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DEPARTMENT OF CHEMISTRY
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18MC052– ENVIRONMENTAL SCIENCE AND ENGINEERING
SEMESTER: I
PART – A

UNIT – I: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

1. **Define environment. (U) (CO-1) (JUNE 2017)**
   Environment is derived from the French word 'Environer' which means to encircle or surround. All the biological and non – biological things surrounding an organism are included in environment.
2. **Explain the following terms (a) Super-pests (b) Blue baby syndrome. (U) (CO-1)**
   (a) Super-pests
   Some individuals of the pest species usually survive even after pesticide spray. The survivors give rise to highly resistant generations. About 20 species of pests are now known which have become immune to all types of pesticides and are known as "**super pests**".
   (b) Blue baby syndrome
   Nitrogenous fertilizers applied in the fields often leach deep into the soil and ultimately contaminate the ground water. When the concentration of the nitrates in ground water exceeds 25 mg/L, they become the cause of a serious health hazard called "**Blue baby syndrome**" (or) "methaemoglobinemia". This disease affects the infants to the maximum extent causing even death
3. **What is ecology? (R) (CO-1)**
   The word ecology has its roots from two Greek words where **Ikos -** meaning a house or place of living or habitat and Logos - meaning study. Ecology is the study of the inter relationship among plants and animals and their interactions with the environment.
4. **Recall the term deforestation. Or what is deforestation? (R) (CO-1) (JUNE 2016)**
   Deforestation means destruction of forests. The term deforestation refers to drastic elimination of forest resources due to many natural and man – made activities.
5. **What do you understand by the term over grazing? List out the impacts. (R) (CO-1) (JUNE 2018)**
   The phenomenon of excess grazing by livestock, mostly in the grass lands, is called overgrazing. Overgrazing occurs when too many animals graze for too long and exceeds the carrying capacity of a grass land areas. Excessive number of domestic livestock feeding for too long in a particular area causes most overgrazing.
   Impacts of overgrazing: 1. Land degrading, 2. Soil erosion, 3. Loss of species, 4. Deforestation and 5. Impact on global warming.
6. **Define "Eutrophication". (R) (CO-1)**
   Eu – means "**more**" and trophic – means "**nutrient**".
   A large proportion of N and P fertilizers used in crop fields is washed off by the runoff water and reaches the water bodies causing **over nourishment** of the lakes. This process is known as Eutrophication.
7. **What are critical and strategic minerals? (R) (CO-1) (DEC 2014, JUNE 2018)**
   Critical Minerals: These are essential for the economic power of a country eg., Iron, Aluminum, Copper and Gold.
   Strategic minerals: these are required for the defense of a country.eg. Manganese, Cobalt, Platinum and chromium.

8. What is Hydrological Cycle? (R). (CO-1)

Water from the water bodies (oceans, rivers, lakes, etc.) is evaporated due to sun rays. The water which is evaporated forms clouds. These clouds are condensed to form rain. The process is repeated naturally. This is called as Hydrological Cycle.

9. List out the scope of the environmental science. (An) (CO-1)

The main scope of environmental studies include

a. To get awareness and sensitivity to the total environment and its related problems
b. To motivate the active participation in the environmental protection and improvement.
c. To know the necessity of the conservation of natural resources.

10. How would environmental awareness help to protect our environment? (An) (CO-1)

People should be made to know how our environment gets polluted and what are the ways and means by which environment can be protected. They should be taught of the importance of keeping our surrounding clean and green.

11. What is mining? Categorize the methods. (An) (CO-1)

Mining is done to extract minerals or fossil fuels from deep deposits in soil.

Methods of Mining:

Sub – surface mining: Mining is done in shallow deposits.

Surface mining: This method is more destructive, dangerous and expensive including risks of occupational hazards and accidents.

Three types of surface mining: 1. Open – pit mining, 2. Dredging, 3. Strip mining.

12. Recall the term aquifers. List out their types. (An) (CO-1)

A layer of sediment or rock that is highly permeable and contains water is called aquifer. Types: 1. Confined aquifers, 2. Unconfined aquifers.

13. Define water logging. Analyze its problems. (An) (CO-1) (JAN 2018)

The water stand for most of year in the land is known as water logging.

Problems: During water-logged condition, pore-voids in the soil get filled with water and the soil-air gets depleted. In such a condition the roots of plants do not get adequate air for respiration. So mechanical strength of soil decreases and crop yield falls.

14. Distinguish renewable with non-renewable resources. (An) (CO-1) (JUNE 2014)

Renewable Resources

Renewable resources are those resources which can be renewed or replaced over time. Examples of renewable resources are: wind, sunlight, tides, biomass, etc.

The renewable resources are supposed to have continuous supplies,

Non-renewable Resources

Non-renewable resources are those natural resources which cannot be renewed once they are completely consumed.

Examples of non-renewable resources are fossil fuels such as coal, oil, and natural gases

These resources will not have continuous supplies.

15. Justify the need for environmental education. (E) (CO-1)

- ☞ By environmental education, people will understand the concept of need of development without destruction of environment.
- ☞ Environmental studies inform the people about their effective role in protecting the environment by demanding changes in laws and enforcement systems.
- ☞ Environmental studies have a direct relation to the quality of life we live. Environmental studies develop a concern and respect for the environment.

16. Evaluate the effect of mining with example. (E) (CO-1) (JAN 2017, JAN 2018)

Some of the effects of mining on forest resources are:

1. Clear-cutting of forests leads to deforestation, 2. Formation of acid mine drainage incase of coal mining, 3. Land sliding and loss of fauna and flora, 4. Soil erosion and loss of water

resources, 5. Loss of top soil & lowering of ground water table.

17. Compile the measures of an individual to conserve our natural resources. (C) (CO-1)

Environment belongs to each one of us and all of us have a responsibility to contribute towards its conservation and protection. An individual can help in conservation by

1. Conserve water, 2. Conserve energy, 3. Protect the soil, 4. Conserve forest and
5. Promote sustainable agriculture.

18. List two causes of overgrazing (An) (CO-1) (JAN 2016)

It can be caused by either livestock in poorly managed agricultural applications, game reserves, or nature reserves. It can also be caused by immobile, travel restricted populations of native or non-native wild animals.

19. List out the reasons for drought. (An) (CO-1) (JUNE 2015)

The reasons for drought are

- Lack of rainfall
- Soil erosion
- Improper agriculture methods
- overgrazing
- Global warming
- Deforestation
- Excess use of scarce natural resources

20. What is salt water intrusion? (U) (CO-1) (JAN 2017)

Saltwater intrusion is the movement of saline water into freshwater aquifers, which can lead to contamination of drinking water sources.

21. List few methods to create awareness among the public on natural resources (R) (CO-1) (JAN 2019)

Awareness can be created by providing environmental related programmes in media.

And it can also be done by posting importance of environment through wall paper.

22. Point out few roles o individual in conservation of natural resources (An) (CO-1) (JAN 2019)

(i) Switch off lights, fans and other appliances when not in use

(ii) Use minimum water for all domestic purposes

(iii) Use green manure in the garden which will protect the soil.

23. Distinguish deforestation from forest degradation (An) (CO-1) (APR 2019)

- Deforestation: Deforestation means destruction of forest. The process of removal (or) elimination of forest resources due to many natural or man-made activities.
- Deforestation occurs when forests are converted to non-forest uses, such as agriculture and road construction.
- Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature.
- Forest degradation occurs only by man made activities.

24. List two causes of salinity caused in Rajasthan which led to crop failure. (R) (CO-1) (APR 2019)

1. Over irrigation : Over irrigation of croplands by farmers can result in salinity. During daytime water evaporates leaving behind salts in the top soil.

2. Salt water intrusion: Intrusion of sea water to farmlands can also result in the increases in salt content of the soil.

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UNIT – II: ECOSYSTEM AND BIODIVERSITY

1. **Outline the structure of an ecosystem? (or) What are the structural components of ecosystem (U) (CO-2) (JAN 2016)**
   i. Abiotic components: The abiotic components are non-living factors, which are essential to biotic components.
   Example: Soil, minerals, water, air, light, nutrients, etc.,
   ii. Biotic components: It includes all the organisms living in our planet earth.
   Example: Human beings, plants, animals and microbes.
2. **Illustrate the term energy flow. (U) (CO-2)**
   The flow of energy from producer to top consumer level is called energy flow. The flow of energy in an ecosystem is unidirectional, that is, it flows from the producer level to the consumer level and never in the reverse direction.
   The process of energy flow involves transfer of energy from autotrophs to various components of heterotrophs and help in maintaining diversity and order with in ecosystem.
3. **What is biodiversity? Summarize the significance of biodiversity (U) (CO-2)**
   Biodiversity is defined as the variety and variability among all groups of living organisms and the ecosystem in which they occur.
   Significance of biodiversity:
   1. It is very important for human life as we are entirely dependent on plants, micro organisms, earth's animal for our food, medicine and industrial products.
   2. It is important for forestry, fisheries and agriculture, which depend on rich variety of various biological resources available in nature.
4. **Relate the term In-situ and Ex-situ conservation of biodiversity. (U) (CO-2)**
   In-situ conservation involves conservation of flora and fauna within its natural habitat, where the species normally occurs. Examples: Biosphere Reserves, National Parks, Wildlife Sanctuaries, Reserve Forests, etc.
   Ex-situ conservation involves conservation of flora and fauna outside their natural habitat, where the species normally occurs. Example – Botanical Gardens, Gene Banks, Seed Banks, Zoos, Culture collections, etc.
5. **Define ecology and ecosystem. (R) (CO-2)**
   Ecology: It is the study of interrelationship between the biotic and abiotic components.
   Ecosystem:
   A group of organisms interacting among them and with the environment is known as ecosystem.
   An ecosystem may be natural as a pond, lake, river, an ocean or a forest or it may be manmade like an aquarium.
6. **What is ecological succession? (R) (CO-2) (JAN 2017)**
   The progressive replacement of one community by another till the development of stable community in a particular area is called ecological succession.
7. **What are the types of ecological succession**? **(R) (CO-2)**
   a) Primary succession: It involves the gradual establishment of biotic communities on nearly lifeless ground.
   b) Secondary succession: It involves the establishment of biotic communities in an area where some type of biotic community is already present.
   c) Hydrarch succession: If succession starts from the bare water bodies.
   d) Xerarch succession: If succession starts form bare rocky formation.
8. **Find the meaning of the term ecological pyramids. (R) (CO-2)**
   The graphic representation of the number, biomass and energy of the successive trophic levels of an

ecosystem is called food pyramid or ecological pyramid. In the ecological pyramid, the first or producer level forms the base and successive levels form the tiers, which make up the apex.

9. Define species diversity and genetic diversity (R) (CO-2) (JUNE 2014)

Species diversity:

It is the sum of the variety of all living organisms at the species levels.

Genetic diversity:

It is the concept of variability with in a species. It is measured by the variation in genes within a particular species, variety, subspecies or breed.

10. What is "Biomagnification"? (R) (CO-2)

The non-biodegradable materials keep on passing from one tropic level to another. At each successive tropic level, the concentration keeps on increasing. This process is known as Biomagnification.

11. Name the bioreserve centers of Tamilnadu. (R) (CO-2)

1.Gulf of Mannar Biosphere Reserve, 2. Nilgiri Biosphere Reserve, 3. Vedanthangal Bird sanctuary, 4. Mundanthurai Reserved Forest, 5. Anaimalai Reserved Forest, 6. Vettangudi Bird sanctuary (near Tirupattur) of Sivaganga District, 7. Palani hills are also preserving several valuable species of flora and fauna.

12. What is Red Data Book? (R) (CO-2) (JUNE 2013) (JAN 2016)

The Red Data Book is the book which categorizes species at the threshold of risk according to the severity of the threat.

13. Recall the term "Hot-spots of Biodiversity"? (R) (CO-2) (DEC 2014, JUNE 2015)

The hot spots are the regions which possess the endemic species. Endemic species are the species, which are confined to only particular locality. Such organisms are very important from the point of conservation.

14. Recall the term flora and fauna. (R) (CO-2)

Flora: Plants present in a particular region or period

Fauna: Animals present in a particular region or period.

15. Define pyramid number. (R) (CO-2) (DEC 2014)

The population of each organism in a food chain can be shown in a sort of bar chart called a pyramid of numbers. The more organisms there are, the wider the bar. The producer in the food chain always goes at the bottom of the pyramid of numbers.

16. List out the different functions of an ecosystem. (An) (CO-2)

Different functions of ecosystems

a. **Metabolic process:** This includes assimilation, respiration, growth, production, etc.,
b. **Energy flow:** Energy flow involves transfer of energy from producer to various consumers.
c. **Bio-geochemical cycling:** bio-geochemical cycling operates continuously circulating materials and water in between biotic and abiotic components of an ecosystem.
d. **Biological regulations:** Biological regulations include both regulations of organisms by environment and regulation of environment by the organisms.

17. Classify the ecological pyramid. (An) (CO-2)

Pyramid of numbers-showing number of organism at each level

Pyramid of biomass-showing the total dry weight and total amount of living matter.

Pyramid of energy – showing the rate of energy flow.

18. List out the values of biodiversity. (An) (CO-2)

i) Consumptive use value, (ii) Productive use value, (iii) Social value, (iv) Aesthetic value and (v) Optional value

19. Distinguish food chain and food web (Or) Define food chain and food web (Or) Compare food chain and food web (An) (CO-2) (JUNE 2013 & 2014, JUNE 2015 & 2016, JAN 2017, JUNE 2017, JAN 2018, JUNE 2018, JAN 2019)

- A food chain refers to the transfer of energy (food) from the producers through a series of organisms with repeated eatings. A network of food chains (interconnected food chains) is called a food web.
- The food chain shows only one pathway of energy and material transfer. A food web is a set of interconnected food chains by which energy and materials circulate within an ecosystem.
- An organism can occupy only one trophic level in a food chain while an organism can occupy more than one trophic level in a food web.

20. List out the hot-spot regions in India. (An) (CO-2) (JUNE 2018, JAN 2019, APR 2019)

1. Eastern Himalayas, 2. The Western Ghats

21. Survey the endangered species in India. (An) (CO-2)

According to RED data book, 44 plant species are critically endangered, 54 endangered and 143 vulnerable. India ranks second in terms of the number of mammals and India is sixth among the countries with the most threatened birds.

22. Identify the laws that govern energy flow in ecosystem. (Ap) (CO-2)

1. First Law of Thermodynamics: It states that energy can neither be created nor destroyed, but it can be converted from one form to another. Solar energy is converted into biochemical energy by the green plants.
2. Second Law of Thermodynamics: It states that whenever energy is transformed, there is a loss of energy through the release of heat. The loss of energy occurs when energy is transferred between tropic levels.

23. Compare autotrophs and heterotrophs. (E) (CO-2)

Autotrophs

Producers or Autotrophs are organisms that are capable of making their required food themselves. (Auto = self, troph = feeder). Green plants, Algae, bacteria, etc., are some of the examples of autotrophic components.

Heterotrophs.

Those organisms which depend on others (Producers-Autotrophs) for their energy requirements are known as Consumers or Heterotrophs. Since the animals are not having chlorophyll, they are unable to produce their own food.

24. Tell importance of the decomposer. (E) (CO-2)

a. They breakdown complex compounds of dead organisms.
b. Absorb some of the decomposed or breakdown products and
c. Release inorganic nutrients into the environment thus making them available again to the autotrophs.

By this way, the decomposers are performing an invaluable service to the ecosystem.

25. Evaluate the biodiversity of Tamilnadu. (Or) Give the data of biodiversity of Tamilnadu (E) (CO-2) (JUNE 2016)

The distribution of plants and animals, different districts of Tamilnadu is uneven.

Example –

- ☞ Western Ghats has 1,500 species of plants, 50 species of mammals and 90 reptiles.
- ☞ Birds of several species are coming to Vedanthangal from far off places.
- ☞ The Elephant Sanctuary at Mudumalai
- ☞ The Tiger Sanctuary at Mundanthurai.

o The development and constructional work in and around forest area should be stopped immediately.

26. Compare and identify endemic species with endangered species. (E) (CO-2) (JUNE 2017, JAN 2018) 27.

- The species which are only found among a particular people or in a particular region are known as endemic species. Ex. Nilgiri Tahr, Lion tailed macque.

- Certain species of plants and animals are in the verge of disappearing from the earth due to various physical and biological factors induced by human. The endangered species otherwise known as "threatened species". Ex. Giant panda, Indian elephant, Royal Bengal tiger

28.

- Some of the endangered species are the wild turtles from Eastern coast, peacocks from Madhya Pradesh and Andhra, Snakes from south, Musk deer from Garhwal Himalayas, etc., are endemic.

27. Discuss the significance of Food Chain and Food Web. (C) (CO-2)

Food chain and Food web play a very important role in the ecosystem.

1. Energy flow and nutrient cycling takes place through them.
2. They maintain and regulate the population of size of different tropic levels, and thus help in maintaining ecological balance.
3. They have the property of biomagnification.

28. Energy flow in the ecosystem is always unidirectional. Justify the statement (E) (CO-2) (APR 2019)

The solar radiations reach the earth's surface, some of which is absorbed by organism (primary producers) to produce organic matter through photosynthesis. The producers (plants) are used by herbivores and herbivores are used by carnivores as their food. In this way energy is transferred from one organism to another and so on. The conversion of solar energy is governed by law of thermodynamics (First &Second law). There will be a **loss of energy (about 80-90%) in the form of heat as it moves from one tropic level to another tropic level**. The loss of energy takes place through respiration, hunting. So Energy flow in the ecosystem is always unidirectional.

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UNIT-III ENVIRONEMENTAL POLLUTION

1. **What is "Photochemical smog"? or Define Photochemical smog.(U) (CO-3) (JAN 2016)**
   Photochemical smog is formed when primary pollutants react with (sunlight) ultraviolet light to create a variety of toxic and reactive compounds.
2. **What do you understand by the term pollution & pollutants? (R) (CO-3)**
   Pollution: Pollution is an undesirable change in physical, chemical and biological characteristics of environment.
   Pollutants: The substances that are responsible for the undesirable changes in the environment are called as pollutants.
3. **Define air pollution**. **(R) (CO-3)**
   Air pollution may be defined as the excessive concentration of foreign matter in the air adverse effects on plants, animals, human beings and materials.
4. **Define the terms primary and secondary pollutants with examples. (R) (CO-3) (JUNE 2013 & 2014)**
   Primary pollutants
   Primary pollutants are those emitted directly in the atmosphere in a potentially harmful form.
   Example: Ash, smoke, dust, CO, NO, SO_2, etc.
   Secondary pollutants
   Some of the primary pollutants may react with one another or with the basic components of air to form new pollutants. They are called as secondary pollutants.
   Example: NO\$NO_2$ Moist (HNO_3\$NO_3$), aldehyde, ketone, PAN etc.
5. **Define water pollution. (R) (CO-3)**
   "Water pollution may be defined as the alteration in physical, chemical and biological

characteristics of water which may cause harmful effects on humans and aquatic life".

6. Define suspended particulate matter (SPM). (R) (CO-3)

Suspended Particulate Matter (SPM) is a complex mixture of small and large suspended droplets (solid particles) with size less than 100 **µm** varying origin and chemical composition.

7. Name the gaseous pollutants. (R) (CO-3)

These are toxic and poisonous gases such as carbon monoxide, chlorine, ammonia, hydrogen sulphide, sulphur dioxide, nitrogen oxides and carbon dioxide.

8. Define noise pollution. (R) (CO-3) (JAN 2019)

"Noise pollution is defined as the unwanted unpleasant or disagreeable sound that causes discomfort for all living beings"

9. What are the sources, effects and control measures of noise pollution? (R) (CO-3) (JUNE 2013, JUNE 2017, JAN 2018)

Sources: Road traffic noise, Air traffic noise, Rail traffic noise, Domestic noise, Industrial noise, Incompatible land use noise

Effects: Headache, Hearing damage, Lack of concentration, Raise in blood pressure

Control measures: Planting trees, use of sound absorbing substances, proper maintenance of machinery.

10. What are solid wastes? (R) (CO-3) (JUNE 2016)

The wastes generated and discarded from human and animal activities that are normally solid are called as solid wastes

11. How will you define biomedical wastes? (R) (CO-3)

Biomedical wastes are defined as any solid, semi solid or liquid waste including its containers and any intermediate product which are generated during diagnosis, treatment or immunization of human being/ animals or in production and testing of biological parts.

12. Define incineration. (R) (CO-3)

It is a hygienic way of disposing solid waste. It is more suitable if the waste contains more hazardous material and organic content. It is a thermal process and is very effective for detoxification of all combustible pathogens. It is an expensive technology compared to land-fill and composting because incinerators are costly.

13. Define biological oxygen demand. Write down its significance in environmental studies. (R) (CO-3) (June 2014) & (DEC 2014) (JUNE 2018)

Biochemical oxygen demand is a measure of the quantity of oxygen used by microorganisms (e.g., aerobic bacteria) in the oxidation of organic matter.

Significance:

- BOD is the principle test to give an idea of the biodegradability of any sample and strength of the waste. Hence the amount of pollution can be easily measured by it.
- This is important parameter to assess the pollution of surface waters and ground waters where contamination occurred due to disposal of domestic and industrial effluents.
- It serves as a measure of the amount of clean diluting water required for the successful disposal of sewage by dilution.

14. List out the sources of air pollution. (An) (CO-3) (JUNE 2017)

The two main sources of air pollution are

Natural Sources: Natural sources include dust particles, volcanic eruptions, sea salt sprays, smoke, forest fires, pollen grains etc.

Man-made or anthropogenic sources: The man made sources are agricultural activities, industrial growth, domestic wastes, automobile exhausts, Thermal power plants, Fossil fuel burning etc.

15. Classify the pollution (An) (CO-3)

The different kinds of pollution that affects the environment are,

1. Air Pollution, 2. Water Pollution, 3. Soil Pollution, 4. Marine Pollution, 5. Noise Pollution, 6.

Thermal Pollution, 7. Nuclear Pollution.

16. **Distinguish biodegradable and non-biodegradable pollutants. (An) (CO-3)**
17. **Biodegradable pollutants:**
Pollutants which decompose rapidly by natural processes are called biodegradable pollutants.
18. **Example:** Domestic sewage.
19. **Non-degradable pollutants:**
Pollutants which do not decompose or decompose slowly in the environment are called non-degradable pollutants **Example:** Mercury salts, long chain phenolic chemicals, DDT and Aluminum cans etc.

17. Analyze the effects of air pollution. (An) (CO-3)

- Long exposure to CO may cause **headache, visual difficulty, suffocation and death.**
- Production of CO_2 leads to Global warming.

18. Discover the causes of water pollution. (An) (CO-3)

Sewage, Industrial effluents, Synthetic detergents, Agrochemicals, Oil, Waste heat.

19. Analyze the effects of water pollution. (An) (CO-3)

Many wastewater especially **sewage contain many pathogenic** (disease causing) organisms like Bacteria, Viruses, Protozoa and Parasitic worms. **Water borne diseases** like cholera, dysentery, typhoid, jaundice etc., are spread by water contaminated with sewage. **Excess of fluoride** in drinking water causes defects in teeth and bones called **fluorosis.**

20. How will you distinguish point Source from non-point Source of pollution? (An) (CO-3)

Point sources are **specific sites near water** which directly discharge effluents into them. These sources are **discrete** and **identifiable**, and are therefore, relatively **easy to monitor** and **regulate.** **Examples:** Industries, power plants, underground coal mines, oil wells etc.

Non-point source

The discharge from non-point sources is **not at any particular site**, rather, these sources are **scattered**, which individually or collectively pollute water .This type of pollution is **difficult to monitor and regulate.**

Examples: Surface run-off from agricultural fields, atmosphere deposition, and construction sites etc.

21. Distinguish mist and fog. (An) (CO-3)

Mist: Mist is made up of liquid droplets generally smaller than 10 μm which are formed by condensation in the atmosphere or released from industrial operations.

Fog: Fog is similar to mist but the droplet size bigger (> 10 μm). Fog is sufficiently dense to incomprehensible vision.

22. Evaluate the advantages of landfill method. (E) (CO-3)

i. It is simple, economical and Segregation not required.
ii. Land filled areas can be reclaimed and used for other purposes.
iii. Converts low-lying, marshy waste- land into useful areas,
iv. Natural resources are returned to soil and recycled.

23. Compile the measures to control air pollution. (C) (CO-3) (JUNE 2016, JAN 2017)

i. The emission rates should be restricted to permissible levels by each and every industry.
ii. Incorporation of air pollution control equipment in the design of the plant layout must be made mandatory.
iii. Continuous monitoring of the atmosphere for the pollutants should be carried out to know the emission levels

24. Define chemical oxygen demand. Write down its scope in environmental studies. (R) (CO-3) (JAN 2016)

- Chemical oxygen demand (COD) analysis is a measurement of the oxygen-depletion capacity of a water sample contaminated with organic waste matter.

- Most applications of COD determine the amount of organic pollutants found in surface water (e.g. lakes and rivers) or wastewater, making COD a useful measure of water quality. It is expressed in milligrams per liter (mg/L), which indicates the mass of oxygen consumed per liter of solution.

25. Compare BOD with COD. (E) (CO-3) (JUNE 2015, JAN 2018)

S.No	COD	BOD
1.	COD is also called as Chemical Oxygen Demand	BOD is also called as Biochemical Oxygen Demand
2.	Chemical Oxygen Demand is the total measurement of all chemicals in the water that can be oxidized	Biochemical Oxygen Demand is supposed to measure the amount of food (or organic carbons) that bacteria can oxidize
3.	COD is usually measured and can be done in 2 hours	BOD is usually measured and can be done in 5 days
4.	Permissible limit of COD =250 to 500 ppm	Permissible limit for BOD = 30 mg/L

26. What is a hazardous waste? Give an example. (U) (CO-3) (JUNE 2015)

Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. For example

- Paints and solvents , Pesticides (insecticides, herbicides, fungicides, etc.)
- Mercury-containing wastes (thermometers, switches, fluorescent lighting, etc.)
- Electronics (computers, televisions, cell phones)
- Refrigerant-containing appliances & Some specialty (e.g. lithium, nickel cadmium, or button cell batteries).

27. Define e-waste. (R) (CO-3)

Electronic waste or e-waste may be defined as items of all types of electrical and electronic equipments and its parts that have been discarded as waste without intention of re-use. The waste includes discarded computers, office electronic equipment, entertainment devices such as mobile phones, laptops, tablets, television sets and refrigerators.

28. Dissolved oxygen is a measure of pollution in sewage water-Justify. (An) (CO-3) (JAN 2017)

Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water

29. Define hardness of water. (R) (CO-3)

Hardness is the property or characteristics of water which does not produce lather with soap. Hardness can be detected by treating water with soap.

$$2C_{17}H_{35}COONa + CaCl_2 \longrightarrow (C_{17}H_{35}COO)_2Ca\downarrow + 2NaCl$$

Soap — hardness causing Substance — hard soap

30. Differentiate permanent and temporary hardness eith suitable examples. (R) (CO-3) (APR 2019)

Permanent Hardness: It is due to chlorides and sulphates of calcium & Magnesium. It cannot be removed by boiling.

Temporary Hardness: It is due to carbonates and bicarbonates of calcium & Magnesium. It can be removed by boiling.

31. Compare the effects of e-waste and medical waste on soil (E) (CO-3) (APR 2019)

E-Waste: Toxic heavy metals and chemicals from e-waste enter the "soil-crop-food pathway," one of the most significant routes for heavy metals' exposure to humans. These chemicals are not biodegradable—they persist in the environment for long periods of time, increasing the risk of exposure.

Medical waste: Toxins would interject into the food chain and eventually reach humans who consume sea creatures. Human exposure to such toxins can stunt human growth development and cause birth defects.

32. Define alkalinity. How is alkalinity classified? (R) (CO-3) (JUNE 2013)

Alkalinity of water is a measure of its acid-neutralizing ability. The natural alkalinity in water is imparted by the hydroxides, carbonates and bicarbonates.

Depending upon the anion present in water alkalinity is classified into three types:

1. Hydroxide alkalinity, OH^- 2. Carbonate alkalinity, CO_3^{2-} and 3. Bicarbonate alkalinity, HCO_3^-

33. Classify the types of hardness of water (An) (CO-3) (JAN 2019)

Carbonate hardness and bicarbonate hardness.

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UNIT – IV: SOCIAL ISSUES AND ENVIRONMENT

1. Summarize the significance of rain water harvesting. (U) (CO-4)

1. Rain Water Harvesting helps in recharging the aquifers. Hence the ground water level is increased.
2. Increases the availability of water from wells.
3. Improves the ground water quality by dilution.
4. Improves soil moisture and reduces soil erosion by minimizing run – off water.
5. Upgrading the social and environment status etc.

2. Summarize the measures to check Global Warming? (U) (CO-4)

- CO_2 emission can be cut by reducing the use of fossil fuels.
- Utilize renewable resources such as wind, solar and hydropower.
- Plant more trees.
- Shift from coal to natural gas.
- Stabilize population growth.
- Remove atmospheric CO_2 by utilizing photosynthetic algae

3. Outline the measures to be adopted for water conservation. (U) (CO-4)

Water, being one of the most precious and indispensible resource, needs to be conserved by,

1) Decreasing run–off losses:

Huge water– loss occurs due to run – off on most of the soils. This can be reduced by allowing most of the water to infiltrate into the soil. This can be achieved by using the following ways.

a) Contour cultivation on small furrows and ridges the slopes trap rainwater and allow more time for infiltration.

b) Conservation – bench terracing involves construction of a series of benches for catching the run-off water.

2) Reducing the evaporation losses.

3) Storing water in Soil.

4) Reducing the irrigation losses

4. Define "Rain water harvesting". (R) (CO-4)

Rain water harvesting is a technique to increase the recharge of groundwater by capturing and storing rainwater. This is done by constructing special water harvesting structures like dug wells, percolation pits, lagoons, check dams etc.

5. **Define watershed. (R) (CO-4)**
   Watershed is defined as the land area from which water drains under gravity to a common channel like streams, river, etc., (or) a watershed can be defined as the entire land area that ultimately drains into a particular body of water.
6. **Define environmental ethics. (R) (CO-4) (DEC 2014, JUNE 2018)**
   Ethics is the branch of philosophy; it deals with morals and values.
   1. Environmental ethics refers to the issues, principles and guidelines relating to human interactions with their environment
   2. Environmental ethics tells us that we should leave a lively world for our future generations.
   3. All religious teach that damaging god's creation is evil.
7. **Define greenhouse effect. (R) (CO-4) (JUNE 2015)**
   The green house effect may be defined as "the progressive warming up of the earth's surface due to the blanketing effects of manmade CO2, CH4, CFC's, N2O etc., in the atmosphere."
8. **Define global Warming (Or) What is global warming? (R) (CO-4) (JUNE 2016, JAN 2017, JUNE 2017)**
   Global warming is defined as "the rise in temperature when the earth heats up". It occurs when greenhouse gases such as CO_2, CH_4, CFC's, N_2O, etc., trap heat and light from the sun in the earth's atmosphere, which increases the temperature. This hurts many people, animals, and plants.
9. **Define acid rain and its mechanism (R) (CO-4) (JAN 2018)**
   Acid rain contains acids that form in the atmosphere when industrial gas emissions (especially sulfur dioxide and nitrogen oxides) combine with water.
10. **How ozone hole is formed? (R) (CO-4) (JAN 2018)**
    In the presence of UV radiation from the sun, Chloro Floro Carbon (CFC) breaks up into chlorine free radicals ($Cl^{\bullet}$) which readily consumes ozone. Thus each atom of $Cl^{\bullet}$ liberated attacks ozone molecules further.

$$CFCl_3 \longrightarrow CFCl_2 + Cl^{\bullet}$$

$$Cl^{\bullet} + O_3 \longrightarrow ClO^{\bullet} + O_2$$

$$O_2 \longrightarrow [O] + [O]$$

$$ClO^{\bullet} + [O] \longrightarrow Cl^{\bullet} + O_2$$

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11. **What are the objectives of watershed management? (Or) why watershed management is essential? (R) (CO-4) (JUNE 2013, JUNE 2015)**
    1. Conservation, up gradation and optimum utilization of natural resources and vegetation in an integrated manner.
    2. Generation of huge employment opportunities in the backward rain – fed areas to ensure livelihood security, particularly the poorest section of the rural people.
    3. Promotion of social forestry and horticulture activity on all suitable areas of land.
12. **Analyze the objectives of rain water harvesting. (An) (CO-4)**
    The rain water harvesting has the following objectives;
    1. To reduce run – off loss and consequently avoids flood in road
    2. To meet the increasing demand of water.
    3. To raise the water table by recharging ground water.
    4. To reduce ground water contamination and prevent salinity increase in coastal areas.
13. **Analyze the term water shed management. (An) (CO-4)**
    The water shed is defined as the land area from which water drains under gravity to common

channels like streams, rivers etc. (or) water shed can be defined as the entire area that ultimately drains into a particular body of water.

- A watershed is a geographic area where all water running off the land drains to a specific location. This location may be streams, rivers, lakes, oceans, or the water may drain underground into the ground water.
- Watersheds can be of many different shapes or sizes.
- The watersheds can be range from a few square kilometers to few thousand square kilometers in size and
- The water shed comprises complete interactions of soil, landforms, vegetations, land se activities and water.

14. Name the chemicals that take part in ozone depletion. Or What are the agents responsible for ozone layer depletion (An) (CO-4) (JAN 2016)

The following gases are found to be instrumental in ozone depletion.

1. Chloro Fluoro Carbon (CFC)
   Sources: Refrigerants in refrigerators, propellant in aerosol spray cans.
2. Hydro Chloro Fluoro Carbon (HCFC): Sources- Refrigerants, blowing agents.
3. Bromo Fluro Carbons (BFC): Sources: fire extinguishers.

15. Criticize the impacts of green house effects on the environment. (E) (CO-4)

1. Global temperature increases
2. Rise in sea level
3. Effects on human health
4. Effects on agriculture.
5. Disruption of the water cycle.

16. Recommend few steps to control acid rain. (E) (CO-4)

- Emissions of SO_X and NO_X from industries and power plants should be reduced by using pollution control equipments.
- Liming of lakes and soils should be done to correct the adverse effects of acid rain.
- Coal with lower sulphur content is desirable to use in thermal power plants.
- Replacement of coal by natural gas would reduce the problem.
- Due to this continuous attack of $Cl^{\bullet}$ thinning of ozone layer occurs, which leads to the formation of ozone hole.

17. Propose the possible techniques of rain water harvesting. (C) (CO-4)

There are two main techniques in rain water harvesting

i. Storage of rain water on surface for future use and
ii. Recharging of ground water.

18. Design some steps to control water shed management. (C) (CO-4)

1.Water harvesting, afforestation and agroforestry
2.Mechanical measures for reducing soil erosion and run-off
3.Scientific mining and quarrying, 4. Public participation.

19. Define earthquake. Bring out the measures for earthquake. (U) (CO-4)

Earthquake is defined as the sudden violent shaking of a part of the earth due to sudden movements of earth's crust along faults.

Measures:

- Damage to property and life can be prevented by constructing earthquake-resistant buildings in the earthquake prone zone or seismic areas.
- Wooden houses are preferred in earthquake prone zone and caution residents.
- People should come out of their houses and stay in the open till the tremors subside.

20. Recall the term Tsunami. Bring out the causes. (An) (CO-4)

Tsunamis are large waves that are generated when the sea floor is deformed by seismic activity, vertically displacing the overlying water in the ocean.

Causes:

- Under sea volcanic eruption that create treatments force
- Deformation of the sea floor due to tectonic movement

21. Mention any two environmental issues. (R) (CO-4) (JUNE 2016)

Ozone layer depletion & Global warming

22. Describe the measures to be taken before a natural disaster like flood (U) (CO-4) (JUNE 2017)

i. Listen for warning signs and community alert systems
ii. Stock emergency building materials
iii. Store enough food and drinking water
iv. Plan immediate an evacuation route

23. The watershed raises the water table – Justify the statement (R) (CO-4) (JAN 2019)

1. **Trenches:** Trenches were dug at equal intervals to improve ground water storage
2. **Earthern Dam:** To check the run-off water, earthern dam must be constructed in the catmint area
3. **Farm Pond:** A farm pond can be built to improve water storage capacity of the catchment area.
4. **Underground barriers:** Underground barriers should be built along the nullahs to raise the water table.

24. Argue that the earth quake management is essential or not in countries like india (Ap) (CO-4) (JAN 2019)

It is essential in our country. Because already we have faced Tsunami in the year as a consequence of earthquake near Indonesia. And it made huge number of human economic losses.

25. Two issues related to environmental ethics (Ap) (CO-4) (APR 2019)

Controlling the pollution and reducing the wastes,Make goods that have longer life, and conserve biodiversity, Discourage the earth degrading behavior, Reduce the population growth, Limit the use of non – renewable resources.

26. Suggest two measures to be followed by people before, during and after being hit by tsunami. (C) (CO-4) (APR 2019)

Before the Tsunami: Ensure your house to be above sea level, Ensure all family members know how to respond.

During the Tsunami: Listen to radio for emergency and evacuation information.Dont go to the beach to watch tsunamis.

After the Tsunami: Help the injured person. and give first aid, Don't use appliances or light until properly checked by an electrician.

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UNIT – V: SUSTAINABILITY AND GREEN CHEMISTRY

1. **Define value education and type of values? (or) what do you mean by value education (Or) Mention any two objectives of value education (R) (CO-5) (JUNE & DEC 2014)**

Education is one of the most important tools in bringing about socio economic and cultural progress

of country.

Type of values

1. Personal values 2. Social values, 3. Moral values, 4. Ethical values, 5. Spiritual values and 6. Behavioral values.

2. Define Environmental Impact Assessment (EIA). (R) (CO-5)

Environmental Impact Assessment – it is a systematic analysis of the effect of major developmental activities on ecosystem, resources and environment.

3. Differentiate between HIV and AIDS. (An) (CO-5) (JUNE 2015, JUNE 2018)

- HIV is expanded as **Human Immunodeficiency Virus**. AIDS is expanded as **Acquired Immuno Deficiency Syndrome**
- HIV is a virus. If left untreated, the virus can lead to AIDS
- If a person suffers from HIV, they can live for many years without ever developing AIDS. But if a person has AIDS, he /she will have HIV.

4. What are the screening test for AIDS. (U) (CO-5)

A person whose blood contains HIV antibodies is said to be HIV positive meaning that he/she is infected with HIV. Now, there is a wide range of screening tests based on detection of HIV antibodies. At first a sensitive test (**ELISA Test**) is used to detect the HIV antibodies while a second test (**Western Blot)** is confirmatory test.

5. Define "Remote Sensing". (R) (CO-5)

"Remote sensing is the science of making inferences about objects from measurements made at a distance without coming into physical contact with the objects under study"

6. What is meant by green chemistry? (U) (CO-5) (JUNE 2014)

The term green chemistry is defined as, the invention, design and application of chemical products and processes to reduce or to eliminate the use and generation of hazardous substances.

7. List out the fundamental rights of human beings. (An) (CO-5)

1.The rights to equality, 2. The rights to freedom, 3. The rights to property, 4. The rights against exploitation, 5. The rights to freedom of religion, 6. Cultural and educational rights and 7. The rights to constitutional remedies.

8. List out the mode of transmission of AIDS. (An) (CO-5)

The basic modes of transmission of AIDS are

1.Sexual transmission, 2. Blood contact, 3. Maternal – fetal transmission, 4. By surgical equipments.

9. What are the major symptoms of AIDS? (C) (CO-5)

The major symptoms of aids are

1. Fever for more than one month, 2. Weight loss more than 10% of body weight, 3.Diarrhea, 4. Night sweats, 5. Cough for more than one month, 6. General skin diseases,
7. Viral infection, 8. Fungal infection in mouth and throat and 9. Enlargement of lymph glands.

10. Distinguish human value and social value. (An) (CO-5) (JUNE 2013)

S.No	Human value	Social value
1.	It involves preparation of text book and resource material about the environmental education.	It tells about the importance of human conditions such as Love, compassion, tolerance and justice.
2.	The basic human value "man in nature" rather than "nature for man".	The basic social values protect "all forms of life and biodiversity" on this earth.

11. Define human right. (R) (CO-5) (JUNE 2016)

Human rights are the basic rights and freedoms that belong to every person in the world. These basic rights are based on values like dignity, fairness, equality, respect and independence.

12. List out of few family welfare program (U) (CO-5) (JUNE 2017)

Mid day meal scheme for school children, Child labour eradication scheme, Rajiv Gandhi national crèche scheme for the children of working mothers.

13. Develop few ideas to achieve the goal of sustainable development. (C) (CO-4)

- Economic policies are to be redefined to protect and develop farm, sustainable agriculture and fertile soil.
- Conserving all nonrenewable sources by recycling and reuse.
- Controlling pollution and avoiding wastage of natural resources.
- Developing appropriate technology with minimum environmental hazards.

14. Define sustainable development and compare it with unsustainable development (R) (CO-4) (JAN 2016, JAN 2018, JUNE 2018)

Sustainable development is defined as "meeting the need of the present generation without compromising the ability of future generations to meet their needs".

15. Outline the methods to control AIDS? (U) (CO-5)

If a person is infected with HIV the person remain infected for life. There is neither a cure nor a vaccine but can be prevented.

i) Through education
ii) Safe sex
iii) Counseling services
iii) Prevention of HIV transmission
iv) Primary health care
v) HIV/AIDS programme

16. What is AIDS? How is it caused? (C) (CO-5)

AIDS is the **Acquired Immune Deficiency Syndrome;** Sometimes Called As "Slim Diseases" is caused by a human immune deficiency virus (HIV).

HIV breaks down the body's immune system, leaving the victim vulnerable to number of life threatening opportunistic infections neurological disorders and unusual cancers. HIV causes damage to the body's natural ability to fight off illness.

17. What are the important objectives of family welfare programmes? (R) (CO-5) (JAN 2016)

- To ensure adequate, qualitative, preventive & curative health care to people of the State.
- To eliminate diseases like polio & leprosy from the state & prevent as well as control other communicable diseases
- To reduce maternal, infant & neo-natal mortality rates.

18. Most of the industries discharging the untreated waste water to the nearby water bodies. Is it the symptom of sustainability? (R) (CO-5) (JAN 2019)

The addition of untreated water to nearby water bodies pollute the water by reducing the amount of dissolved oxygen in water. It creates threat to both plant and animal species in water and it reduces it population in the water. So it is not sustainable.

19. What is the need for environmental impact assessment? (R) (CO-5) (JAN 2019)

(i) To identify the main issues and problem of the parties.

(ii) To identify who is the party.

(iii) To identify what are the problems of the parties.

(iv) To identify why are the problems arise.

20. Identify any one committee constituted related to human rights in your institution and mention its role. (Ap) (CO-5) (APR 2019)

Women empowerment

21. Define sustainable development in the face of agriculture. (R) (CO-5) (APR 2019)

development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs .

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PART – B QUESTIONS

UNIT – I: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

1. Outline on Water logging and Salinity. **(U) (CO-1)**
2. Explain the effects of mining with example. (OR) Discuss the major environmental impacts of mineral extraction. **(E) (CO-1) (JUNE 2013, JUNE & DEC 2014, JAN 2016, JUNE 2016, JAN 2018, APR 2019)**
3. Explain uses of forest resources, over – exploitation and deforestation. **(E) (CO-1)**
4. Explain the major causes and consequences of deforestation **(E) (CO-1) (JUNE 2013, DEC 2014, JUNE 2015, Jan 2016, JAN 2017, JUNE 2017, JUNE 2018)**
5. Discuss the development of modern agriculture and its effect. (OR) Explain the adverse environmental impacts of modern agriculture? **(E) (CO-1) (JUNE 2013, DEC 2014, JUNE 2015, JUNE 2017, JAN 2019)**
6. How individual take part in conservation of natural resources. **(An) (CO-1) (JUNE 2014, JUNE 2016, JAN 2017, JUNE 2017, JAN 2018)**
7. Discuss briefly the consequences of over exploitation of surface and ground water **(C) (CO-1) (JUNE 2014, JAN 2017, JAN 2018, JAN 2019, APR 2019)**
8. Discuss the traditional and modern agriculture and its effect on environment. **(C) (CO-1) (JUNE 2014 & 2015, JAN 2017, JAN 2018, JUNE 2018, APR 2019)**
9. Explain the commercial and ecological uses of forest **(U) (CO-1) (JUNE 2017, APR 2019)**
10. Explain the term soil erosion and desertification **(U) (CO-1)** (**JAN 2018)**
11. Extracting and using mineral resources causes environmental pollution. Justify the statement (R) (CO-1) (JAN 2019)

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UNIT – II: ECOSYSTEM AND BIODIVERSITY

1. Briefly explain the structure and function of an ecosystem. **(U) (CO-2) (DEC 2014, JUNE 2015, JUNE 2016, JAN 2017, JUNE 2017, JAN 2019)**
2. Briefly explain the structure and function of forest ecosystem. **(U) (CO-2) (JAN 2016, JAN 2018, JUNE 2018)**
3. Briefly explain the structure and function of Aquatic ecosystem. Give a note on the structure and functions by ocean ecosystem **(U) (CO-2) (JUNE & DEC 2014, APR 2019)**
4. Explain the values of biodiversity. **(U) (CO-2) (DEC 2014, JUNE 2015, JAN 2016, JUNE 2016, JUNE 2017, JAN 2018, JAN 2019, APR 2019)**
5. Write notes on endangered, endemic, vulnerable and extinct species in India. **(U) (CO-2) (APR 2019)**
6. Discuss the energy flow in the Eco system with an example. **(C) (CO-2) (JUNE 2013)**
7. Discuss the salient features of hot-spots of biodiversity that extend in India **(C) (CO-2)**

(JUNE 2014, JUNE 2016)

8. Discuss the status of India as a mega diversity nation or Describe upon Indian Biodiversity with reference as a Mega diversity Nation. **(C) (CO-2) (JUNE 2013, JAN 2017)**
9. Discuss the process of ecological succession (or) Discuss how various sequences of ecological succession takes place with examples. **(C) (CO-2) (JUNE 2013, JUNE 2014, JUNE 2017)**
10. Write notes on food chain, food web, ecological pyramid and ecological succession. **(R) (CO-2) (JUNE 2015, JAN 2016, JAN 2018, APR 2019)**

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UNIT – III: ENVIRONMENTAL POLLUTION

1. Write the classification of solid waste? What are the sources of urban and industrial solid waste? Explain. **(U) (CO-3) (JUNE 2013)**
2. What are the different sources, types, causes and control measures of Air Pollution? Or Discuss the control measures of air pollution **(R) (CO-3) (JUNE 2013) & (DEC 2014) (JUNE 2015, JAN 2017, JUNE 2017, JAN 2018, JUNE 2018, JAN 2019, APR 2019)**
3. What are the different sources, types, causes and control measures of Water pollution? Or Explain the major water pollutants and their effects **((R) (CO-3) JUNE 2013 & 2014, JUNE 2016, JAN 2017, JAN 2018)**
4. What are the different sources, types, causes and control measures of Noise Pollution? **(R) (CO-3) (DEC 2014, JUNE 2015)**
5. Define COD and BOD. How will you determine DO by Winkler's method? Or Mention the significance and measurement of dissolved oxygen in water **(R) (CO-3) (JUNE, DEC 2014, JUNE 2015, JAN 2016, JAN 2017, JUNE 2017, JUNE 2018)**
6. As an individual how can you prevent environmental pollution? Why such an effort at individual level is important? **(E) (CO-3) (JUNE 2013, JUNE 2016)**
7. Discuss the various methods of solid waste disposal or Discuss the various methods adopted for the solid waste management **(C) (CO-3) (JUNE , DEC 2014, JUNE 2015, JAN 2016, JAN 2017, JAN 2018, JUNE 2018, JAN 2019, APR 2019)**
8. What are the hazardous effects of nuclear pollutants? Discuss the environmental problems associated with nuclear wastes. How can they be managed **(U) (CO-3) (JAN 2016, JUNE 2016, JAN 2018)**
9. List out the E-waste and its harmful effects **(U) (CO-3) (JUNE 2017)**

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UNIT – IV: SOCIAL ISSUES AND ENVIRONMENT

1. Write a short note on ozone layer depletion Or Explain the mechanism of ozone layer depletion and its adverse effects to ecosystem **(U) (CO-4) (JUNE 2014, (JUNE 2015, JUNE 2016, JUNE 2017)**
2. Write notes on Environmental ethics **(U) (CO-4) (JUNE 2013 &14, JAN 2016)**
3. What are green house gases and green house effect? Discuss the contribution of these gases to global warming phenomenon. **(R) (CO-4) (JUNE 2013 & 2014, JAN 2017, JAN 2018, JUNE 2018, JAN 2019, APR 2019)**
4. What are the impacts of acid rain? How can we control it? **(R) (CO-4) (DEC 2014, JAN 2016)**
5. What is rainwater harvesting? What are the purposes served by it? **(R) (CO-4) (JUNE 2015, JUNE 2016, JAN 2017, JUNE 2017, JAN 2018, JAN 2019, APR 2019)**

6. What is a watershed? Critically discuss the objectives and practices of watershed management. **(E) (CO-4) (JUNE 2014)**
7. List out and give a discussion about the strategies adopted for the conservation of water **(An) (CO-4) (DEC 2014)**
8. Discuss the measures to conserve water. **(C) (CO-4)**
9. Why do earthquake, tsunami occur? Explain the case of any earthquake that occurred in India**. (U) (CO-4) (JUNE 2017, JAN 2018).**
10. Write in detail about climate change. **(R) (CO-4) (JUNE 2016)**
11. Describe about the disaster Management. **(C) (CO-4) (JAN 2019)**
12. Examine the possible causes, effects and control measures of cyclones and earthquake (**An) (CO-4) (APR 2019)**

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UNIT – V: SUSTAINABILITY AND GREEN CHEMISTRY

1. Explain the role of IT on environment and human health. **(U) (CO-5) (JUNE 2013 & (DEC 2014, JAN 2016, JUNE 2016, JAN 2017, JUNE 2017, JAN 2018, JUNE 2018, JAN 2019)**
2. Explain briefly HIV/AIDS, mode of its spread and control measures **(U) (CO-5) (JUNE 2014, JAN 2016, JUNE 2016, JAN 2017, JAN 2018, APR 2019)**
3. What do you mean by sustainable development? What are the major measures to attain sustainable development? (Or) Explain the need for public awareness to achieve the goals of sustainable development. **(U) (CO-5) (DEC 2014**)
4. Summarize green chemistry. (or) With examples, discuss the importance of green chemistry for achieving sustainable development. **(U) (CO-5) (JUNE 2015, JUNE 2017, JAN 2018, JAN 2019, APR 2019)**
5. What are the important articles of fundamental rights? or Write a brief note on human rights and value education **(R) (CO-5) (JUNE 2014, JUNE 2015, JAN 2016, JUNE 2017, JUNE 2018, JAN 2019)**

Note: (U) - Understanding (R) - Remembering
(An) - Analyzing (Ap) - Applying
(E) - Evaluating (C) - Creating