

Q. No 3:

a. What is tsunami? How is it generated? Give examples of a few recent tsunamis.

A tsunami is a series of large, powerful ocean waves caused by the displacement of a large volume of water, typically due to an undersea earthquake, volcanic eruption, or landslide.

• How Tsunamis are Generated:

1. Undersea Earthquake:

Most tsunamis are caused by tectonic movements of platelets undersea. Besides this, earthquake is also considered to be the main reason of tsunamis generation which then propagate a large amount of water waves in oceans.

2. Volcanic Eruption:

A volcanic eruption, especially one that involves the collapse of a volcanic island or an underwater eruption, can displace water and create waves.

3. Landslides:

Landslides, especially under-water, can also displace water, generating waves.

Examples of Recent Tsunamis:

1. 2011 Japan Tsunami:

Triggered by a massive earthquake (magnitude 9.1) off the coast of Japan, this tsunami devastated coastal regions of Japan, causing over 15000 deaths and destruction of the country's infrastructure.

2. 2018 Indonesia Tsunami:

Triggered by an undersea earthquake and a volcanic eruption, this tsunami hit the coast of Indonesia, resulting in more than 4000 deaths.

b. Discuss Environmental Pollution? Its harmful effects. Give few measures to curb it.

Environmental pollution refers to the introduction of harmful substances into the natural environment of earth, which as a result causes ~~adverse~~ adverse effects on living organisms, ecosystem and natural resources. It takes many forms including air-pollution, water pollution, and soil pollution.

Types:

1. Air Pollution: The release of harmful ~~substances~~ substances into atmosphere like carbon dioxide (CO_2), nitrogen oxides (NO_x) and sulfur dioxide (SO_2) into the atmosphere. This is mainly caused by industrial activities, vehicle emissions, deforestation, and burning fossil fuels.

2. Water Pollution:

Contamination of water bodies (lakes, rivers, oceans) by harmful chemicals, pathogens, or waste. Common sources include industrial discharge, agricultural runoff, sewage, and oil spills.

3. Soil Pollution:

The degradation of soil quality due to the presence of toxic chemicals, heavy metals, or industrial waste. This affects agriculture, plant life, and animal life.

• Harmful Effects:

1) Climate Change:

Air pollutants such as carbon dioxide and methane contribute to global warming, leading to climate change. This results in more extreme weather patterns, rising sea level, and loss of biodiversity.

2) Depletion of Natural Resources:

Pollution can lead to the depletion of natural resources, such as clean water and fertile soil, necessary for life on Earth.

• Measures to Curb it:

1) Promote Renewable Energy: Transitioning from

fossil fuels to renewable energy sources like solar, wind and hydroelectric power reduces air-pollution and mitigates climate change.

→ Public Awareness and Education:

Educating the public about the causes and effects of pollution can encourage responsible behaviour and community driven environmental protection efforts.

c) What is wireless communication? Briefly explain the working of a satellite.

• Wireless communication refers to the transmission of information between two or more devices without the use of physical wires or cables. It relies on electromagnetic waves such as radio waves, microwaves, and infrared waves to carry signals over distances. Wireless communication is used in various applications, including mobile phones, Wi-Fi, Bluetooth, and radio casting.

• Working of a satellite

A satellite is a man-made object placed in orbit around the Earth. It acts as a relay station to transmit and receive signals for various purposes, including communication, weather forecasting, GPS, and scientific research. Here is how it works:

1) Launch and Orbit:

A satellite is launched into space using a rocket and placed into a specific orbit around the earth.

2) Transmitting Signals:

A ground station on earth sends signals such as radio or microwave signals, to the satellite. These signals may contain data, audio, video, or other types of information.

3) Global Coverage:

Depending on the orbit, satellites can cover large geographical areas, enabling communication over vast distances, even in remote or rural regions.

1. Explain and draw the structure of Sun?

The Sun is a ~~star~~ star at the center of our solar system, and its structure can be divided into several layers.

i. **Core:** The core is the Sun's innermost layer and is the site of nuclear fusion. The temperature in the core is around 15 million °C.

ii. Radioactive Zone:

The layer surrounding the core is the radioactive zone. Energy produced in the core is transferred outward by radiation in this zone.

3. Convective Zone:

Above the radiative zone, the convective zone transports energy through convection.

4. Photosphere:

The photosphere is the visible surface of the Sun, from which light is emitted.

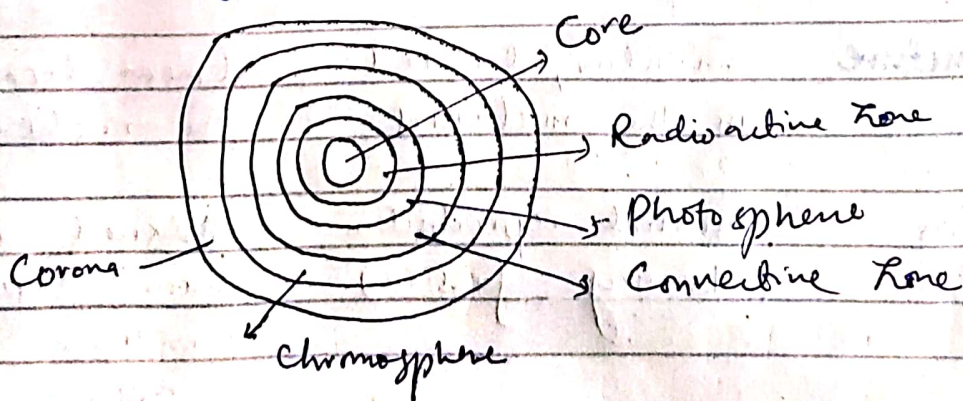
5. Chromosphere:

Above the photosphere is the chromosphere, a thin layer that is usually visible during a solar eclipse as a reddish glow.

6. Corona:

The outermost layer of the Sun is the corona, which is a halo of hot plasma.

Diagram of Sun



Q.No 5

1. Differentiate between prokaryotic and Eukaryotic cells?

• Feature	Prokaryotic cells	Eukaryotic cells
• Nucleus	No true nucleus; genetic material is not enclosed in a membrane	It has a true nucleus with a membrane-bound structure containing genetic material
• Cell type	Unicellular (e.g. bacteria and archaea).	Unicellular or multicellular (e.g. plants, animals, fungi and protists)
• Organells	Lack membrane-bound organelle (e.g. no mitochondria or endoplasmic reticulum)	Have membrane-bound organelles (e.g. mitochondria, Golgi apparatus)
• DNA structure	Circular, located in the nucleoid	Linear located in the nucleus
• Reproduction	Asexual reproduction (binary fission)	Asexual and sexual reproduction (mitosis and meiosis)
• Ribosomes	Smaller (70s)	Larger (80s)

b. What is global warming? Explain Kyoto protocol?

• Global warming

Global warming refers to the long-term increase in Earth's average surface temperature due to human activities, primarily the release of greenhouse gases such as carbon dioxide, methane, and nitrous oxide into the atmosphere. These gases trap heat from the sun, causing a greenhouse effect that leads to a rise in global temperatures.

• Causes of Global warming:

- Burning of fossil fuels.
- Deforestation
- Agricultural Activities.
- Industrial Activities.

• Effects of Global warming:

- Rising sea level
- More frequent and intense weather events.
- Loss of biodiversity
- Impact on ecosystem

• Kyoto - Protocol

The Kyoto Protocol is an international binding treaty aimed at reducing green house gas emissions and combating global warming. It was basically adopted in Kyoto, Japan, in 1997 and came into effect in 2005. The protocol stresses upon the developed nations to reduce their emission of greenhouse gases.

c. Write a detailed note on GIS?

• Geographic Information System

GIS is a technology used to collect, analyze, manage and display spatial or geographic data. It integrates hardware, software and data to help users understand patterns, relationships, and trends in a geographical context. GIS is used across various fields, including urban planning, environmental management, transportation, agriculture, and disaster management.

• Functions of GIS :

i- Data Input and Collection: GIS collects spatial and attribute data from various sources such as GPS device, satellite imagery, aerial surveys and filed data.

2. Data Storage:

GIS stores geographic data in a structured format, often using databases or files that contain both spatial (locations) and non-spatial (attributes) information.

d. Briefly describe antioxidants

Antioxidants are molecules that help protect the body from damage caused by free radicals, unstable molecules that can damage cells and contribute to aging, inflammation, and the development of various diseases, including cancer and heart disease.

• Sources of Antioxidants:

- Fruits and vegetables
- Nuts and seeds
- Herbs and spices
- Green Tea

• Health benefits of Antioxidants

- Protection against chronic disease
- Anti-aging
- Improved immune function.