

## UNIT - I ENVIRONMENT AND BIODIVERSITY

*Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.*

### QUESTION BANK

#### Part – A (2 Marks)

1) Define **ecosystem**

A group of organisms interacting among themselves and with environment.

**Example:** Forest ecosystem, grassland ecosystem, desert ecosystem and lake ecosystem.

**Ecology is the study of ecosystems.**

2) Define **environment**

Environment is defined as the *sum total of all the living and non-living things around us.*

3) State the significance and **scope of environmental education.**

1. Environmental studies inform the people about their effective role in protecting the environment by demanding changes in laws and enforcement system.
2. Environmental studies have a direct relation to the quality of life we live.
3. Environmental studies develop a concern and respect for the environment

4) **Distinguish** between **food chain** and **food web**

| <b>Food Chain</b>   | <b>Food Web</b>   |
|---|---|
| A <i>Linear Pathway</i> showing the flow of energy                                      | A <i>multitude of network</i> showing the flow of energy                                |
| An organism of higher trophic level feeds on a specific organism of lower trophic level | An organism of higher trophic level has access to more members of a lower trophic level |

5) Write about the **structure/component of ecosystem**

The structure of an ecosystem can be split into two main components, namely:

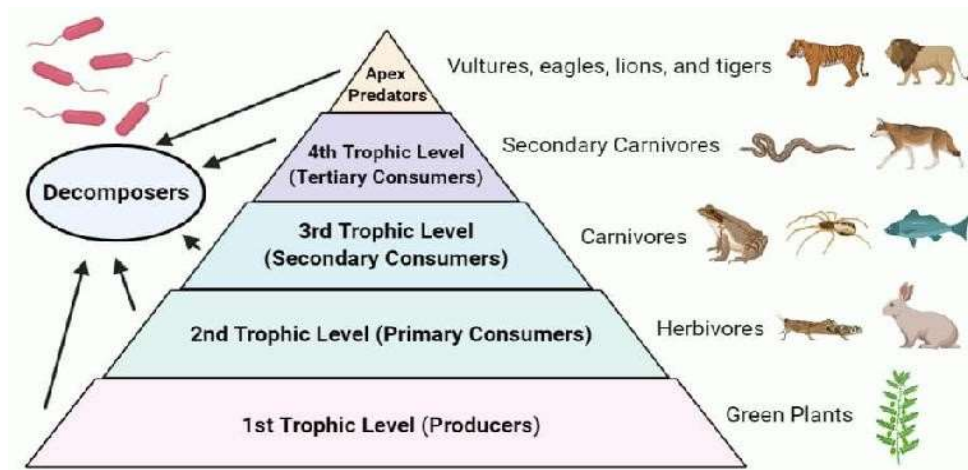
- Biotic (living) Components
- Abiotic (non-living) Components

6) What are the **types of Biotic component**?

Biotic components refer to all living components in an ecosystem, biotic components can be categorized into

- Producers
- Consumer
- Decomposer

7) Draw the **trophic level diagram** and give examples



(The Trophic Level Diagram)

8) Types of **Abiotic component**

The term abiotic refers to all the non-living factors present in an ecosystem.

- Sunlight,
- water and
- land

9) Describe the **functions** of **any two abiotic components**

**I). Lithosphere:** The soil and rock components of the earth is called lithosphere.

**Functions:**

1. Home for human beings and wildlife.
2. Store house of minerals and organic matters.

**II). Hydrosphere:** The portion of the earth which is surrounded by water is called hydrosphere. Ocean, lakes, rivers and water vapor constitute hydrosphere.

**Functions:**

1. Used for drinking purpose and supports the aquatic life
2. Used for irrigation, power production, industries and transport.

10) List out the **functions of ecosystem**

- **Productivity** – It refers to the rate of biomass production.
- **Energy flow** – It is the sequential process through which energy flows from one trophic level to another. The energy captured from the sun flows from producers to consumers and then to decomposers and finally back to the environment.
- **Decomposition** – It is the process of breakdown of dead organic material. The top-soil is the major site for decomposition.
- **Nutrient cycling** – In an ecosystem nutrients are consumed and recycled back in various forms for the utilization by various organisms.

11) What are the **types of ecosystem**?

There are two types of ecosystem:

- Terrestrial Ecosystem
- Aquatic Ecosystem

12) Write the **concept of energy flow in ecosystem**

Flow of energy in an ecosystem takes place through the food chain and it is this energy flow which keeps the ecosystem going. The most important feature of this energy flow is that it is unidirectional or one-way flow. Energy flows from the lowest trophic level (primary producers) to the top (apex predators).

13) Write down the **characteristics of energy flow**

- i. Unidirectional flow
- ii. Progressive decrease
- iii. Respiratory loss (high in higher trophic levels)
- iv. Unutilised energy

14) What is **nutrient cycling**?

The nutrient cycle is a system where energy and matter are transferred between living organisms and non-living parts of the environment. This occurs as animals and plants consume nutrients found in the soil, and these nutrients are then released back into the environment via death and decomposition.

15) Explain **ecological succession**

Ecological succession is the process by which natural communities replace (or “succeed”) one another over time. Succession stops temporarily when a “climax” community forms; such communities remain in relative equilibrium until a disturbance restarts the succession process.

16) What are the **process of succession**?

The process of succession takes place in a systematic order of sequential steps as follows

- **Nudation**
- **Invasion**
- **Competition and coaction**
- **Reaction**
- **Stabilization**

17) Define **Biodiversity**

Biodiversity is all the different kinds of life you’ll find in one area—the variety of animals, plants, fungi, and even microorganisms like bacteria that make up our natural world.

18) What is **genetic and species biodiversity**?

Species diversity – discrete group of organisms of the same kind, diversity between different species.  
Genetic diversity – Species with different genetic characteristics.

19) Describe **Mega diversity**

Mega diversity means *exhibiting great biodiversity*. The main criterion for megadiverse countries are

- Endemism at the level of species
- Country must have at least 5,000 species of endemic plants and
- Country must border marine ecosystems.

20) Describe **hot spots of biodiversity**

Areas which exhibit high species richness as well as high species endemism are termed as hotspots of biodiversity. There are four hotspots present in India, namely the

- Eastern Himalayas
- Western Ghats and,

- Indo-Burma region (covering Eastern Himalayas) and Western Ghats - Sri Lanka region.

21) Differentiate **endangered** and **endemic species**

A **species** is said to be **endangered** when its **number has been reduced to a critical level** or whose habitats, have been drastically reduced and if such a species is not protected and conserved, it is in immediate danger of extinction.

**An endemic species** is one that is **found only in a particular region** or a particular area. These organisms are adapted to a region and are unable to grow and thrive in other locations.

22) What is **RED DATA book**?

The Red Data Book is referred to as the public document that **records the information about all rare and endangered species of plants, animals, and fungi** existing within the boundary of a state or territory. It can be considered as a catalogue of species facing the risk of extinction.

23) List out **endangered species of India**

1. Reptiles : Tortoise, python
2. Mammals : Indian wolf, Red fox, Tiger
3. Primates : Hoolock gibbon, Golden monkey
4. Plants : Rauwolf serpentina, Santalum

24) List the **reasons for man-wildlife conflicts**

- Due to shrinkage of forest cover
- Weak and injured animals have a tendency to attack man
- Due to development of human settlements in these corridors, the path of wildlife has been disrupted

25) What are the **approaches to conserve biodiversity**?

There are two approaches of biodiversity conservation:

- (A) In situ conservation (within habitat)
- (B) Ex situ conservation (outside habitats)

**Part –B (12 Marks)**

- 1) What is an ecosystem? Mention the structural and functional components of an ecosystem and its type.
- 2) Describe the three energy flow models in detail
- 3) Express about the value that can be assigned to biodiversity
- 4) What are the major causes of man-wild conflict? discuss the remedial steps that can curb/restrict the conflict
- 5) Criticize India as a mega biodiversity nation.
- 6) Discuss the threats to biodiversity and Explain in-situ and ex-situ conservation of biodiversity.

## Unit II Environmental Pollution

*Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.*

### Question Bank

#### Part-A (2 Marks)

1) Define **environmental pollution**

Lowering of the quality of environment by natural and human activities is called environmental pollution.

2) What is **water pollution**?

Water pollution can be defined as alteration in physical, chemical or biological characteristics of water making it unsuitable for designated use in its natural state.

3) What are the **causes (reasons) of water pollution**?

1. Industrial Waste
2. Sewage and Wastewater
3. Oil Leaks / Spills
4. Agricultural practices

4) Define **COD & BOD**

COD – Chemical Oxygen Demand ; The amount of oxygen in water consumed for chemical oxidation of pollutants.

BOD – Biological Oxygen Demand ; The amount of oxygen taken up by microorganisms that decompose organic waste matter in water.

5) What are the **causes/reasons of air pollution**?

- i) Incomplete burning of fossil fuels, liberate CO, NO<sub>2</sub>, etc.,
- ii) Coal burning in power plant liberates SO<sub>2</sub>
- iii) Paint, smelters, lead manufacture liberate Pb.
- iv) Agriculture, decay of plants, liberates hydrocarbon

6) Define **soil pollution**.

Soil pollution is defined as “the contamination of soil by human and natural activities which may cause harmful effects on living beings”.

7) Differentiate between **primary and secondary air pollutants** with examples.

#### **Primary Pollutants**

These are emitted directly in the atmosphere in harmful form. (CO, NO, SO<sub>2</sub>)

#### **Secondary Pollutants**

Some of the primary pollutants react with one another or with basic components of air to form new pollutants. (NO/NO<sub>2</sub> → HNO<sub>3</sub>/NO<sub>3</sub>)

8) What are the **causes and effects of ozone layer depletion**?

#### **Causes:**

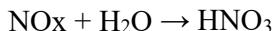
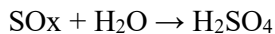
- i) Chloro Fluoro carbon (CFC)
- ii) Hydro Chloro Fluoro Carbon (HCFC),
- iii) Bromo Fluoro Carbon (BFC)

#### **Effects:**

- i) Affects the aquatic forms.
- ii) Increases the average temperature of the earth.
- iii) Degrades paints, plastics and other polymeric materials.
- iv) UV rays destroy the melamine pigment in human body.

**9) What is acid rain?**

- The presence of excessive acids in rain water is known as acid rain.
- The presence of SO<sub>2</sub> and NO<sub>2</sub> gases in the atmosphere decreases the pH of the water during the rainfall.



**10) What is Noise pollution?**

The sound intensity is measured in decibel (dB), which is tenth part of the longest unit Bel. One dB is equal to the faintest sound, a human ear hears. If the intensity of the sound exceeds 1db, noise pollution occurs. The unwanted, unpleasant or disagreeable sound that causes discomfort for all living being is called noise pollution.

**11) State the role and responsibility of an individual in prevention of pollution?**

- i) Plant more trees
- ii) Help more in pollution prevention than pollution control
- iii) Use water, energy and other resources efficiently
- iv) Purchase recyclable, recycled and environmentally safe products
- v) Use CFC free refrigerators

**12) Define Solid waste**

Solid waste is a waste type that includes predominantly household waste (domestic waste) with sometimes the addition of commercial wastes collected by a municipality within a given area.

**13) What is hazardous waste?**

A substance, such as nuclear waste or an industrial byproduct, which is potentially damaging to the environment and harmful to humans and other living organisms, is called hazardous waste.

**14. Mention the disposal methods of Hazardous waste**

Disposal of hazardous waste is the final stage of a hazardous waste management system. The different waste disposal methods include

- Secure landfill
- Deep well injection and
- Bedrock disposal

**15. Describe about 3 Rs in waste management**

The principle of

- Reducing waste,
- Reusing and
- Recycling resources and products is often called the "3Rs."

**16. What are the objectives of wastewater treatment?**

1. To improve quality of wastewater
2. Elimination of pollutants, toxicants and many such
3. Preservation of water quality of natural water resources
4. To make wastewater usable for other purposes
5. Prevention of harmful diseases

**17. What are the four water quality parameters and their importance?**

- i) pH
- ii) Dissolved oxygen
- iii) Total dissolved solids
- iv) Colour, odour, taste

## 18. Define **Occupational Health and Safety Management Systems (OHSMS)**

An *Occupational Health and Safety Management System (OHSMS)* is a fundamental part of an organization's risk management strategy. It includes health and safety policies, systems, standards, and records, and involves incorporating your health and safety activities.

## 19. What is **environmental protection**?

Environmental protection focuses on solving problems arising from the interaction between humans and environmental systems and includes issues related to conservation, pollution, loss of biodiversity, land degradation or environmental policy.

## 20. What are the **objectives of environmental protection act**?

1. To protect the environment from degradation and take actions to improve the current condition.
2. To implement the decisions made at the UN Conference on the Human Environment held in Stockholm in 1972.
3. To set up a government body to look after the industries and regulate the effect they have on the environment, and also issue direct orders such as for closure of industries.
4. To punish and penalize those posing a danger to the environment, health, and safety.

## 21. What is meant by **point and non-point sources**?

**Point sources** are discharged pollutants at specific location through pipes, ditches or Sewers into bodies of surface water.

**Non point sources** cannot be traced to any single site of discharge. They are usually large land areas or air sheds that pollute water by runoff, subsurface flow or deposition from the atmosphere.

## 22) What are the **types of solid wastes**?

1. Municipal wastes
2. Industrial wastes
3. Hazardous wastes

## 23) Define **noise pollution**.

The unwanted, unpleasant or disagreeable sound that causes discomfort for all living beings is called noise pollution. Noise beyond 120 dB cause noise pollution.

## 24. Give any **four methods to control noise pollution**

- Suppression of Noise at Source
- Control at Receiver's End
- Sound insulation at construction stage
- Planting more trees

## 25. Mention the **treatment (or) recovery methods of Hazardous waste**

- a. **Chemical treatment** – e.g., neutralization, precipitation, ion exchange, reduction
- b. **Thermal treatment** – e.g., incineration;
- c. **Biological treatment** – e.g., land farming; and
- d. **Physical treatment** – e.g., solidification, flotation, sedimentation, evaporation, or filtration.

## 26. What is **incineration**?

It is a treatment technology involving destruction of waste by controlled burning at high temperatures.

## 27. What is **particulates**?

Particulates are dispersed solid or liquid particles of microscopic size in gas media.

### **Part – B**

- 1) Discuss in detail about the major source of air pollution, its impact and control measures.
- 2) Explain in detail the major sources of water pollution, its impact and control measures
- 3) Explain the various sources, effects and methods of control of water pollution.
- 4) Describe about solid waste and solid waste management processes?
- 5) Write about hazardous waste and e-waste, and its disposal method.
- 6) What is Occupational Health and Safety Management system? Explain with two case studies.
- 7) Explain about the important features of environmental protection acts  
(i) Water act, (ii) Air act (iii) Forest act (iv) Wildlife act (v) Environment act



### UNIT III - RENEWABLE SOURCES OF ENERGY

*Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.*

#### **Question Bank** **Part-A (2 Marks)**

- 1) What are the sources of **renewable energy (or) New energy sources?**  
(or)

List the types of Renewable energy

- Biomass
- Solar energy
- Wind energy
- Hydropower
- Hydrogen
- Geothermal
- Ocean Energy

- 2) What are the sources of **conventional (or) non-renewable** energy?  
Conventional energy sources cannot be regenerated after they exhausted.

- Oil / Petroleum
- Gas
- Coal

- 3) Differentiate between **renewable and non-renewable energy resources**

| Renewable Resources  | Non-renewable Resources  |
|--|--|
| Renewable resources cannot be depleted over time.                            | Non-renewable resources deplete over time  |
| Most renewable resources have low carbon emissions and low carbon footprint. | Non-renewable energy has a comparatively higher carbon footprint and carbon emissions. |

- 4) Why is **coal not a renewable resource** whereas wood is?

Wood is renewable resource since it can be grown from a seedling into a tree in 15 to 20 years. But coal requires millions of years to produce and cannot be replenished in our time.

- 5) What is **solar energy**?

Solar energy is the energy that we get from the sun. Nuclear fusion reactions within the sun produce massive amounts of energy in the form of heat and light.

- 6) What is meant by **renewable resources**?

The resources that regenerates through natural processes with reasonable time period is called as renewable resources.

- 7) List out the **advantages of alternative energy sources.**

- An endless supply
- Energy security is ensured
- Clean energy
- Non-toxic

**8) Define the principles of energy management**

- a. Reducing needless energy use
- b. Increasing energy efficiency
- c. Purchasing energy at a lesser cost
- d. Changing operations to allow for lower cost energy purchases

**9) List out the disadvantages of solar energy**

- Cost: Substantial initial cost
- Weather dependent
- Solar energy storage is expensive
- Not portable

**10) What is meant by energy management?**

Energy management is the process of monitoring, managing and conserving energy in a building or organization when it comes to energy savings.

**11) Describe the concept of power plants of Geothermal energy**

Geothermal technology extracts the heat found within the subsurface of the earth, which can be used directly for heating and cooling or converting it to electricity. The steam comes from the reservoirs of hot water found a few miles below the earth surface rotate a turbine that activates a generator, which produces electricity.

**12) List out the types of geothermal power plants.**

- Dry steam power plant
- Flash steam power plant
- Binary cycle power plant

**13) Explain shortly about wind energy**

Air in motion is referred to as wind. Wind has a lot of energy since it moves quickly. Wind energy is the power that has been harnessed from the wind's force it is captured using wind turbines.

**14) What is Tidal Energy?**

Tidal energy is a form of renewable energy that harnesses the power of the tides to generate electricity. *Tidal energy conversion is the process of generating electricity from the movement of ocean tides.* This is typically done by placing turbines in tidal currents or using underwater turbines that are driven by the kinetic energy of moving water. As the tides move in and out, the turbines spin and generate electricity.

**15) What are the ways that energy can be derived from the ocean?**

Ocean energy refers to the renewable energy generated from the following

- ocean's tides,
- waves,
- currents,
- temperature differences and
- salinity gradients.

**Part B (12 Marks)**

- 1) Discuss the concept, origin and power plants of Geothermal Energy
- 2) Discuss in detail about Hydrogen energy and its applications
- 3) Write brief notes on (a) Wind energy (b) Solar Energy
- 4) List out the different types of new energy sources (or) renewable energy resources and explain it briefly
- 5) Discuss the concept of Ocean thermal energy and its applications
- 6) Write in detail about energy management and conservation

## UNIT IV - SUSTAINABILITY AND MANAGEMENT

*Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.*

### **Question Bank** **Part-A (2 Marks)**

1. What is **development**?

Development is a process that creates growth progress positive change in economic environment and social component without damaging the resources of the environment.

2. What are the **characteristics of development**?

- It is a continuous process
- It is predictable
- It is both quantitative and qualitative
- It follows a particular pattern

3. What is **GDP**?

Gross Domestic Product (GDP) is the **total market value of the goods and services produced within a country during the specified period of time** usually 12 months or a year. It is the broadest financial measurement of a nation's total economic activity.

4. What are the **types of GDP**?

- **Nominal GDP:** Nominal GDP is the GDP at current prices (i.e. with inflation).
- **Real GDP:** Real GDP is the GDP after inflation has been taken into account.
- **Per capita GDP:** This is calculated by dividing the GDP of a country by its population.
- **Purchasing power parity (PPP) GDP:** This adjusts GDP figures to account for differences in the cost of living between countries.
- **Gross National Product (GNP):** GNP measures the total economic output of a country's citizens, regardless of their location.

5. What are the **significances (or) importance of GDP**?

- I. It identifies the present state of economy
- II. It is used to compare the economics between countries
- III. It is the root cause
- IV. It is objective of policy formulation

6. What are the **advantages and disadvantages of GDP**?

#### **Advantages:**

- It is a broad indicators of development
- It is easy to measure growth in percentage
- It is easy to compare to itself and other countries
- It is easy and cheap to collect

#### **Disadvantages:**

- It does not include non-market transactions
- It does not account inequality
- It does not account for environmental impacts of the economic policies
- It does not include the activity of informal sector

7. What is **Sustainability**?

- **Sustainability refers to the ability to maintain or support a process continuously over long time.**
- In business contexts, sustainability seeks to prevent the depletion of natural or physical resources, so that they will remain available for the long term.

8. What is **sustainable development**?

**"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."**

9. What are the approaches (or) **significance of sustainability**?

- Developing appropriate technology
- 3R approach
- Providing environmental education and awareness
- Consumption of renewable resources

10. What are the **causes of unsustainability**?

- Developing countries are responsible for the degradation
- The rate of increase of National Pollution
- Raising population
- Purchasing and using polyethylene bags contribute to growth of pollution

11. What are **characteristics of sustainability**?

- a) It reduces emission of greenhouse gases, which will reduce global warming and helps in preserving the environment.
- b) It uses natural and biodegradable materials for reducing the impact on the environment
- c) It follows non-polluting construction practices
- d) It improves the quality of human life

12. **Differences** between **sustainability** and **unsustainability**.

| S. No. | Sustainability  | Unsustainability   |
|--------|---|--|
| 1      | Prevention of natural resources   | Exploitation of natural resources is faster than the planet can handle replenish     |
| 2      | Long-term economic growth without negatively impacting our environment (or) society | Not quantifying ecosystem services and increased vulnerability to crises             |
| 3      | Equality, diversity, social cohesion and democracy                                  | Labour laws, human rights, gender inequality and poor treatment of indigenous people |

13. Mention any four **goals of sustainable development**.

- End poverty everywhere, in all its forms
- End hunger, achieve food security and improved nutrition
- Ensuring good health and promote the well-being of all age groups
- Achieving gender quality and empowering all women and children

14. Write any five **Millennium development goals**

- To eradicate extreme poverty and hunger
- To achieve Universal primary education
- To promote gender equality
- To improve maternal health

15. What is **climate change**?

Climate change refers to the long term shifts in temperatures and weather pattern these changes may be natural or artificial

16. What are the **causes/reasons of climate change**?

- a. Presence of greenhouse gases in the atmosphere
- b. Cutting down forests
- c. Depletion of Ozone layer

17. What are the **effects of climate change**?

- Hotter temperatures
- More severe storms
- Increase the drought
- Rising of sea levels

18. Define **carbon credit**

A carbon credit is a tradeable permit or certificates that represents the right to emit set amount of CO<sub>2</sub> or 1 ton of CO<sub>2</sub>.

19. What are the **types of carbon credit**?

Voluntary emissions reduction it is a carbon offset that is exchanged in the voluntary market for credits.  
Certified Emission reduction it relies on emission credit created through a regulatory framework

20. Define **carbon footprint**

It is the total amount of greenhouse gases including CO<sub>2</sub> and CH<sub>4</sub> the term generated by our direct and indirect activities

21. What are the **causes of carbon footprint**?

- # Transportation
- # Household energy
- # Consumption
- # Food

22. What is **environmental management**?

Environmental management is a set of practices and processes that enable any organisation reduce its environmental impacts and increasing its operating efficiency.

23. What are **benefits of environmental management**?

- Improved environmental performance
- Enhanced compliance
- Pollution prevention
- Resource conservation

24. What are the **characteristics of environmental management**?

- ✓ It supports sustainable development
- ✓ It demands the multidisciplinary approach
- ✓ It has to integrate different development view points
- ✓ It seeks to integrate natural and social science

25. What are the **objectives of environmental management**?

- 🔧 To protect environmental resources
- 🔧 To enhance the value of environmental components where possible
- 🔧 To improve the quality of human life
- 🔧 To prevent and solve environmental problems

**Part B (12 Marks)**

1. Discuss briefly about GDP
2. Explain the sustainable development goals and targets
3. Discuss elaborately about the sustainable development indicators
4. Explain in detail for principles and steps involved in environmental management
5. Write a note on the following: (i) Carbon footprint, (ii) Carbon Credit.
6. Explain Climate Change and case study for climate change
7. Write a notes on Millennium Development Goals,
8. Explain the economic and social challenges of sustainability.

## UNIT- 5 SUSTAINABILITY PRACTICES

*Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socioeconomical and technological change.*

### **Question Bank** **Part-A (2 Marks)**

1. Define **zero waste**.

Zero waste is a set of principles, focused on waste prevention, that encourages redesigning resource life cycles, so that all products are reused.

2. What are **the principles of zero waste**?

- Refuse what you don't need
- Reduce what you do use
- Reuse whatever you can
- Regulate of what's left over

3. What are the **steps to achieve zero waste**?

- ✚ Identify the high waste areas of our life-style
- ✚ Substitute single use plastic with eco-friendly zero waste options
- ✚ Buy zero waste (or) eco-friendly products
- ✚ Support eco-friendly businesses

4. What are the **advantages and disadvantages of zero waste**?

**Advantages:**

- Zero waste reduces our climate impact
- It conserves resources and minimizes pollution
- It supports a local circular economy and creates jobs
- Zero waste needs businesses to play a key role

**Disadvantages:**

- It is more expensive
- Zero waste is time-consuming
- It can cause anxiety
- Zero waste products are hard to find

5. State the **principle of 3R concept**.

3R is the order of priority of actions to be taken to reduce the amount of waste generated and to improve overall waste management processes and programs.

6. Write the **importance of 3Rs**.

- (i) By reducing waste at the source, the resources like water and energy can be saved.
- (ii) Operating a well-run recycling program costs less than waste collection and land filling.
- (iii) Recycling helps families save money because they pay less for disposal cost
- (iv) Proper disposal and recycling will prevent water and soil contamination.

7. Define **circular economy**.

- *The circular economy aims to create a more sustainable and regenerative system that mimics natural processes, where resources are continuously cycled and regenerated.*
- It reduces the consumption of raw materials and recover wastes by recycling (or) giving it a second life as a new product.

8. What are the **benefits of circular economy**?

- a. It protects environment
- b. It benefits local economy
- c. It drives employment growth
- d. It promotes resource independence

9. What is **ISO 14000 series**?

ISO is an International Organization for Standardization. It is composed of representatives from various national standard organizations. It provides standards and guidelines for a variety of businesses and purposes and publishes technical reports.

10. What are the **advantages and disadvantages of ISO 14000**?

• **Advantages:**

- It identifies risks and opportunities
- It prevents problems from reoccurring
- It improves your control over the business
- It helps to reduce waste

• **Disadvantages:**

- It is extremely costly to implement if not done properly
- It requires a lot of administrative work
- No improvement in environmental performance
- Organizations face a lot of challenges while implementing this standard

11. What is **Material Life Cycle Assessment (or) LCA**?

It is a process **evaluating the effects of a material on the environment over the entire period of its life**, thereby increasing resource use efficiency and decreasing liabilities.

12. Define **Environmental Impact Assessment (EIA)**

- It is defined as a formal process of **predicting the environmental consequences of any developmental projects**.
- It is used to **identify the environmental, social and economic impacts of the project prior to decision making**.

13. What are the **benefits of EIA**?

- a. Cost and time of the project is reduced
- b. Performance of the project is improved
- c. Usages of resources are decreased
- d. Biodiversity is maintained

14. What is **Sustainable Habitat**?

It is an **ecosystem that produces food and shelter for people and other organisms without resource depletion** i.e., no external waste is produced.

15. What are **Green Buildings**?

Green building is an efficient method of construction that produces healthier buildings, **which have less impact on the environment and climate**. It requires less cost to maintain.



16. What are **Green Materials**? Give examples.

Green materials also called eco-friendly materials, **building construction materials that have low impact on the environment**. Ex: Bamboo floorings, LED lightings, solar panels, reclaimed wood.

17. What is **Energy Efficient**?

It is the **use of less energy to perform the same task** (or) produce the same result.

18. What is **Sustainable Transport**?

Any means of **transportation that has low impact on the environment** is called as Sustainable transport.

19. What is **sustainable energy**?

- Sustainable energy (renewable energy) **refers to energy sources that are obtained from naturally replenishing resources.**
- *Sustainable energy sources cause minimal damage to the environment and will never deplete.*
- They offer sustainability in the form of healthy, safe, long-lasting, and self-replenishing energy sources.

20. What is an **energy cycle**?

It is the interactions between energy sources within the Earth's environment.

21. Define **carbon cycle**.

It is the **movement of carbon (or) carbon compounds continuously from the atmosphere to the earth and then back into the atmosphere.**

22. What is **carbon sequestration**?

- ✓ It is the **process of capturing and storing of atmospheric carbon dioxide.**
- ✓ It is the method of reducing the amount of CO<sub>2</sub> in the atmosphere.
- ✓ Goal of carbon sequestration is to reduce global climate change.

23. What is **Green Engineering**?

It is the design, commercialization and use of **processes and products that minimizes pollution, promotes suitability** and promotes human health without affecting environment.

### **Part – B (12 Marks)**

1. Explain in detail Zero waste & R concept
2. Explain in detail Circular Economy & Material life cycle assessment
3. Explain the features, principles, advantages and disadvantages of green buildings
4. Discuss ISO 14000 series in detail
5. Explain the following in detail (i) Environment Impact Assessment (EIA) (ii) green material
6. Explain in detail: Sustainable transport, Energy Efficiency
7. Discuss about renewable energy sources with neat sketch

