

Date: _____

General Science - 2 Day: _____

Name: Fajar Tiaz

Q2a) Define the following:

i) Food Preservatives:

Food preservatives are defined as the substances used to preserve food from chemical or biological elements to increase its shelf life and use it for a longer period of time without decomposition.

Example:

Both traditional and industrial methods are used to preserve food.

- Traditional methods: Freezing, salting, drying, pickling, canning etc. are used.
- Industrial methods: Pasteurization, food irradiation treatment, high vacuum treatment are used to preserve food.

ii) Food Additives:

Food additives are the substances used to enhance the colour, flavour, texture and taste of the food.

Example: Vitamic C (i.e. lemon), benzal-

Date: _____

Day: _____

dehydrate (to add flavour) are used as additives.

iii) Food Adulteration:

Food adulteration is the process by which adulterants are added to food which willingly. Adulterants may contaminate, spoil or debase the taste of food. These are added as reciprocal for some other ingredients which are essential but expensive. It is done to keep up with market pace by reducing food prices.

Example: Argemone seeds are used in place of mustard which are harmful.

iv) Food Contamination:

Food contamination is the process in which food is contaminated accidentally. It is due to chemical or bacterial reaction.

Example: Fungi may contaminate food i.e. bread placed in refrigerator.

4.5

b) Deterioration of atmospheric condition by human activities :

Human activities deteriorate the atmospheric condition in following ways:

- **Industrialization** : Rapid industrialization releasing harmful chemical and nuclear waste deteriorates the atmosphere causing air, water and land pollution and global warming.
- **Excessive transportation** : it releases smoke containing pollutants which cause pollution and damage to environment.
- **Rapid urbanization** also harms atmospheric condition by depleting resources in an ineffective manner.
- **Improper waste disposal** affects land and aquatic ecosystems, leading to species extinction.

• Controlling measures :

- i) Use of clean and renewable energy resources to generate electricity and power industries to protect environment from harmful gases released from burning fossil fuels.
- ii) Use hybrid vehicles and green-techn.

ology in vehicles to prevent air pollution.

- iii) Government needs to ensure planned and sustainable urbanization to prevent resource depletion and atmospheric deterioration.
- iv) Use proper waste disposal methods to prevent ozone layer damage and unregulated greenhouse effect.

e) Remote Sensing :

It is defined as the science of acquiring knowledge of distant objects by using electromagnetic radiations, without coming into direct physical contact with the objects.

Components of Remote Sensing :

It has following components :

- i) A source for generation of electromagnetic radiations.
- ii) Absorption of radiations by objects and reflection of some radiations.
- iii) A sensor to detect reflected radiations.
- iv) A platform to mount or stage a

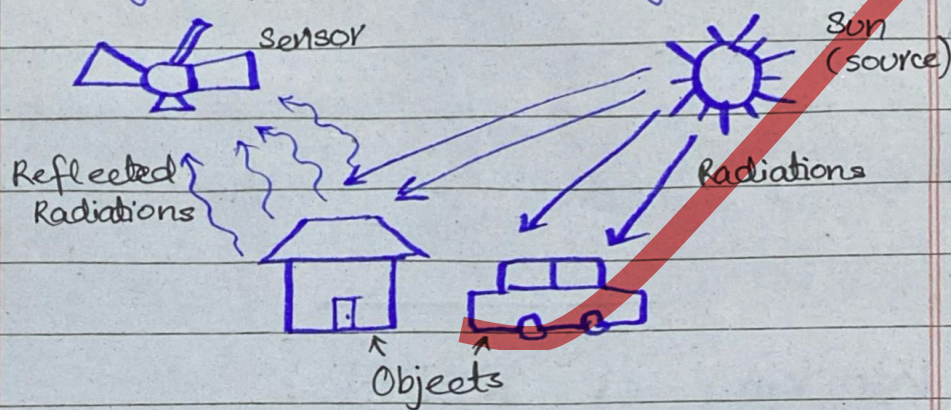
Date: _____

Day: _____

camera or some other device to record radiations.

- v) Analysis of recorded radiations to gain information about objects.

Following diagram illustrates the working of remote sensing :



Remote sensing is of two types :

- Active remote sensing
- Passive remote sensing

• Role of remote sensing in environmental science :

It plays multi-dimensional role in almost every area associated with environmental science. Some of its roles are :

- It helps in environmental protection and conservation by assessing land use and its impact on environment.

Date: _____

Day: _____

- It helps in prediction of disasters as early warnings, preventing environmental damage on a large scale by floods, earthquake, droughts etc.
- It helps in forest protection, by providing information regarding deforestation.
- It helps in managing earth's temperature by analyzing temperature increase or decrease.

d) Working of RADAR:

RADAR (Radio Detection And Ranging) works on the principle of reflected radiowaves in the following way:

- i) RADAR generates radiowaves towards objects to be analyzed.
- ii) Radiowaves are absorbed, and a part of them is reflected back towards a sensor.
- iii) The reflected radiowaves are detected by RADAR and pattern of reflection provides information.
- iv) The speed of reflected radiations

Date: _____

Day: _____

with which they bounce back is used to measure the distance of object.

- v) The direction of reflected radiowaves and their frequency tell about the nature of object.

Question no. 03

a) Effects of Global Warming on Pakistan:

Over the recent years, following effects of global warming have been observed on Pakistan:

- i) Melting of glaciers in Himalayas and ice caps have been accelerated with a fear of melting of all Himalayan glaciers by 2030 by International Commission for Snow and Ice.
- ii) Due to the melting of glaciers, sea level has risen, posing threats of inundation of low-lying areas.
- iii) Global warming has led to erratic rainfall patterns, changing monsoon patterns, thus, delaying precipitation.
- iv) Due to delayed rains, Pakistan's

agricultural sector which largely depends on rainfall is suffering.

- v) Flooding due to erratic rainfall and melting of glaciers is observed more frequently i.e. in 2010, 2022, 2025, causing great damage.
- vi) Global warming has also caused an increase in heatwaves particularly in Sindh.

• Suggestions :

Following measures need to be adopted in order to prevent extreme conditions :

- i) Adoption of modern farming techniques to secure food availability, and early warning system to prevent large scale damage due to flooding.
- ii) International cooperation to prevent further warming due to emissions is essential.
- iii) Reforestation and afforestation to prevent damage due to floods and heatwaves.
- iv) Use of renewable and clean energy.

b) Importance of balanced diet :

Balanced diet is defined as the diet rich in carbohydrates, proteins, vitamins, fats, water and other inorganic minerals in balanced proportion. Its importance is as follows :

- i) A balanced diet provides all essential nutrients in proportional quantity.
- ii) It enables the person to perform all functions appropriately.
- iii) It enables healthy growth of mind, bones and muscles.
- iv) It ensures proper functioning of all organs and organ systems.

• Disorders associated with unbalanced diet :

- i) An unbalanced diet with less protein and iron content causes muscle degeneration and anemia.
- ii) An unbalanced diet with more fats and carbohydrates lead to obesity.
- iii) It results in hair loss, ageing of skin, fatigue etc.

c) Strata and Functions of Atmosphere :

Following are the major strata and functions of atmosphere :

i) Troposphere :

- It ranges from 10-15 km with a temperature range from $+15^{\circ}\text{C}$ to -56°C .
- It sustains life i.e. contains gases for photosynthesis (CO_2), respiration (O_2), protein synthesis (N_2) etc.
- It regulates weather as weather is tropospheric phenomena.

ii) Stratosphere :

- It ranges from 15-55 km with a temperature range from -56°C to -2°C .
- It contains ozone which protects all life from harmful UV-radiations.

iii) Mesosphere :

- It ranges from 55-85 km with a temperature range from -2°C to -100°C .
- It is the coldest layer of atmosphere.
- In it, meteoroids disintegrate.

Date: _____

Day: _____

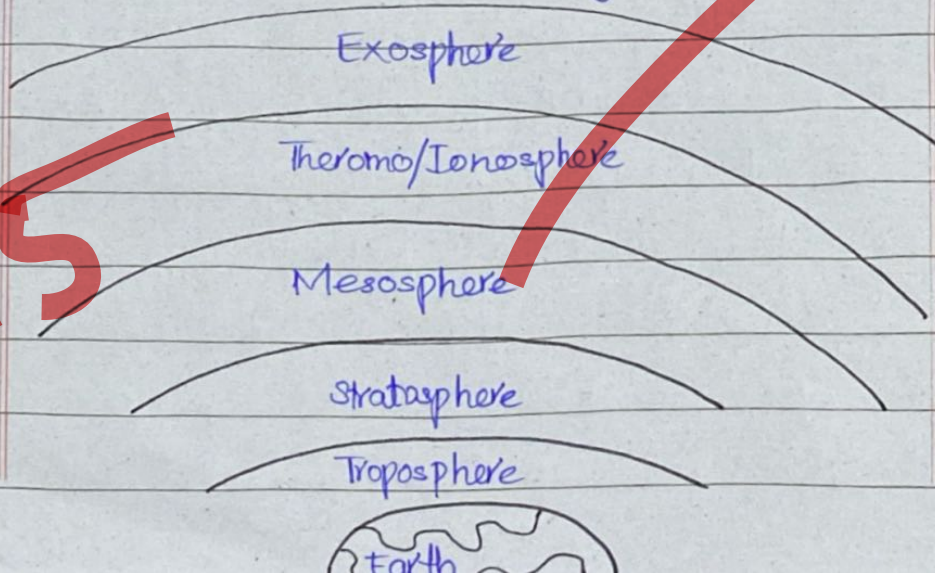
- It ensures communication through radiowaves, also ensuring long-distance communication through GPS, satellites.

iv) Thermosphere / Ionosphere :

- It ranges from 85 - 500 km with temperature ranging from -100°C to $+1500^{\circ}\text{C}$.
- It is the hottest layer of atmosphere.
- It is where the molecular ions exist which direct electric and magnetic fields to Earth's polar regions leading to aurora formation.

v) Exosphere :

- It is the outermost layer of atmosphere containing space.
- It is here that satellites revolve and orbit Earth, enabling communication.



d) SWM :

SWM stands for "Solid Waste Management". It is defined as the techniques and procedures to manage Earth's solid or semi-solid waste effectively so that it does not harm the environment. It classifies waste on the basis of:

- Source : biological waste, industrial waste, chemical waste, construction waste, household waste etc.
- Nature : hazardous waste and non-hazardous waste based on its effect on surroundings.
- Available disposal methods :

i) Landfills :

It involves digging out land and putting waste into it by packing into big polythene bags. The waste, then, is layered one above the other and a system of gas (CO_2 , CH_4) collection is attached.

This process takes a lot of time to decompose waste, hence, is not

much preferred.

ii) Incineration :

It is a process of breaking down waste into smaller elements which can be easily decomposed by giving thermal treatment in an incinerator. The waste, in it, is broken down in 2 steps :

- Pyrolysis : First step involves breaking down waste in absence of oxygen.
- Combustion : Second step involves breaking down waste in presence of oxygen.

In both steps, heat, CO_2 and CH_4 is generated.

iii) Composting :

It is a process in which waste is treated in the presence of air to form a green compost - used as green fertilizer - CH_4 and heat.

iv) 3R Method :

In this method, waste production is lessened, instead of only

Date: _____

Day: _____

treatment, in 3 ways:

- Reduce : By reducing the use of raw material i.e. rubber, plastic.
- Reuse : By using again and again those substances which can be reused i.e. cans, plastic bottles, paper.
- Recycle : By recycling or reprocessing waste to generate new products i.e. paper can be recycled 5 times.

3-5