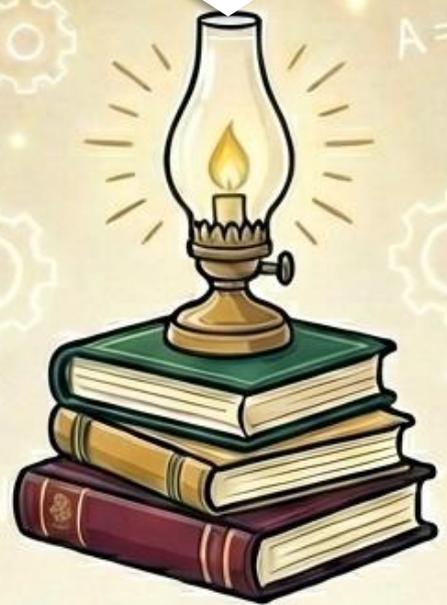




$$A = \frac{m}{(m^2 + c)^2}$$



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:

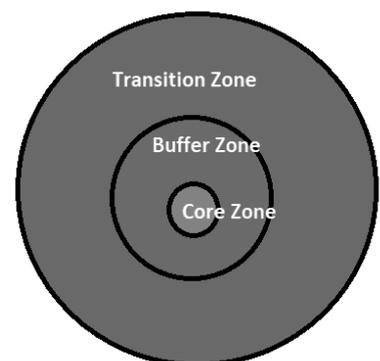
1. **Overgrazing:** Animals eating grass down to the roots leaves the soil bare.
2. **Indiscriminate Deforestation:** Cutting down trees reduces moisture and the land begins to dry up.

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 (SO₂), 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 CO₂ 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 (CO₂) 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.

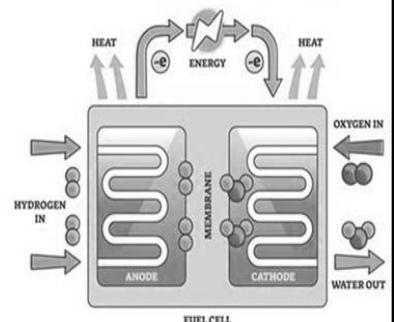
Or

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.





Thank you!

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

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