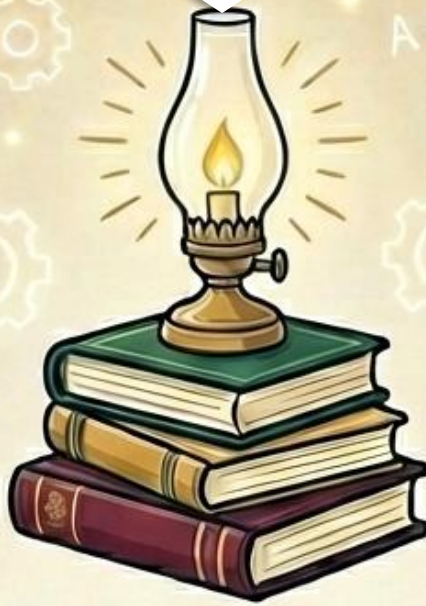




$$A = \frac{m}{(m^2 + c)^2}$$



NIOS PYQ's SOLUTIONS

$$fa = bc^2$$

$$\sqrt{h-x^2}$$

PREVIOUS YEARS' QUESTIONS & ANSWERS



APRIL-2025

Your Path to Success

CORE MODULE

1. Primitive humans used fire to:

- I. cook food**
- II. scare away animals**
- III. make ornaments**
- IV. make tools**

Select the most appropriate option.

- (A) I and II**
- (B) I and III**
- (C) II and IV**
- (D) III and IV**

Answer - (A) I and II

2. Azolla is a/an:

- (A) water fern in which blue-green algae grow**
- (B) symbiotic bacteria found in root nodules of legume plants**
- (C) aerobic, free-living nitrogen-fixing bacteria**
- (D) fungus that grows on roots of forest trees**

Answer - (A) water fern in which blue-green algae grow

3. BEE stands for:

- (A) Bureau of Energy Efficiency**
- (B) Branch of Energy Efficiency**



(C) Board of Energy Efficiency

(D) Basis of Energy Efficiency

Answer - (A) Bureau of Energy Efficiency

4. Homo erectus used tools made up of:

(A) bones

(B) pebbles

(C) stones

(D) wood

Answer - (C) stones

5. Slums are:

(A) clusters of huts in parts of cities

(B) clusters of huts in parts of villages

(C) clusters of huts in dense forests

(D) clusters of huts on the banks of a river

Answer - (A) clusters of huts in parts of cities

6. The consequence of deforestation is:

(A) soil erosion

(B) land subsidence

(C) depletion of minerals

(D) ozone layer depletion

Answer - (A) soil erosion



7. The scientific study of the relationship of living organisms with each other and with their environment is known as:

- (A) biology
- (B) zoology
- (C) ecology
- (D) physiology

Answer - (C) ecology

8. Immigration of rural folks towards cities is due to:

- (A) good chances of employment
- (B) wish for simple living
- (C) illiteracy
- (D) joint family system

Answer - (A) good chances of employment

9. Interaction between two populations in an ecosystem in which both species are harmed to some extent is called:

- (A) amensalism
- (B) predation
- (C) competition
- (D) commensalism

Answer - (C) competition



10. Grasslands found in South America are called:

- (A) Prairies
- (B) Savanna
- (C) Pampas
- (D) Steppes

Answer - (C) Pampas

11. Absorption, storage and release of gases is one of the:

- (A) regulative functions of forests
- (B) productive functions of forests
- (C) protective functions of forests
- (D) chemical functions of forests

Answer - (A) regulative functions of forests

12. Blue-baby disease is caused due to:

- (A) increased levels of nitrate in groundwater
- (B) exposure to increased amount of DDT
- (C) prolonged exposure to UV radiations
- (D) exposure to tobacco smoke

Answer - (A) increased levels of nitrate in groundwater

13. Hazardous waste will not exhibit:

- (A) toxicity
- (B) reactivity



(C) corrosivity

(D) productivity

Answer - (D) productivity

OPTIONAL MODULE-8A

14. The fraction of total water available on earth as freshwater is about:

(A) 97.3%

(B) 2.14%

(C) 2.7%

(D) 0.5%

Answer - (C) 2.7%

15. Pits, aquifer and trenches are structures used for:

(A) distribution of groundwater

(B) storage of rainwater

(C) purification of rainwater

(D) recharge of groundwater

Answer - (D) recharge of groundwater

16. Artificial recharge of groundwater in urban areas can be done by:

(A) reduction in open soil surface area

(B) rooftop collection of rainwater

(C) increase in runoff

(D) more dependence on groundwater use



Answer - (B) rooftop collection of rainwater

OPTIONAL MODULE-8B

14. Wind turbine transforms wind energy into:

- (A) electrical energy
- (B) hydropower energy
- (C) passive solar energy
- (D) potential energy

Answer - (A) electrical energy

15. Methanogenesis is a/an:

- (A) microbial process
- (B) heating process
- (C) cooling process
- (D) evaporation process

Answer - (A) microbial process

16. Energy intensity is an indicator to show how:

- (A) fast energy is used in the economy
- (B) slow energy is used in the economy
- (C) efficiently energy is used in the economy
- (D) inefficiently energy is used in the economy

Answer - (C) efficiently energy is used in the economy



CORE MODULE

17. (a) How does biodiversity represent a potential source of wealth?

Answer - Biodiversity provides us with new food sources, life-saving medicines (e.g., Quinine, Taxol), and raw materials for industries (resins, gums), which have immense economic value.

(b) Mention any two causes of biodiversity loss.

Answer - Two causes of biodiversity loss are:

1. Habitat destruction (Deforestation).
2. Poaching (Illegal hunting).

18. Answer the following questions in one or two sentences (15-20 words):**(a) Name any two important aspects of Environmental Impact Assessment.**

Answer - 1. Assessing the impact on environmental components (air, water, noise) of the project.
2. Suggesting measures to mitigate adverse effects.

(b) What is a village forest?

Answer - Forests located within or around village boundaries that are managed by the local community to meet their needs (fuel/fodder) are called village forests.

(c) How does crop rotation practice improve soil quality?

Answer - Planting leguminous crops allows the Rhizobium bacteria present in their root nodules to fix atmospheric nitrogen into the soil, thereby increasing soil fertility.

(d) What is GAP? When was its first phase completed?

Answer - GAP stands for 'Ganga Action Plan'. Its first phase was declared complete in 1990.



(e) How do CFCs damage ozone layer?

Answer - CFCs reach the stratosphere and break down under sunlight to release chlorine atoms, which break Ozone (O₃) molecules and convert them into Oxygen (O₂).

(f) Which species of wildlife are found in the Kaziranga Sanctuary and Gir Forest in India?

Answer -

- **Kaziranga:** One-horned Rhinoceros.
- **Gir Forest:** Asiatic Lion.

19. Answer the following questions in one word only:

(a) Which tool helps to evaluate environmental impact of proposed developmental projects?

Answer - Environmental Impact Assessment (EIA)

(b) Which convention provides framework for international cooperation for conservation of wetland habitats?

Answer - Ramsar Convention

(c) Which is the most dangerous outcome of population explosion?

Answer - Poverty (or Resource Depletion)

(d) What is the genetic relationships between different groups of species known as?

Answer - Phylogeny

(e) Name the trees that shed leaves in autumn and grow new foliage in spring.

Answer - Deciduous trees

(f) Which metal does battery scrap leave in the environment?

Answer - Lead (Pb)



20. Fill in the blanks with the words given below:

(pathogen, terrestrial, developer, energy)

(a) The three EIA participants are government, _____ and public.

Answer - developer

(b) The capacity to do work is called _____.

Answer - energy

(c) Tundra is an example of _____ ecosystem.

Answer - terrestrial

(d) Vector is carrier of _____.

Answer - pathogen

21. Write the following statements as True or False:

(a) Land is one of the environmental components of EIA.

Answer - True

(b) It is sensible to irrigate plants and lawns in the afternoon.

Answer - False

(c) Mangroves are littoral forest ecosystems and are examples of ecotone.

Answer - True

OPTIONAL MODULE-8A**22. What harm does arsenic cause if consumed with water contaminated with it?**

Answer - Drinking arsenic-contaminated water can cause serious diseases like 'Black Foot Disease', skin cancer, lung cancer, and 'Hyperkeratosis' (thickening of the skin).



23. How can rainwater harvesting be effectively used for water conservation?

Answer - Instead of letting rainwater flow away, it can be collected in tanks for domestic use or directed underground to recharge the falling groundwater table.

24. Mention two benefits of reuse of water.

Answer - Two benefits of water reuse:

1. It reduces the demand for fresh (clean) water and lessens pressure on resources.
2. It reduces the discharge of wastewater, thereby decreasing pollution in rivers and lakes.

OPTIONAL MODULE-8B**22. What is tidal energy? What is the main criterion for a tidal power generation site?**

Answer - Energy generated from the difference in water levels during high tide (rise) and low tide (fall) in the sea is called tidal energy.

Main Criterion: There must be a difference of at least 5 meters between high and low tides.

23. Give two examples of liquid biofuels.

Answer - Two examples of liquid biofuels:

1. Ethanol – obtained from sugarcane or maize.
2. Biodiesel – obtained from plants like Jatropha.

24. Give two ways by which energy can be conserved while cooking.

Answer - Two ways:

1. Use a pressure cooker instead of open vessels for cooking.
2. Soak pulses or rice in water for some time before cooking so they cook faster.



CORE MODULE

25. Match the items in Column I with the options of Column II:

Column-I

Column-II

(a) The Air Act

(i) 1977

(b) The Environment Act

(ii) 1974

(c) The Water Act

(iii) 1981

(d) The Water Cess Act

(iv) 1986

Answer -

(a) The Air Act	—	(iii) 1981
(b) The Environment Act	—	(iv) 1986
(c) The Water Act	—	(ii) 1974
(d) The Water Cess Act	—	(i) 1977

26. What is IPM? What is its aim?

Answer - IPM (Integrated Pest Management) is a farming method where, instead of indiscriminately using chemical pesticides, crops are protected using a combination of biological methods (like beneficial insects) and mechanical methods.

Aim: Its main objective is to protect crops from pests and reduce economic losses for farmers without harming the environment and human health.

Or



Write one benefit and one controversy on use of GM products.

Answer -

Benefit: Nutritional value can be enhanced in GM (Genetically Modified) products. For example, Vitamin A content has been increased in 'Golden Rice', which helps in eliminating malnutrition.

Controversy: Opponents believe that GM crops can destroy the genetic purity of natural species and may have long-term allergic or adverse effects on human health.

27. Why is solar energy (power) promotion good for India? Which agencies encourage us to use solar energy system?

Answer - India is a tropical country that receives bright sunlight for about 300 days a year. Solar energy is pollution-free, inexhaustible, and can reduce dependence on coal/petrol to meet India's energy needs. Therefore, promoting it is very beneficial for India.

Agencies: MNRE (Ministry of New and Renewable Energy) and IREDA (Indian Renewable Energy Development Agency) encourage the use of solar energy.

28. What are hotspots? What is the criterion for determining a hotspot?

Answer - Hotspots are biodiversity-rich regions of the Earth where a very high diversity of species is found, but they face a serious threat of extinction due to human activities.

Criteria:

1. **Endemism:** It must contain at least 1,500 species of vascular plants that are not found anywhere else in the world.
2. **Threat:** At least 70% of its original natural habitat must have been destroyed.

29. List two factors that lead to rise in population in the world.

Answer -

1. **Decrease in Death Rate:** Due to modern medical facilities, vaccination, and better sanitation, epidemics have been controlled, leading to a drastic reduction in death rates and increased life expectancy.
2. **Food Security:** Technological advancements in agriculture (Green Revolution) have increased grain production, ensuring food availability and reducing deaths caused by famine.



30. How a habitat can be designed for cows?

Answer - A habitat (shed) for cows should be designed scientifically:

- **Ventilation:** There should be proper arrangement for fresh air and light in the shed.
- **Floor:** The floor should be paved (pucca) and slightly sloped so that urine and dung can easily flow into the drain and the place remains dry.
- **Facilities:** There should be an arrangement for clean drinking water and a paved manger for feeding fodder.

31. Differentiate between rural and urban settlements on the basis of their:

(a) occupation;

(b) social interactions.

Answer -

(a) Occupation: People in rural societies are mainly engaged in primary occupations like agriculture, animal husbandry, fishing, or cottage industries. Whereas, people in urban societies are employed in secondary and tertiary occupations like industries, jobs, trade, and services.

(b) Social Interactions: Due to low population in rural areas, relationships between people are informal, close, and based on a "we-feeling." In contrast, despite overcrowding in urban areas, relationships are formal, limited, and individualistic.

Or

State two major problems emerging from use of modern technology in farming.

Answer -

1. **Soil Salinity:** Excessive irrigation and use of chemicals in modern agriculture cause a layer of salt to come to the surface, making the soil barren.
2. **Water Pollution (Eutrophication):** Chemical fertilizers (Nitrates/Phosphates) applied in fields wash away with rain into rivers and ponds, causing excessive growth of algae and death of aquatic life.



32. Define deforestation and write its two consequences.

Answer - Deforestation refers to the cutting, burning, or removal of forests on a large scale so that the land can be used for agriculture, housing, industries, or other non-forest purposes.

Consequences:

1. **Loss of Biodiversity:** Cutting down forests takes away the habitat of wild animals, leading to the extinction of many species.
2. **Soil Erosion:** Tree roots bind the soil. When trees are cut, the soil becomes loose and washes away with rain or wind.

Or

Define desertification and mention two human activities that accelerate desertification.

Answer - Desertification is the process in which fertile and green land gradually turns into barren, dry, and desert-like land, losing its productive capacity.

Human Activities:

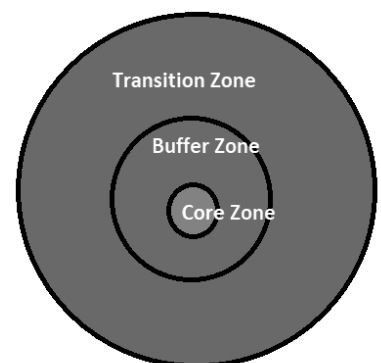
1. **Overgrazing:** Animals eating grass down to the roots leaves the soil bare.
2. **Indiscriminate Deforestation:** Cutting down trees reduces moisture and the land begins to dry up.

33. What is a biosphere reserve? What are its various zones? Explain diagrammatically.

Answer - Biosphere Reserve: It is a special area for biodiversity conservation where wildlife, along with the traditional lifestyle of tribals living there and plants, are conserved.

It has three main zones:

1. **Core Zone:** The innermost part which is fully protected. No human activity is allowed here.
2. **Buffer Zone:** Surrounds the core zone. Limited research, education, and tourism are allowed here.
3. **Transition Zone:** The outermost part. Settlements, farming, and resource use with the cooperation of local people are allowed here.



Or

Explain any two techniques of ex-situ conservation of plant species of biodiversity.

Answer - Ex-situ Conservation: When plants are conserved outside their natural habitat (like forests) in an artificial place, it is called ex-situ conservation.

Two Techniques:

1. **Botanical Gardens:** Here, rare and endangered plants are grown under special care. It also serves as a center for education and research. Example: Botanical Garden of Kolkata.
2. **Seed Banks:** Here, seeds of different plants and crops are stored for a long time at very low temperatures and controlled moisture so that they can be grown again if a species becomes extinct in the future.

34. What is meant by demography? If N is the total number of individuals in the population, then define birthrate, death rate and growth rate of the population. Also give expressions for each one of them for their determination.

Answer - Demography is the statistical study of human population size, structure, distribution, and changes occurring in it over time.

Let Total Population = N

Birth Rate (B): The number of new births occurring in the population per unit of time.

- **Expression:** $B = \frac{\text{Number of New Births}}{N} \times 1000$

Death Rate (D): The number of deaths occurring in the population per unit of time.

- **Expression:** $D = \frac{\text{Total Deaths}}{N} \times 1000$

Growth Rate (GR): It is the difference between birth rate and death rate (assuming migration is zero).

- **Expression:** $GR = \text{Birth Rate (B)} - \text{Death Rate (D)}$



35. Define an ecosystem. Taking example of a pond as an ecosystem, explain its various components.

Answer - Ecosystem: It is a functional unit of nature where living organisms (biotic) interact with their surrounding non-living environment (abiotic).

Components of a Pond Ecosystem:

1. Abiotic Components: Include pond water, sunlight (source of energy), temperature, and dissolved minerals & gases (Oxygen, CO₂) in water.

2. Biotic Components:

- **Producers:** Green plants that make their own food. E.g., Phytoplankton (microscopic algae), Hydrilla, and Lotus.
- **Consumers:**
 - **Primary:** Small insects and Zooplankton that eat algae.
 - **Secondary:** Small fish and frogs.
 - **Tertiary:** Large fish and cranes/herons.
- **Decomposers:** Bacteria and fungi living at the bottom of the pond. They decompose dead plants and animals and return nutrients to the water, which plants reuse.

36. What is meant by air pollution? Name various particulates and gaseous air pollutants, their sources and harmful effects. How can air pollution be prevented and controlled? Give four measures.

Answer - Air Pollution: The mixing of dust, smoke, or toxic gases in the atmosphere in such quantities that they become harmful to human health, plants, and animals is called air pollution.

Pollutants, Sources, and Effects:

- **Particulate:** Dust, Smoke, Fly ash. *Source:* Vehicles, Thermal Power Plants. *Effect:* Asthma, Lung diseases.



- **Gaseous:** Sulfur Dioxide (SO_2), Carbon Monoxide (CO). *Source:* Burning of coal, vehicle smoke.
Effect: Acid rain, Global warming, Cancer.

four Measures for Control:

1. **Vehicle Improvement:** Use CNG instead of petrol/diesel and make Pollution Under Control (PUC) checks mandatory.
2. **Filters in Industries:** Install 'Electrostatic Precipitators' (ESP) in factory chimneys to trap dust particles.
3. **Afforestation:** Plant more trees as they absorb CO_2 and purify the air.
4. **Energy Alternatives:** Increase the use of clean sources like solar and wind energy instead of coal.

Or

Explain the following terms:

- (a) Ozone hole
- (b) Greenhouse effect
- (c) Radiation
- (d) Thermal pollution
- (e) Soil pollution

Answer -

(a) Ozone Hole: Thinning of the ozone gas layer in the stratosphere over Antarctica, allowing harmful UV rays from the sun to reach the earth. The main cause is CFC gases.

(b) Greenhouse Effect: The increase of gases like Carbon Dioxide (CO_2) and Methane in the atmosphere which trap the earth's heat from escaping into space, causing the earth's temperature to rise (Global Warming).



(c) Radiation: Invisible and dangerous energy waves emitted from radioactive substances (like Uranium, nuclear waste). These destroy cells and cause cancer or genetic diseases.

(d) Thermal Pollution: When hot water from factories and power plants is released directly into rivers or ponds, the water temperature rises suddenly, killing fish and aquatic life.

(e) Soil Pollution: The decline in soil fertility and quality due to the mixing of plastic, chemicals, pesticides, and industrial waste in the soil is called soil pollution.

OPTIONAL MODULE-8A

37. Explain the following terms:

(a) Pathogenic pollution

(b) Eutrophication

Answer -

(a) Pathogenic Pollution: The presence of microorganisms like viruses, bacteria, protozoa, and worms in water that spread diseases. Its main source is domestic sewage and animal waste. It causes diseases like cholera, typhoid, and dysentery.

(b) Eutrophication: Excessive accumulation of nutrients (Nitrates/Phosphates) in water bodies due to domestic waste and agricultural fertilizers. This causes algae to grow very fast, absorbing all oxygen from the water, leading to the death of fish and rotting of water.

38. How will you perform the water audit of your home?

Answer - For a water audit, first, I will note the reading of my house's water meter. Then, for a day or a week, I will monitor how much water is being used in bathing, washing clothes, flushing, kitchen, and gardening. I will also check for leaking taps. Finally, I will compare the total consumption with the meter reading to find out where water is being wasted.

Or



List any four reasons for the growing water shortage throughout the world.

Answer -

1. **Population Explosion:** Water demand is increasing to meet the needs of the growing population.
2. **Over-exploitation in Agriculture:** Excessive use of groundwater for irrigation.
3. **Water Pollution:** Rivers and lakes have become unfit for drinking due to industrial and domestic waste.
4. **Wastage of Rainwater:** Not harvesting rainwater and letting it flow away uselessly.

39. Give an example of community level effort to overcome water scarcity.

Answer - In Gujarat (Saurashtra), local communities and voluntary organizations worked together to build **Check Dams**. They stopped rainwater, which raised the water table in dry wells, solving the problem of irrigation and drinking water. The effort of 'Tarun Bharat Sangh' in Rajasthan is also a similar example.

Or

What can an individual do to conserve water? Mention any four ways.

Answer -

1. Do not leave the tap open while shaving or brushing.
2. Use a bucket and mug instead of a shower for bathing.
3. Get leaking taps in the house repaired immediately.
4. Do not throw leftover water after washing vegetables or fruits into the drain; pour it into plants.

OPTIONAL MODULE-8B

37. Differentiate between renewable and non-renewable energy sources along with examples.

Answer -

- **Renewable:** Energy sources that are continuously formed in nature and will never be exhausted. They are pollution-free. *Examples:* Solar energy, Wind energy, Hydro-power.



- **Non-renewable:** Energy sources that are present in limited quantities and cannot be formed again once exhausted (they take millions of years to form). *Examples:* Coal, Petroleum, Natural gas.

38. Mention any two environmental impacts of geothermal energy.

Answer -

1. **Toxic Gases:** Geothermal plants may release gases like Hydrogen Sulfide (H_2S) from underground, which are toxic and smell like rotten eggs.
2. **Water Pollution:** Hot water coming from the ground often contains harmful minerals (like Arsenic, Mercury), which can pollute nearby water sources.

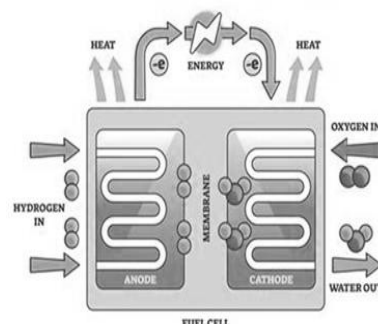
Or

Diagrammatically explain the working of hydrogen fuel cell.

Answer - A Hydrogen Fuel Cell is an electro-chemical device that converts the chemical energy of hydrogen directly into electricity.

Working Mechanism:

1. **Anode:** Hydrogen gas (H_2) is fed to the anode, where it breaks into electrons (e^-) and protons (H^+).
2. **Electric Flow:** Electrons flow through an external circuit, generating electricity.
3. **Cathode:** Protons and electrons combine with Oxygen (O_2) to form pure water (H_2O) and heat.



Main Equation: $2H_2 + O_2 \rightarrow 2H_2O + \text{Energy}$

Benefit: It causes zero pollution as its only emission is water vapor.

39. Mention any two ways for energy conservation at community level for housing complexes.

Answer -

1. **Community Solar Lighting:** Solar Street Lights should be used instead of regular electricity in parks, corridors, and roads of housing complexes.

2. **Solar Water Heaters:** Large solar water heaters on rooftops should be made mandatory for the entire society to save electricity costs on geysers in every home.

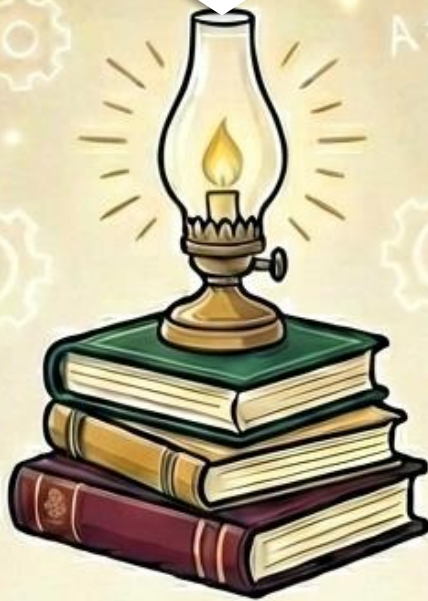
Or

Mention four technologies or equipments that were used during construction of Auroville Visitors Centre in Pondicherry that led it to win Hassan Fathy International Award in 1992.

Answer - Energy-saving and eco-friendly architecture was adopted at the Auroville Centre:

1. **Ferro-cement Roofs:** Which create strong roofs using less material.
2. **Compressed Earth Blocks:** Bricks made from local soil that did not require coal for firing.
3. **Solar Chimney:** For natural ventilation, keeping the air cool without AC.
4. **Windmill:** Use of wind energy for pumping water.





NIOS PYQ's SOLUTIONS

PREVIOUS YEARS' QUESTIONS & ANSWERS



OCTOBER-2025

Your Path to Success

Q 1 – The earliest human ancestors who walked upright and evolved in South Africa, are:

- (A) Homo Erectus
- (B) Homo Habilis
- (C) Australopithecus
- (D) Homo Sapiens

Answer - (C) Australopithecus

Q 2 - The total rate at which the radiant energy is stored in the green plants by the process of photosynthesis is called:

- (A) Net primary production
- (B) Gross primary production
- (C) Trophic Net level
- (D) Heat energy level

Answer – (B) Gross primary production

Q 3 - Which among the following is a Y-shaped food chain?

- (A) Producers -> Carnivores -> Herbivores
- (B) Producers -> Detritus feeders -> Carnivores
- (C) Herbivores -> Producers -> Decomposers
- (D) Omnivores -> Producers -> Carnivores

Answer – (B) Producers -> Detritus feeders -> Carnivores

Q 4 - Which of the following is NOT considered as an adverse effect of mining?

- (A) Depletion of minerals
- (B) Cause of soil erosion
- (C) Loss of flora & fauna
- (D) Increased deposits of lead, aluminium and copper

Answer – (D) Increased deposits of lead, aluminium and copper



Q 5 - Chemical pesticides are considered as harmful because they:

- (A) Causes water logging
- (B) Cause loss of vegetation
- (C) Cause deforestation
- (D) Kill pollinators and birds

Answer – (D) Kill pollinators and birds

Q 6 - As per the 10% rule if autotrophs produce 200 cal, the amount of energy stored by herbivores and carnivores respectively will be :

- (A) 10 cal, 1 cal
- (B) 20 cal, 2 cal
- (C) 10 cal, 2 cal
- (D) 20 cal, 1 cal

Answer – (B) 20 cal, 2 cal

Q 7 - Which among the following is NOT a characteristic of rural communities?

- (A) Simple living
- (B) Joint family system
- (C) Small community size
- (D) Rampant caste system

Answer – (D) Uncontrolled caste system

Q 8 - Tehri power project site is located near

- (A) Garhwal
- (B) Godavari
- (C) Aravali
- (D) Kutch

Answer – (A) Garhwal

Q 9 - The Lion tailed monkey is endangered because:

- (A) Their numbers are few and are continuing to decrease
- (B) Their numbers are reduced greatly from those of the recent past
- (C) Its homeland is very small and its numbers are few
- (D) They live in an unusual environment



Answer – (C) Its habitat territory is very small and population is very low

Q 10 - The study of various aspects of a population is called

- (A) Census
- (B) Growth
- (C) Demography
- (D) Mortality

Answer – (C) Demographics

Q 11 – Long term exposure to coal dust can cause

- (A) impaired hearing
- (B) black lung disease
- (C) liver cirrhosis
- (D) brittle bones

Answer – (B) Black lung disease

Q 12 - The development of mankind is said to be sustainable if it meets the needs of

- (A) the present and past generations
- (B) the past generations only
- (C) the future generations only
- (D) the present and future generation

Answer – (D) Present and future generations

Q 13 - Nile perch is an exotic predatory fish as it

- (A) can eliminates several native species of the small cichlid fish
- (B) threatens the survival of terrestrial species
- (C) clogs lakes and river sides
- (D) can wipe out native grass species

Answer – (A) It can eliminate many native species of small cichlid fish



Optional Module 8A

Q 14 - The method used to remove excess salt from water is referred to as

- (A) filtration (B) gravity flow filtration
(C) desalination (D) coagulation

Answer – (C) Desalination

Q 15 - In which one of the following water harvesting techniques pits, aquifer, trenches and dugwells like structures are used?

- (A) Underground water harvesting (B) Rain water harvesting
(C) Rooftop water harvesting (D) Stream water harvesting

Answer – (A) Underground water harvesting

Q 16 - An example of anti-transpirants is:

- (A) kaolin and limewash (B) methane
(C) asphalt (D) drip irrigation

Answer – (A) Kaolin and limewash

Optional Module – 8B

Q 14 - Photovoltaic cells are used to convert

- (A) Chemical energy to electrical energy
(B) Electrical energy to solar energy
(C) Solar energy to electrical energy
(D) Wind energy to electrical energy

Answer – (C) Solar energy into electrical energy



Q 15 - The fourth largest source of commercial energy production globally is

- (A) Tidal energy (B) Hydropower
(C) Wind energy (D) Solar energy

Answer – (B) Hydroelectric energy

Q 16 - Jatropha Curcas is referred to as petro crop as it produces

- (A) Biogas (B) Hydrocarbon
(C) Bagasse (D) Biomass

Answer – (B) Hydrocarbons

Q 17 - Identify the names of the forests found in India on the basis of features mentioned below:

(a) Trees grow very briskly and attains heights of 60 m and above, found in rainy slopes of Western Ghats.

Answer – Tropical rainforest

(b) Sundari, a renowned mangrove tree, is mostly found in these forests.

Answer – Tidal forest

Q 18 - Answer the following questions in one or two sentences:

(1) Give one preventive step for Black lung disease.

Answer – To protect against the prolonged effects of dust, mineworkers should wear appropriate safety equipment (like masks).

(2) Why the conservation of biodiversity is important?

Answer – The conservation of biodiversity is necessary because it is a vast reservoir of products essential for human use and well-being.

(3) What is meant by an ecological footprint?

Answer – An ecological footprint is the biologically productive land and water area required for the resource consumption and waste absorption of an individual or society.



(4) Integrated pest management is a most sustainable way to control pests. Explain.

Answer – It is an eco-friendly method in which biological and natural measures are used instead of chemical pesticides.

(5) What organic farmers can do when pest populations get out of balance?

Answer – Organic farmers can use biological control and natural methods (IPM).

(6) Use of CFL is promoted over the traditional light bulb. Justify any one reason for this promotion.

Answer – CFLs consume less energy and last longer compared to other traditional bulbs.

Q 19 - Answer the following questions in one word only:

(1) Callophyllum is used to produce this fuel which is a substitute for petroleum.

Answer – Biodiesel

(2) It represents discharge of pollutants into any water sources from diffused sources or from a larger area such as construction sites.

Answer – Non-point source

(3) Regions in the world which are very rich in biodiversity and support > 1500 endemic species.

Answer – Hotspots

(4) The ambitious and first of its kind project launched by Government to clean the river Ganga.

Answer – Ganga Action Plan (GAP)

(5) The principle which refers that the earth provides enough to satisfy every person's need but not for every person's greed.

Answer – Principle of sufficiency

(6) Depletion or destruction of potentially renewable resource such as soil, grassland, forest or wildlife that is used faster than it is naturally replenished.

Answer – Overexploitation



Q 20 - Fill in the blanks by using appropriate words given below (protocol, wildlife, biodiversity, forest) :

(1) The main intent of ___ legislation is to protect India's rich biodiversity and associated knowledge against their use by foreign individuals and organizations and to check biopiracy.

Answer – Biological Diversity

(2) The ___ Conservation Act was enacted to consolidate the law related to forest and the transit of its produces and the duty leviable on timber.

Answer – Forest

(3) The ___ act regulates hunting of wild animals and birds along with establishment of sanctuaries and national parks.

Answer – Wildlife

(4) An international agreement called ___ is framed to support any convention which is linked to an existing convention.

Answer – Protocol

Q 21 - Write the following statement as true or false:

(a) Industries require environmental clearance from 'Impact Assessment Agency, Government of India.

Answer – True

(b) EIA applies only to private sections and does not include public.

Answer – False

(Reason: EIA also involves private sectors, government projects, and public participation.)

(c) To control industrial pollution Electrostatic precipitators are installed in thermal power plants to remove particulate matter.

Answer – True



Optional Module 8A

Q 22 - Why the removal of arsenic from ground water is essential?

Answer – Arsenic in groundwater is a very toxic element, the consumption of which can cause skin diseases, lesions, and skin cancer.

Q 23 - What is the primary purpose of classifying water into 'designated best use' by CPCB?

Answer – Its primary objective is to ensure water quality based on its use (like drinking or irrigation) and to control pollution.

Q 24 - Water harvesting is considered a crucial strategy for water conservation in India. Justify.

Answer – Rainfall in India is irregular; hence, water harvesting is helpful in increasing the groundwater level and overcoming water scarcity by storing rainwater.

Optional Module 8B

Q 22 - Solar energy is the most important type of renewable energy. Why?

Answer – Solar energy is an inexhaustible source, and it is obtained directly from the sun without polluting the environment.

Q 23 - What could be the reason for Indian sugar mills turning to bagasse to generate electricity?

Answer – Bagasse is the dry residue left after extracting juice from sugarcane. It is used for electricity generation.

Q 24 - Why should there be regular monitoring and energy audit at workplace?

Answer – An energy audit identifies unnecessary energy expenditure, allowing costs to be reduced by adopting effective methods of energy conservation.

Q 25 - Among the pond animals how does Zooplankton differs from Nektons? Give one example of each type.

Answer – Zooplanktons are microscopic swimming animals that flow with water currents, e.g., Cyclops. In contrast, nektons are animals capable of swimming independently and changing direction at will, e.g., Fishes.

Q 26 - Which are the two steps to be undertaken to carry out development without destruction?

Answer – The following two steps are important -



1. Humans should limit their needs so that natural resources are not unnecessarily exploited.
2. Human interference in natural ecosystems should be minimized, and protected areas (reserves) should be created.

Q 27 - How can environmental legislation make a difference in improving and conserving environment?

Answer – Environmental laws protect the environment by imposing legal controls on the overexploitation of resources and pollution. These laws regulate industrial and human activities, thereby preventing environmental damage and ensuring good management of natural resources.

OR

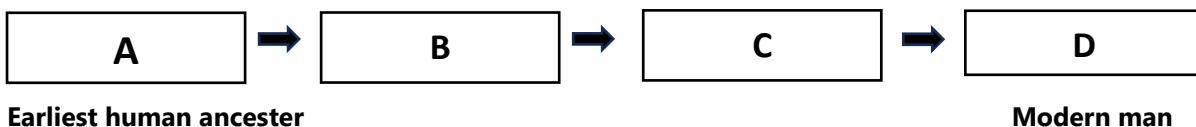
State the 'Directive Principle of State Policy' regarding the protection and improvement of the environment. Which Article encompasses this policy?

Answer – Under the Directive Principles of State Policy for environmental conservation and improvement, Article 48-A clarifies that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country. This policy makes environmental conservation a constitutional responsibility of the state.

Q 28 - How can water hyacinth help in removing pollutants from waste water and for producing ecofriendly fuel?

Answer – Water hyacinth cleans wastewater by absorbing nutrients and heavy metals from it. Also, its biomass can be used to produce biogas (an eco-friendly fuel).

Q 29 - Fill in the given boxes with the names of their species tracing the evolution of humans upto modern man:



Answer – A - Australopithecus, B - Homo habilis, C - Homo erectus, D - Homo sapiens

Q 30 - How has expanding agriculture a cause of deforestation?

Answer – More land is required to meet the food needs of a growing population. For this, forests are cut down and converted into agricultural fields. Since the agricultural area is being expanded by removing forests, agricultural expansion has become a cause of deforestation.

OR



How has tribal communities adapted to live in forests without harming it?

Answer – Tribal communities practice eco-friendly agriculture. They grow several types of crops together and then leave the land fallow for several years so it can turn back into a forest. Their resource-management skills and cultural connection keep the forests safe.

Q 31 - The Botanical Garden at Noida is an example of ex-situ conservation of biodiversity. Justify.

Answer – Ex-situ conservation means protecting organisms outside their natural habitat. The Botanical Garden of Noida is a man-made place where various plant species are brought from outside their natural habitat and conserved, hence it is an example of ex-situ conservation.

Q 32 - Village youth have great compulsion to move to cities. What reasons will you attribute to this migration?

Answer – The main reason for the migration of rural youth is the lack of employment opportunities, poverty, and the lack of better education and health facilities in villages. Additionally, the fragmentation of agricultural land and the desire for modern amenities force them to migrate to cities.

OR

How modern technology in farming has led to soil erosion and flooding? Justify.

Answer – The use of modern agricultural machinery loosens the soil, which leads to soil erosion. Then, this loose soil washes away with rain and accumulates in rivers, decreasing the depth of rivers and increasing the risk of floods.

Q 33 - Why is the use of biofertilizers considered as sustainable agricultural practice? Using examples of Rhizobium, Azotobacter, Azolla and blue green algae biofertilizers explain their use in agriculture.

Answer – Biofertilizers maintain the natural fertility of the soil and reduce dependence on chemical fertilizers, which is why they are considered a sustainable agricultural practice. Their uses are as follows -

1. **Rhizobium** : Lives in the root nodules of leguminous plants and fixes atmospheric nitrogen.
2. **Azotobacter** : A free-living bacterium that increases fertility by fixing nitrogen in the soil.
3. **Azolla** : An aquatic fern used as a biofertilizer to supply nitrogen in paddy fields.
4. **Blue-green algae** : Increase soil fertility, especially in rice cultivation, by fixing nitrogen.

OR



Genetically modified plants can act as the second 'Green revolution'. Why are the plants so known? Mention at least three ways in which they can cause less damage to the environment.

Answer – Genetically modified (GM) plants increase productivity in agriculture, so they are called the second 'Green Revolution'. The ways they can cause less harm to the environment are –

- 1. Pest resistance :** GM plants have natural resistance against insects, reducing the need to spray harmful chemical pesticides.
- 2. Tolerance to diseases :** They have the power to fight viruses and fungi, reducing the need for fungicidal chemicals.
- 3. Resource efficiency :** The ability to fix atmospheric nitrogen can be developed in these plants, reducing the use of nitrogenous fertilizers.

Q 34 - As a member of town's water conservation committee, propose a comprehensive plan incorporating at least four methods for conservation of water.

Answer – Four methods of water conservation –

- 1. Rainwater harvesting :** Collecting rainwater in tanks or underground pits helps increase the groundwater level.
- 2. Reuse of water :** The water left after domestic use is utilized for gardening and other purposes.
- 3. Leakage control :** Timely repair of leaks in water distribution pipes can prevent massive water wastage.
- 4. Water frugality :** Saving water by stopping the unnecessary use of taps and adopting water-efficient appliances.

OR

How does biosphere reserves act as in-situ conservation strategy?

Answer – Biosphere reserves act as 'in-situ conservation' for biodiversity conservation because flora and fauna are protected in their natural habitat within them. For this, they are divided into three zones-

- 1. Core zone :** This is the most protected area, where human activities are strictly prohibited.
- 2. Buffer zone :** It surrounds the core zone. Only limited activities, like scientific research and training, are permitted here.



3. **Transition zone** : This is the outermost area of the reserve, where local people are allowed to carry out agriculture and other traditional activities.

Q 35 - Impact of human activities has increasingly disturbed the global carbon cycle. Explain each step of the carbon cycle in one sentence and also mention the reason for disturbance of carbon cycle.

Answer – Human activities, especially the excessive burning of fossil fuels and large-scale deforestation, have severely disrupted the natural balance of the global carbon cycle. This increases the amount of carbon dioxide in the atmosphere, which becomes a major cause of global warming and climate change. The carbon cycle is as follows -

1. **Photosynthesis** : Green plants take CO₂ from the atmosphere and make their food (carbohydrates).
2. **Respiration** : Organisms take in oxygen and release CO₂ back into the atmosphere through the process of respiration.
3. **Decomposition** : The decomposition of the bodies of dead plants and animals releases organic carbon back into the soil or atmosphere.
4. **Combustion** : Large amounts of carbon are released into the atmosphere from the burning of fossil fuels (coal, petroleum).

OR

Define ecotone and mention its four characteristics.

Answer – The meeting place of two or more different ecosystems is called an 'ecotone'. It is a transitional area where two different communities meet. For example, mangrove forests are an ecotone because they are the meeting point between marine and terrestrial ecosystems. Its four main properties are -

1. **Transition zone** : It acts as a zone of tension between two communities where environmental conditions are intermediate to those of adjacent ecosystems.
2. **Species diversity** : The number and density of species in this area are often higher than in surrounding areas.
3. **Unique species** : Some specific species may also thrive in it that are not found in the main communities.
4. **Regional variation** : The width of an ecotone region can be very narrow or very wide, depending on how much physical and environmental difference exists between the ecosystems.



Q 36 - What are the measures which one can adopt to control and prevent industrial pollution?

Answer – Controlling and preventing industrial pollution is absolutely essential to maintain the environment. The following measures can be adopted for this -

1. **Wastewater treatment** : Instead of discharging polluted water from industries directly into rivers, it should first be treated in an 'Effluent Treatment Plant' (ETP) so that harmful chemicals can be removed.
2. **Air pollution control technology** : Devices like 'scrubbers' and 'electrostatic precipitators' (ESP) should be used in chimneys, which separate harmful gases from smoke and prevent them from spreading into the atmosphere.
3. **Use of clean technology** : Industries should adopt eco-friendly 'clean production processes' instead of old technology, which can reduce waste generation.
4. **Solid waste management** : Industrial waste should be properly recycled or disposed of. Hazardous waste should be managed through safe incineration.

Optional Module 8A**Q 37 - Water has to be treated before it is used for living beings. Why? What are the main steps for its treatment?**

Answer – Water may contain pathogenic microorganisms (bacteria, viruses) and toxic pollutants, which pose a serious threat to the health of all living beings. That is why purification is necessary.

1. **Sedimentation** : Allowing heavy particles present in the water to settle down.
2. **Filtration** : Removing fine impurities.
3. **Disinfection** : Destroying harmful germs using chlorine or ozone.

Q 38 - How instream uses of water are different from its abstractive uses?

Answer – The 'instream use' of water is where water is used without removing it from its natural source (river/lake), such as navigation, fishing, or electricity generation. In contrast, in 'withdrawal use', water is pumped out of the source and used for irrigation or domestic purposes.

OR



State two causes of long term ecological damage to the rivers.

Answer – Two causes of damage -

1. Building large dams on rivers has a bad impact on their natural flow, water volume, and the migration routes of aquatic animals.
2. Toxic wastewater coming from industries and cities mixing into the river destroys the river's ecosystem, which is long-term damage.

Q 39 - As a student representative you are asked to organize a water wisdom week in your school. How you will do it?

Answer – To organize a 'Water Wisdom Week' in the school, we will first read the water meter to find out the weekly consumption. After this, we will set a goal to reduce consumption by one-third. Along with this, we will do a new activity related to water conservation every day so that all students and staff of the school can participate in these efforts and learn to reduce water wastage.

OR

To water the plants in a garden which two techniques you will invent to reduce water wastage?

Answer – The two main techniques are as follows -

1. **Drip irrigation** : In this, water is delivered drop by drop directly to the roots of the plants through pipes, so that water loss through evaporation is minimal.
2. **Sprinkler irrigation** : In this, water is sprayed in the form of a fountain, which delivers water evenly to the plants like rain, thus reducing water wastage.

Optional Module 8B

Q 37 - Why fuel cell technology is better in generating electricity in comparison to traditional systems? Give two reasons.

Answer – Fuel cell is better because –

1. **High efficiency** : Fuel cells convert chemical energy directly into electricity, which wastes much less energy compared to a traditional combustion engine.
2. **Minimal pollution** : It only emits water vapor and heat as by-products, due to which the emission of harmful gases (CO₂, SO₂) is negligible.



Q 38 - How is an Ecohouse an energy efficient building? Give four features of the same.

Answer – An ecohouse is an energy-efficient building because –

1. The placement of windows is such that artificial lighting is not required during the day.
2. The use of such materials in walls and roofs that keep the house warm in winter and cool in summer.
3. Meeting its own electricity needs by using solar panels.
4. Advanced systems for water saving and reuse.

OR

How can energy auditing play an important role in energy conservation?

Answer – An energy audit is a systematic analysis of energy use in a building or industry. It identifies areas where energy is being wasted (like faulty wiring or old equipment), so that energy consumption can be reduced and costs can be saved by fixing those shortcomings.

Q 39 - In the society, where you live, you are asked to make a poster highlighting at least four energy conservation steps at community level which will be financially advantageous. Elaborate them.

Answer – Four economically beneficial steps for energy conservation –

1. Installing LEDs instead of traditional bulbs leads to a massive reduction in the electricity bill.
2. Installing solar lights in the parks and pathways of the society.
3. Saving electricity by increasing the use of windows during the daytime.
4. Replacing old fans or motors with new efficient technology, thereby reducing energy consumption.

OR

Which has greater future potential for energy production, wind or water power? Justify giving suitable reason and also mention which is more environment friendly.

Answer – Wind power has more potential for the future. The reason is that large dams have to be built for water power, which causes displacement and ecological damage, whereas windmills can be installed anywhere. Wind power is more 'eco-friendly' because it does not cause any harm to the ecosystems of forests or rivers.





Thank you!



We hope you found this material helpful. We wish you the very best for your examination.



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