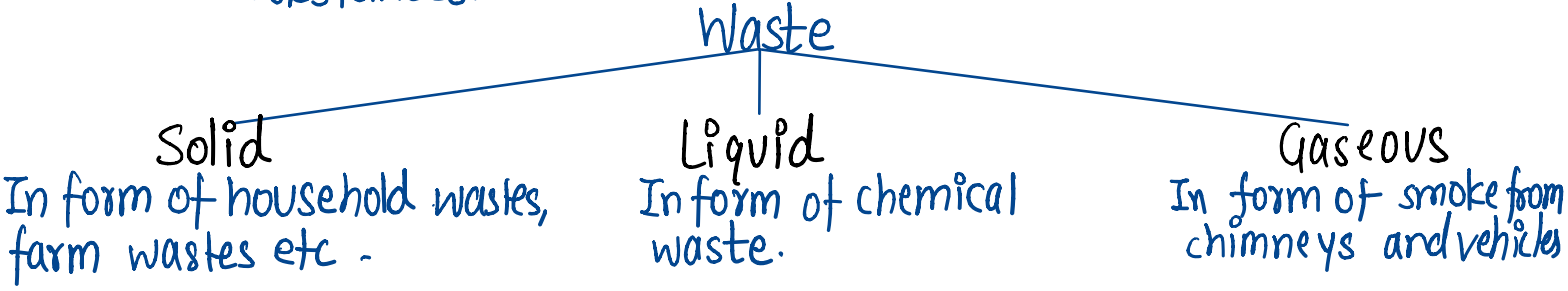
OUR ENVIRONMENT

Environment - It refers to the complete range of physical and biological condition in which org. like and interact with biotic and abiotic factors.

Habitat - The place where an organism live is called its Habitat.

Wastes - The useless; left over on discarded substances are called waste substances.



These substances are divided into two main groups-

(i) Biodegradable Sustances/Wastes (organic): Substances which can be decomposed by action of micro-organisms are called biodegradable wastes. eg- Fruits and vegetable peels, cotton etc.

(ii) Non-Biodegradable Wastes - Substances which cannot be decomposed by action of micro-organisms are called non-biodegradable wastes. eg- plastic, metals etc.

Ways in which biodegradable wastes would affect the environment-

(i) Decomposition of biodegrable wastes leads to fould smell.
(ii) Dumping of industrial wastes at large amount reduces fertility or soil and leads to reduction in crop yields.
(iii) Dumping of waste into water bodies to water pollution and responsible for spreading water-borne diseases.

Ways in which Non-biodegradable wastes affect the environment -

(i) They block the transfer of energy and minerals in the ecosystem.
(ii) They make the environment poissonous and unfit for survival.
(iii) They also pollute water and harms aquatic life.

DDT (Dichloro Diphenyl Trichloroethane) - It cannot be broken down into simpler, harmless substances and harm the environment.

L.P. Besides natural degradation by microbes, what are the other ways to dispose of bio degradable?

ans- The other ways to dispose of biodegradable waste is through waste treatment plants or converting them into manure and form bio-gas

L.P. Mention three environment-friendly practices.

ans- (i) Carrying cloth bags instead of plastic bags for shopping.
(ii) Switching off unecessary lights and fans.
(iii) Limited use of petrol/diesel.

Ecosystem- It was coined by A.G. Tansely (1935). It refers to all the interacting organism in an area together with the nonliving constituents (abiotic) of the environment to form an ecosystem. eg- forest, pond etc. It is the structural functional unit of biosphere.

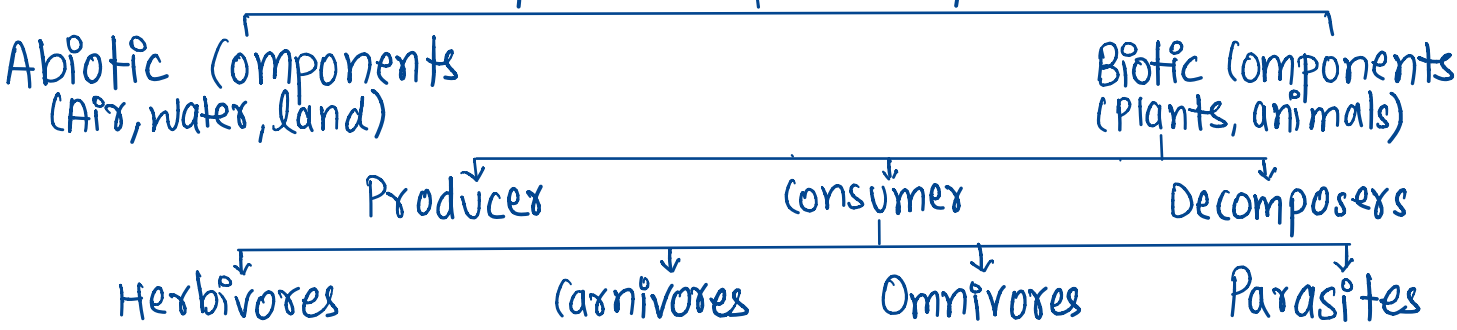
Types:-

(i) Natural Ecosystem: The ecosystem which exist in nature on its own. eg- forest, lake, ocean depending upon the habitats, it may be
(a) terrestrial (desert, grassland, forest).
(b) Aquatic (ponds, lakes)

(ii) Artificial Ecosystem: The ecosystem which is created and maintained by humans are called artificial or man-made ecosystem.
Agro-system is the longest man-made ecosystem.
eg:- aquarium, garden

Types → terrestial = eg: garden, nursery
aquatic

Components of an Ecosystem



(a) Abiotic (components)- All the non-living components such as air, water, land, CO_2, O_2, light etc. form abiotic. These component are physical factors such as light, temp., water etc.

Physical factors or abiotic factors affecting Ecosystem:-

(i) light- light energy (sunlight) is the primary source of energy in all ecosystems. It is energy which is commonly used by green plants contain chlorophyll during process of photosynthesis.

(ii) Temperature- The distribution of plants and animals is greatly influenced by

extremes in temp. for eg- during warm season temp warms the water bodies & water evaporates causing rain later which affects the growth of plants which determines variety animals living that place.

(iii) Atmospheric Gases- The most imp. gases are CO_2, O_2, Nitrogen. O_2 is used by all living organisms during respiration, CO_2 is used by green plants for photosynthesis and nitrogen is made available to plants by certain bacteria.

(iv) Water - Water is essential for life and all organisms depend on it to survive in especially desert areas.

(b) Biotic Components: All the living components such as plants, animals, bacteria etc form the biotic components.
On basis of nutrition, types are-

(i) Producers- Those org. who can produce their own food using abiotic component (photosynthesis are called producers and also autotrophs. eg- All green plants, blue-green algae etc.
* These are source of nutrition for rest of ecosystem.
* Indirectly by these are also source of O_2 and pick up CO_2, so they balance the composition of air.

(ii) Consumers- These are org. who are dependent on producers directly or indirectly for their food. They are thus, heterotrophic. eg- all animals, including human
- Herbivores - These are animals which directly fed on plants. They are called primary or first order consumers. eg - clear, goat etc
  * Since then convert plant matter → animal matter they are know as key industry animals.

- Carnivores- These are animals which prey upon their animals and feed on their flash. They are called second order consumers.
  * Some carnivores may be predator which kill their prey & feed. These are called third order consumers.

- Omnivores - Those who feed upon both plants and animals. eg-human

- Parasites - Those who live on body of host and take food from it without killing them. eg- dice, cascuta etc.

(iii) Decomposers - These are known as organisms of decay as these are microorganisms which feed on decaying and dead living matter. They breakdown the remains of dead plants and animals releasing substances that can used by other members or ecosystem. eg - bacteria, fungi etc.

It plays following role in the environment:
→ They help in recycling of material, replenishment of soils nutrients.
→ They also clean up surroundings by decomposing org. & organic waste.

Food chain- It is a series of org. through which energy is transferred in form of food.
eg:- Grass → Deer → Lion

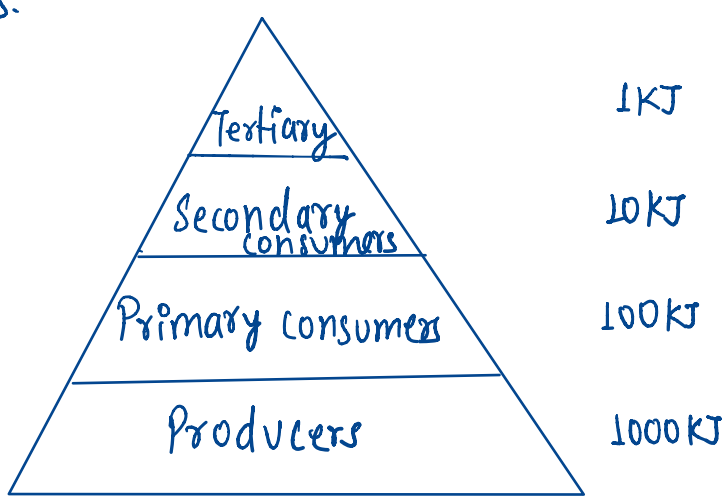
Trophic level – In a food chain various steps where transfer of energy of energy and takes place is called tropic level.

Levels- First tropic level → Producers (autotrophs)
Second tropic level → Herbivores or primary consumers.
Third level → Carnivores or secondary consumers.
Fourth level → large or tertiary level consomers.

Energy flow b/w trophic levels or food chain
(i) Flow of energy in a food chain is unidirectional.
(ii) Green plants capture 1% of sunlight and convert it into food energy.

10% Law- Acc. to 10% law, only 10% of energy entering a particular trophic level of org. is available for transfer to next trophic level (higher). The remaining 90% of energy is used in life processes (digestion, respiration) by present trophic level.
eg:- Grass $\xrightarrow{10KJ}$ Deer $\xrightarrow{1KJ}$ Lion

(iii) Due to this gradual decrease in energy, food chain contain only 3-4 trophic levels.



LP:- Why are crop fields known as artificial ecosystem?

ans- (i) Crop fields are man-made, they do not grow naturally like other plants rather it is grown by human ace to seasons, type of soil etc.
(ii) These are not wild life area which is left to care of nature rather it is managed, soil is prepared for sowing seeds, irrigation etc for getting good yield.
That's why it is known as artificial ecosystem.

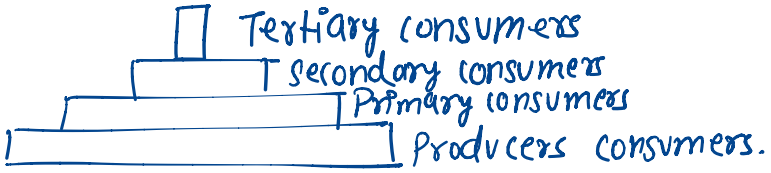
LP:- "Energy flow in a food chain is unidirectional." Justify.

ans- Flow of energy in ecosystem is always unidirectional. This is because the energy that captured by autotrophs cannot revert back to solar Input and energy which passes to herbivores cannot come back to autrotrophs The energy moves progressively through various levels.

Ecological Pyramids

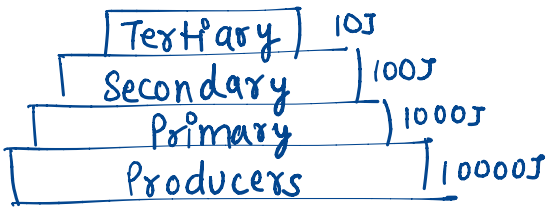
Types-

1. Pyramid of no.- Represent total no. of org. in each trophic level. Always upright but in tree ecosystem it is inverted.



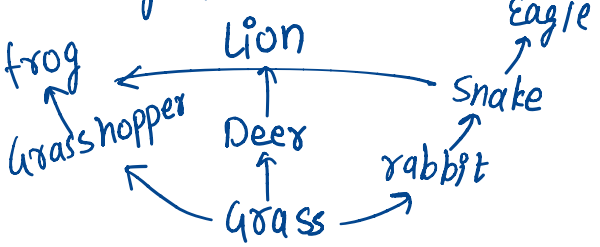
2. Pyramid of Biomers- Represents total weight of org. in each trophic levels. It may be
(i) Upright eg- in grasslands
(ii) Inverted eg- in pond ecosystem.

3. Pyramid of Energy- Represent total energy of org. at each trophic level.
Always upright.



Food Web- It is network or interrelation of diff. food chain present in a ecosystem.

eg



Food chain in Deserts: Cactus → Scorpion → Rat → Snake

Significance of food Chain:
(i) It shows the interdependence b/w org.
(ii) It helps to understand movement of toxic substance.
(iii) It shows who eats whom.
(iv) It shows how ecological balance goes on.

Biological Magnification or Biomagnification - It is the phenomenon that refers to increasing or concentration of harmful chemicals with each successive trophic level.

Ozone - Ozone (O_3) is a molecule formed by three atoms of oxygen. It is deadly poisonous.

⇒ <u>formation in Atmosphere:</u>
The high energy UV radiation coming from sun splits oxygen into 2 free oxygen atoms.

$$\underset{\text{from air}}{O_2} \xrightarrow[\text{from sun}]{UV} O + O$$

The free oxygen atoms produced is very reactive. These oxygen atoms react with oxygen molecule to form ozone molecule.

$$O_2 + O \longrightarrow \underset{\text{Ozone.}}{O_3}$$

⇒ <u>function of Ozone layer</u>
The layer of atmosphere in which most of atmosphere's ozone is concentrated is called ozone layer.
It absorbs most of harmful radiations (UV) coming from sun which can cause skin cancer, cataract, disturb global rainfall. etc.

⇒ <u>Depletion of Ozone layer</u>
It is mainly depleted due to synthetic chemicals called chlorofluoro-carbon (CFCs) used in refrigirators.
As:
CFCs are very stable. Being stable they do not degrade easily and rise up in atmosphere. In atmosphere, UV radiation breaks CFCs molecules in release of chlorine which on reaction with Ozone breaks it into Oxygen molecules.

∴ Two gases replaced CFCs < Hydrofluoro Carbon (HFC)
Perfluoro Carbon (PFC)

⇒ Harmful effects of ozone → (i) In atmosphere, it is highly toxic causing eye irritation etc.
(ii) It harms plants by destroying photosynthetic cells.

GARBAGE: The household waste is called garbage.

→ The disposal of waste generated by us in such a manner that it doesn't affect our environment adversely is called garbage management.

Methods of Garbage Disposal:-

(i) Recycling - It is process of waste materials to form new products. Materials like tin, cans etc are recyclable.

(ii) Composting - Bio degradable domestic wastes such as left over food, peels of fruits and vegetables are buried in a pit dug into ground. They are converted into compost and used as manure.

(iii) Landfills - Solid waste is dumped into a low-lying area and covered with soil.

(iv) Sewage treatment - Sewage is carried to sewage treatment plants (STPs).

-- PREVIOUS YEAR QUESTIONS --

1 MARK QUESTIONS

Q1. How is the increasing demand for energy adversely affecting our environment? [1M,2010]
Ans 1. Our increasing demand for energy is depleting our natural resources and polluting the environment in one or the other way.

Q2. Mention one negative effect of our affluent lifestyle on the environment. [1M,2013, 2014]
Ans 2. Exploitation and overconsumption of natural resources will ultimately result in their scarcity.

Q3. In a food chain of frog, grass, insect and snake, assign trophic level to frog. [1M,2016]
Ans 3. Grass-› Insect-› Frog Snake,
Frog is the secondary consumer.

Q4. Define ecosystem. [1M,2012]
Ans 4. Ecosystem refers to a system that includes all living organisms (Biotic factors) such as plants, animals, microorganisms etc in a habitat as well as its physical environment (Abiotic factors) such as weather, soil, earth, sun, climate, rocks minerals etc, functioning together as a unit.

Q5. List two main components of our environment. [1M,2012]
Ans 5. Two main components exist in an ecosystem: abiotic and biotic. The abiotic components of any ecosystem are the properties of the environment; the biotic components are the life forms that occupy a given ecosystem.

Q6. List two biotic components of an ecosystem. [1M,2017]
Ans 6. Biotic components means all the living organisms living on earth two examples for biotic components are: human , animals.
They are also sorted in groups like autotrophs or producers , heterotrophs, consumer's and decomposers.

Q7. List two man-made ecosystems. [1M,2017]
Ans 7. Examples of man made ecosystem includes aquarium, zoo, botanical garden. In man made ecosystem, the plants and animals grow or survive outside their natural habitat in an artificial environment.

Q8. What is meant by biological magnification? [1M,2011]
Ans 8. The gradual accumulation of harmful non biodegradable and chemical substances from one trophic level to next trophic level and then throughout The food chain is known as biological magnification. In

Q9. DDT has entered the food chain. Which food habit is safer vegetarian or non-vegetarian? [1M]
Ans 9. Vegetarian habit is safer. Being closer to producers, less DDT will accumulate in our body. Biomagnification leads to higher levels of DDT in higher trophic levels.

Q10. List two natural ecosystems. [1M,2016]
Ans 10. Terrestrial ecosystem: Land-based.

Aquatic ecosystem: Water-based.

Q11. List two biotic components of a biosphere. [1M,2016]
Ans 11. Biotic components is the group of organisms which is made up of many different interdependent populations. This two among them are
a) Producer organisms also called autotrophs they synthesis their own food. All green plants are producers.
b) Consumer organisms also called heterotrophs they depend on others for their food. All the animals are consumers.

Q12. We often use the word environment. What does it mean? [1M,2016]
Ans 12. Environment means the natural world, as a whole or in a particular geographical area, especially affected by human activity. It can also be defined as the surroundings or conditions in which a person, animal, or plant lives or operates.

Q13. Name two decomposers operating in our ecosystem. [1M,2012]
Ans 13. Bacteria and fungi.

Q14. Why is a lake considered to be a natural ecosystem? [1M,2017]
Ans 14. A lake is considered as a natural ecosystem as it consists of both abiotic components (water, soil, air, etc) and biotic components (different living organisms like plants, algae, aquatic animals, etc). Both these components in a lake are interdependent and do not require any human interference for their sustenance.

Q15. Name the two abiotic components of ecosystem. [1M,2012]
Ans 15. Abiotic components of an ecosystem include all chemical and physical elements i.e. non-living components. Abiotic components can vary from region to region, from one ecosystem to another. They mainly take up the role of life supporter. They determine and restrict the population growth, number, and diversity of biotic factors in an ecosystem. Hence they are called limiting factors.

Q16. Why are green plants called producers? [1M,2016]
Ans 16. Green plants are called producers because they make their own food out of water and carbon dioxide in the presence of sunlight.

Q17. Mention the role of microorganisms like bacteria and fungi. [1M,2008]
Ans 17. The role of microorganisms like bacteria and fungi in the ecosystem is to decompose the things. They are present in soil and water to decompose the dead and decaying matter. That's why they are called decomposers.

Q18. Mention the role of decomposers in our ecosystem. [1M,2012]
Ans 18. Decomposers help in decomposing the dead animals and plant material through which the mineral goes into the soil making it more fertile.

Q19. What will happen if we kill all the organisms in one trophic level? [1M,2011]
Ans 19. If we kill all the organisms in one trophic level, then transfer of energy as well as matter to the next higher level will stop. It will lead to overpopulation at one particular level causing amongst

the individuals. This would seriously disturb the food chain and can even cause the collapse of an ecosystem.

Q20. Pesticides added to a field is seen in increased amounts in the crop and in the birds that feed on them. What is this phenomenon called? [1M,2012]
Ans 20. This phenomenon is called as biomagnification.

2 MARKS QUESTIONS
Q21. "Burning fossil fuels is a cause of global warming." Justify this statement. [2M,2012]
Ans 21. Fossil fuels like coal and petroleum are huge reservoirs of carbon and its compounds. On burning fossil fuels, huge reservoirs of carbon present in fossil fuels get converted to carbon dioxide and go into air. The amount of carbon dioxide increases in the atmosphere which leads to an increased greenhouse effect leading to excessive heating of the Earth which is called global warming.

Q22. You being an environmentalist are interested in contributing towards the conservation of nature resources. List four activities that you can do on your own. [2M,2017]
Ans 22. Four activities which can be done as an environmentalist to conserve natural resources are
(i) Using public transport for commuting instead of using a personal vehicle.
(ii) Avoid using clothes, accessories or articles made of animal skin.
(iii) Using energy-efficient electrical appliances to save electricity.
(iv) Ensuring no leakage of water taps and pipes at home.

Q23. What are top carnivores? Give two examples. [2M,2013]
Ans 23. Organisms which feed upon small carnivores and constitute the fourth trophic level.
Examples: Hawk, lion.

Q24. Write any two differences between food chain and food web.
[2M,2014]
Ans 25. (write any two in exam)

Food Chain	Food web
It refers to a natural system by which energy is transmitted from one organism to another	It consists of a number of interconnected food chains.
Member of higher trophic level feed upon a single type of organism	Member of higher trophic level feed upon many organisms
It does not have any effect on improving the adaptability and competitiveness of the organism.	Food webs improves the adaptability and competitiveness of the organism.
Example- Carrots ---> rabbit --> snake --> eagle	Example- A hawk might also eat a mouse, a squirrel, a frog or some other animal. The snake may eat a beetle, a caterpillar, or some other animal. And so on for all the other animals in the food chain.

Q25. Write any four examples of abiotic factors. [2M]
Ans 25. Wind, Rain, Humidity, Latitude.

Q26. State two advantages of conserving (i) forests and (ii) wildlife. [2M,2017]
Ans 26. Advantages of conserving forest:

- In It prevents soil erosion and floods.
- It helps to maintain the water cycle.
- It produces huge amounts of raw materials for the industries.

Advantages of conserving wildlife:

- It protects the endangered species.
- It preserves different kinds of species and thus, maintains the species diversity.
- It helps in maintaining the ecological balance that is required for supporting life.

3 MARKS QUESTIONS

Q27. How is ozone formed in the upper atmosphere? Why is damage to ozone layer a cause of concern to us? What causes this damage? [3M,2008]
Ans 27. UV rays in the atmosphere split some molecular oxygen (O,) into free oxygen (0) atoms. These atoms combine with molecular oxygen to form O_3

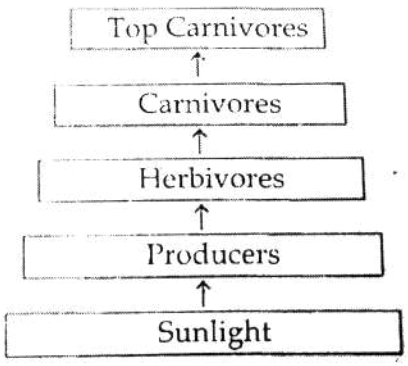
$$O_2 \xrightarrow{UV} O + O$$

$$O + O_2 \rightarrow O_3$$
(Ozone)

Damage to ozone layer will allow UV rays to reach on the surface of earth causing skin cancer, cataract and damage to crops.
Release of chlorofluorocarbons in the atmosphere which are used as refrigerants or in fire extinguishers damages the ozone layer.

Q28. "Energy flow in a food chain is unidirectional". Justify this statement. Explain how the pesticides enter a food chain and subsequently get into our body. [3M,2014]
Ans 28. The flow of energy in the ecosystem is said to be unidirectional because the energy lost as heat from the living organisms of a food chain cannot be reused by plants in photosynthesis. Pesticides are non-biodegradable wastes which pass along the food chain from crops to man or other animals and birds and harm them.

Q29. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem. [3M,2017, 2019]
Ans 29. All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem. Ecosystem consists of biotic and abiotic components.



Q30. What are consumers? Name the four categories into which the consumers are further grouped. [3M,2017]
Ans 30. Organisms that feed directly or indirectly on producers and cannot synthesize their own food from inorganic sources are called consumers. Herbivores, Carnivores, Omnivores and Parasites are various categories of consumers.

ASSERTION AND REASONING QUESTIONS
Rule : Assertion is labelled as (A) and the Reason is labelled as (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true

Q31. Assertion: Food chains generally consist of more than four trophic levels.
Reason: There is loss of energy at each trophic level and very little usable energy remains after four trophic levels.
Ans 31. (b) Both assertion (A) and reason (R) are correct but reason is not the correct explanation of assertion.

Q32. Assertion: An ecosystem consists of 3 to 4 tropic levels.
Reason: Removal of Primary consumers will not affect the ecosystem adversely.
Ans 32. (c) Assertion (A) is correct, reason (R) is incorrect

Q33. Assertion: Certain pesticides and other chemicals used to protect our crops from diseases and pests are non-bio degradable.
Reason: They do not get accumulated at various trophic levels.
Ans 33. (c) Assertion (A) IS correct, reason (R) is incorrect