Index

S. No.	Name of the Experiment	Page No.	Date of Experiment	Date of Submission	Remarks
01.	Environmental Studies				
02.	Water pollution				
03.	Soil pollution				
04	Air pollution				
05	Noise pollution				
06.	Radioactive pollution				
07.	Renewable Sources of Energy.				

Date _____

Expt. No. 01. Page No. 01.

Environment → The word Environment is taken from the french word 'Environ' which means 'Surrounding'. Our Surrounding includes biotic factors like human beings, plants, animals, microbes etc. and abiotic factors such as light, air, water, soil, etc. Thus, environment is sum of our Surroundings and their present condition. It supports life on the earth. The air we breath, the water we drink and the food we eat - all come from our environment. Therefore, the knowledge of our Surroundings is essential to know what exists naturally and what has been changed by human beings.

Components of Environment:→ Our Surroundings Can be diuided into two main components - natural and man-made. The natural environment is further Subdiuided into physical and biological components. It is also known as abiotic and biotic component.

Teacher's Signature _____

Date

Expt. No.

(i) Abiotic components :→ It includes abiotic factors like mountains, plains, Soils, Climate, Sunshine, rainfall, thunderstorms, earthquakes etc. it is also known as physical environment.

(ii) Biotic components → It consists of all living organisms, including bacteria. All types of plants, animals and human beings form the biological environment, also known as the biotic component.

Atmosphere → Atmosphere is the thin blanket of air around the earth. it has several layers and is very dynamic in nature. Air is a mixture of gases. The two main gases of the atmosphere are Nitrogen and oxygen.

Layers of atmosphere → There are five layers of atmosphere.

(i) Troposphere
(ii) Stratosphere
(iii) Mesosphere
(iv) Thermosphere
(v) Exosphere.

Teacher's Signature

Expt. No. _____ Date _____

(i) Troposphere → This is the lowermost layer of the atmosphere. It extends from the earth's surface upto about 15 km. within this range, the temperature of the air decreases at the rate of 1°C for every 165 m of ascent. The upper boundary of the troposphere is called the tropopause.

(ii) Stratosphere → This layer lies above troposphere and extends upto about 50 km from the surface of earth. There are no clouds and partically no water vapour or dust particles in this layer. The temperature in this layer rises from about -60°C at the base to about 0°C at the top.

(iii) Mesosphere → It extends from 50 km to 80 km above the surface of earth. Here the temp. again begins to drop and reaches -100°C at the layer's upper boundary, which is known as the mesosphere.

(iv) Thermosphere → It extends from the top of the mesosphere beyond 80 km upto about 640 km. In this layer, temperature increases with height and reaches about 1700°C.

Teacher's Signature _____

Date _____

Expt. No. _____ Page No. 04

(v) Exosphere → Exosphere is the uppermost layer of the atmosphere. It is very difficult to fix a boundary b/w thermosphere and exosphere. Beyond 640 km height, the atmosphere becomes rarefied. It reaches limit at 1500 km.

Greenhouse effect and global warming.

The Green house effect is a naturally process that warms the Earth's Surface. When the Sun's energy reaches the earth's atmosphere, Some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse effect.

Global warming → Global warming is the long term heating of Earth's climate System observerbed Since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases that-trapping greenhouse gas levels in Earth's atmosphere.

Teacher's Signature _____

Date

Expt. No.

Page No. 05

Ozone layer earth's protective layer. umbrella.

Ozone layer in the upper atmosphere is considered to be earth's protective umbrella. The ozone layer acts as a filter for the shorter wavelength and highly hazardous ultraviolet radiation from the Sun, protecting life on earth.

Depletion of ozone layer → Ozone layer depletion is the thinning of the ozone layer present in the upper atmosphere. This happens when the chlorine and bromine atoms in the atmosphere come in contact with ozone and destroy the ozone molecules. one Chlorine can destroy 100,000 molecules of ozone. It is destroyed more quickly than it is created.

Consequences of ozone depletion → Ozone layer depletion causes increased ultraviolet radiation levels at the Earth's Surface, which is damaging to human health. Negative effects include increases in certain types of skin Cancers, eye cataracts and immune deficiency disorders.

Teacher's Signature

Date

Expt. No.

WATER POLLUTION

Introduction:-
Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifiers and groundwater. Water pollution results when contaminants are introduced into the natural environment.

Sources of water pollution → There are many causes for water pollution but two general categories exist: direct and indirect contaminant sources.

Direct sources include effluent outfalls from factories, refinaries, waste treatment plants etc. that emit fluids of varying quality directly into urban water supplies. In the united states and other countries these practices are regulated, although this doesn't mean that pollutants can't be found in these waters.

Teacher's Signature

Date

Expt. No.

Indirect sources include contaminants that enter the water supply from soils/ groundwater systems and from the atmosphere via rain water. Soils and groundwaters contain the residue of human agricultural practises (fertilizers) and improperly disposed of industrial wastes.

Contaminants can be broadly classified into organic, inorganic, radioactive and acid/ base. Examples from each class and their potential sources are too numerous to discuss here.

Effects of water pollution → The effects of water pollution are varied. They include poisonous drinking water, poisonous food animals (due to these organisms having bioaccumulated toxins from the environment over their life spans), unbalanced river and lake ecosystems that can no longer support full biological diversity, deforestation from acid rain and many others effects. These effects are of cource, specific to the various contaminants.

Teacher's Signature

Date

Expt. No.

Control of water pollution :→ The following ways that we can do control the water pollution :→

(i) Use less plastic :→ It is very difficult to break down plastic after it is produced. plastic waste also spreads decay in the water supply.

(ii) Cleaning chemicals → Cleaning chemicals are hazardous when they enter the water supply.

(iii) Do not Throw Away Medicines → Never throw away medicines in the water supply.

(iv) limit the use of Detergents and Bleaches

(v) Use Phosphate-free Detergent

(vi) Use Environmentally friendly Detergents.

(vii) Gardening.

(viii) Join water conservation organizations.

(ix) Stop chemical pollution.

Teacher's Signature

Oxygen demanding waste

→ A second category of water pollutants is oxygen-demanding wastes; wastes that can be decomposed by oxygen requiring bacteria. When large populations of decomposing bacteria are converting these wastes it can deplete oxygen levels in the water. This causes other organisms in the water such as fish, to die.

Determination of dissolved oxygen.

The Winkler method uses titration to determine dissolved oxygen in the water sample. A simple bottle is filled completely with water (no air is left to skew the results). Dissolved oxygen analysis is best done in the field, as the sample will be less altered by atmospheric equilibration. The dissolved oxygen in the sample is then "fixed" by adding a series of reagents that form an acid point.

Teacher's Signature _____

Expt. No. _____ Date _____

Turbidity → Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspendended particulates. The more total suspended solids in the water, the murkier it seems and the higher the turbidity. Turbidity is considered as good measure of the quality of water.

PH → The PH of pure water (H_2O) is 7 at 25°C, but when exposed to the Carbon dioxide in the atmosphere this equilibrium results in a PH of approximately 5.2. Because of the water association of PH with atmospheric gases and temperature it is strongly recomdend that the water be tested as soon as possible.

BIOLOGICAL OXYGEN DEMAND.

Biological oxygen demand (BOD) represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose

Teacher's Signature _____

organic matter under aerobic (oxygen is present) conditions at a specified temperature.

When you look at water in a lake the one thing you don't see is oxygen. In a way, we think that water is the opposite of air, but the common lake or stream does contain small amounts of oxygen in the form of dissolved oxygen.

CHEMICAL OXYGEN DEMAND

In environmental chemistry, the Chemical oxygen demand (COD) is an indicative measure of the amount of oxygen that can be consumed by reactions in a measured solution. It is commonly expressed in mass of oxygen consumed over volume of solution which in S.I units is milligrams per litre (mg/l).

Date _____

Expt. No. _____ Page No. 12

SOIL POLLUTION

Introduction→ Soil pollution as part of land degradation is caused by the presence of xenobiotics (human made) chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste.

Composition of the Soil→ Soil is composed of both biotic - living and once-living things, like plants and insects - and abiotic materials - nonliving factors, like minerals, water, and soil air. Soil contains air, water and minerals as well as plant and animal matter both living and dead.

Soil is one of the most important elements of an ecosystem, and it contains both biotic and abiotic factors. The composition of abiotic factors is particularly important as it can impact the biotic factors.

Teacher's Signature _____

Date

Expt. No.

Types of Soil in India

(i) Alluvial Soil
(ii) Red soil
(iii) Black Soil
(iv) laterite Soil
(v) Desert / Arid Soil
(vi) peaty / Marshy Soil
(vii) Forest Soil
(viii) Mountain soil
(ix) Tarai Soil
(x) Saline And Alkaline Soil

Main Causes of Soil pollution

(i) Industrial Activity
(ii) Agricultural Activity
(iii) Waste Disposal
(iv) Accidental oil spills
(v) Acid rain
(vi) poisoning of the underground water table.

Effect of Soil pollution.

Teacher's Signature

Date

Expt. No.

Effect of Soil pollution

→ The contamination of soil has a major consequence on human health. Crops and plants that are grown on polluted soil absorb most of the pollution and then pass them to humans. living, working, or playing in contaminated soil can lead to respiratory diseases, skin, diseases, and other health problems.

Effects → Health effects, Effects on microorganisms effects on animals Effects on the fertility of plants etc.

Control of Soil pollution

→ Reducing Chemical fertilizer and pesticide use. Applying biofertilizers and manures can reduce Chemical fertilizer and pesticide use. Biological methods of pest control can also reduce the use of pesticides and there by minimize Soil pollution.

Teacher's Signature

Date

Expt. No.

AIR POLLUTION

Air pollution is a type of environmental pollution that effects the air and is usually caused by smoke or other harmful gases, mainly oxides of Carbon, Sulphur and nitrogen. In other words air pollution is the contamination of a substance which has a poisonous effect.

Introduction → Air pollution refers to the condition in which the existence of toxic substances in the atmosphere generated by various human activities and natural phenomena such as volcanic eruptions, results in damaging effects on the welfare of human beings and the living environment.

Composition of air → The air in Earth's atmosphere is made up of approximately 78% nitrogen and 21% oxygen. Air also has small amounts of lots of other gases, too, such as Carbon dioxide, neon, and hydrogen.

Teacher's Signature

Date _____

Expt. No. _____ Page No. 16

Causes of air pollution

→ Air pollution is caused by solid and liquid particles and certain gases that are suspended in the air. These particles and gases can come from car and truck exhaust, factories, dust, pollen, mold spores, volcanoes and wildfires.

Air pollution causes

↓ (Natural)
- volcano
- forest fire

(Natural)

↓ (man-made)
- factories
- vehicales
- Burning of wood, cow dung etc. (~~Natural~~)

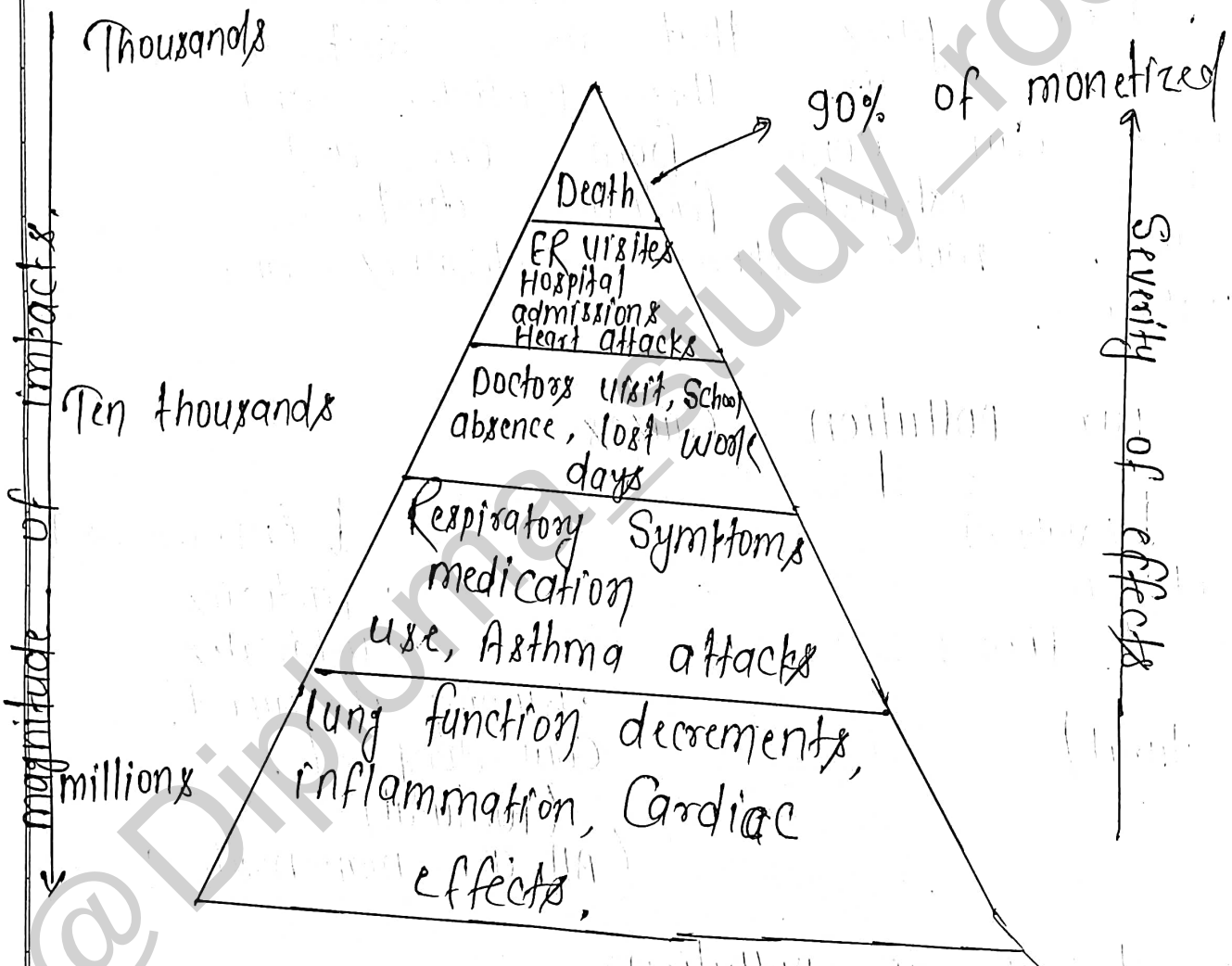
(All are man-made)

Effect of air pollution

→ long-term health effects from air pollution include heart disease, lung cancer and respiratory diseases such as emphysema. Air pollution can also cause long-term damage to

Teacher's Signature _____

A "paramid of Effects" from air pollution:



people's nerves, brain, kidneys, liver, and other organs.

PRIMARY AND Secondary POLLUTANTS.

Primary air pollutants → pollutants that are formed and emitted directly from particular Sources. Examples are particulates, Carbon monoxide, nitrogen oxide, and Sulphur oxide.

Secondary air pollutants → pollutants that are formed in the lower atmosphere by Chemical reactions.

AIR POLLUTION CONTROL

→ Air pollution control, the techniques employed to reduce or eliminate the emission into the atmosphere of Substances that Can harm the environment or human health. The control of air pollution is one of the principal areas of pollution control, along with Waste-water treatment, Solid-waste management and hazardous-waste management.

Teacher's Signature _____

Date

Page No. 18

Expt. No.

Acid rain → Acid rain is Caused by a chemical reactions that begins when compounds like Sulphur dioxide and nitrogen oxides are released into the air. These Substances Can rise very high into the atmosphere, where they mix and react with water, oxygen and other chemicals to form more acidic pollutants, known as acid rain.

Harmful effects of acid rain

→ Effects of Acid rain on plants and Trees Dead or dying trees are a common Sight in areas effected by acid rain. Acid rain leaches dluminium from the Soil. That aluminium may be harmful to plants as well as animals. Acid rain also removes minerals and nutrients from the Soil that trees need to grow.

Teacher's Signature

Date

Expt. No. Page No. 19.

Smog and its kind.

→ At least two distinct types of Smog are recognized: Sulphurous smog and photochemical Smog. Sulfurous Smog, which is also called "London Smog," results from a high concentration of Sulfur oxides in the air and is caused by the use of Sulfur bearing fossil fuels, particularly Coal.

Difference b/w classical Smog and photochemical Smog.

classical Smog → classical Smog is a mixture of Sulphur dioxide and Coal Smoke with fog.

photochemical Smog → photo chemical Smog is a precipitate in the reaction of the nitrogen oxide and other Chemical compounds in Sunlight.

Teacher's Signature

Date

Expt. No. Page No. 20

NOISE POLLUTION

Noise pollution, also known as environmental noise or Sound pollution, is the propagation of noise pollution with ranging impacts on the activity of human or animal life, most of them harmful to a degree. ...
High noise levels can contribute to Cordiovascular effects in human and an increased incidence of Coronary artery disease.

Causes of noise pollution

→ The Source of outdoor noise worldwide is mainly Caused by machines, transport, and propagation Systems. poor urban planning may give rise to noise disitegration or pollution, Side-by-Side industrial and residential buildings can result in noise pollution in the residential areas.

Teacher's Signature

Expt. No. _____ Date _____

6 Radioactive pollution

Summary → The Radioactive pollution is defined as the physical pollution of living organisms and their environment as a result of release of radioactive Substances into the environment during nuclear explosions and testing of nuclear weapons, nuclear weapon production and decommissioning, mining of radioactive ores, handling and disposal of radioactive wastes, and accident at nuclear power points.

Introduction → Radioactive pollution refers to the release of ionizing radiation into the environment as a result of human activity. In Shorts, it's the form of radiation that's commonly thought of as being high energy and thus harmful to living things. Ionizing radiation includes X-rays and gamma rays.

Teacher's Signature _____

Date _____

Expt. No. _____ Page No. 23.

kind of radiation

→ There are four major types of radiation:

(i) alpha
(ii) Beta
(iii) neutrons
(iv) electromagnective wave. Such as gamma rays.

They different in mass, energy and how deeply they penetrate people and objects.

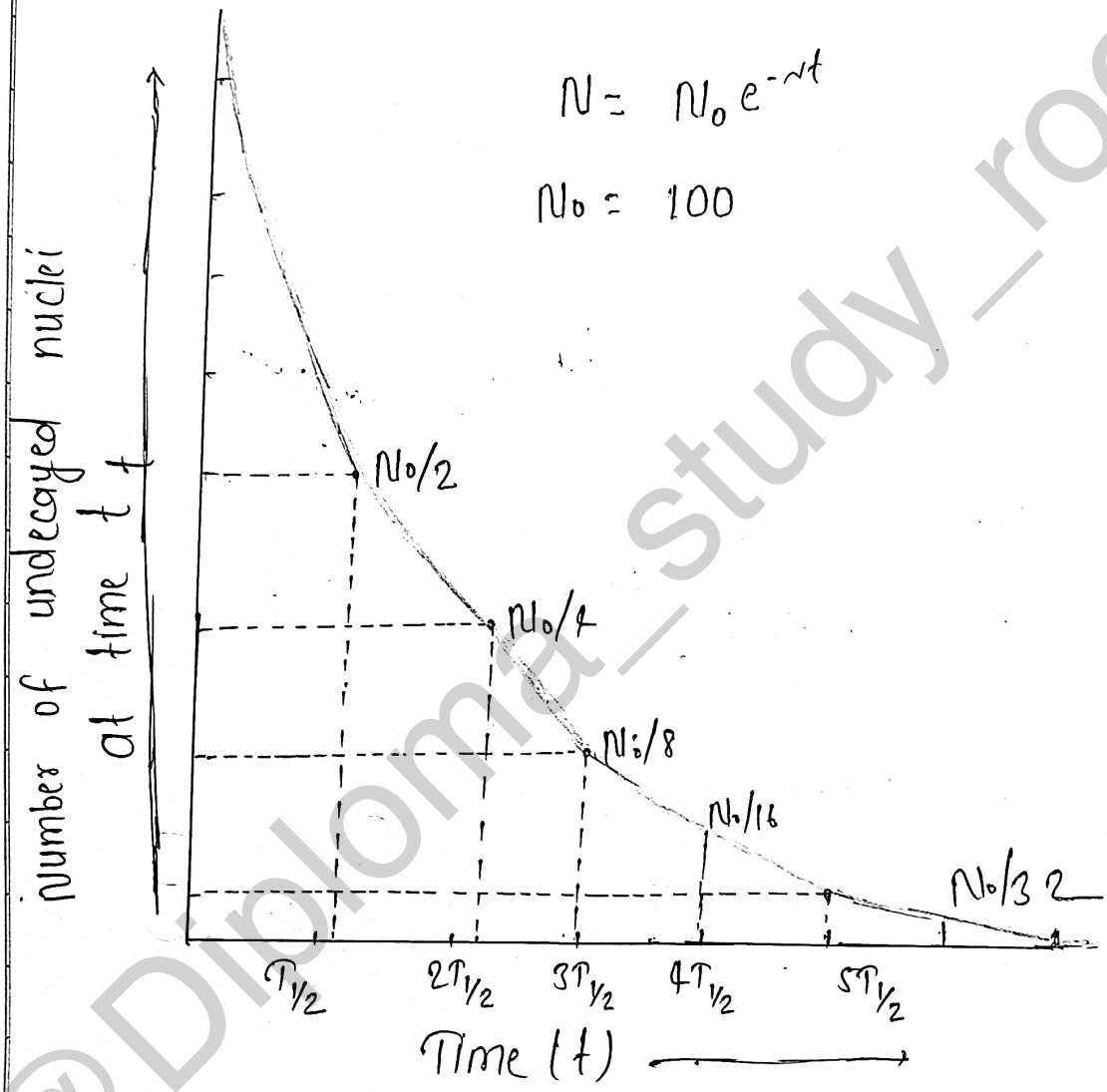
law of Radioactive decay

→ The radioactive decay law states that "The probability per unit time that a nucleus will decay is a constant, independent of time". It is represented by λ (lambda) and is called decay constant.

i.e,

$$\frac{dN}{dt} \propto N$$

Teacher's Signature _____



Decay curve for a radioactive element.

$$\frac{dN}{dt} = -\lambda N$$

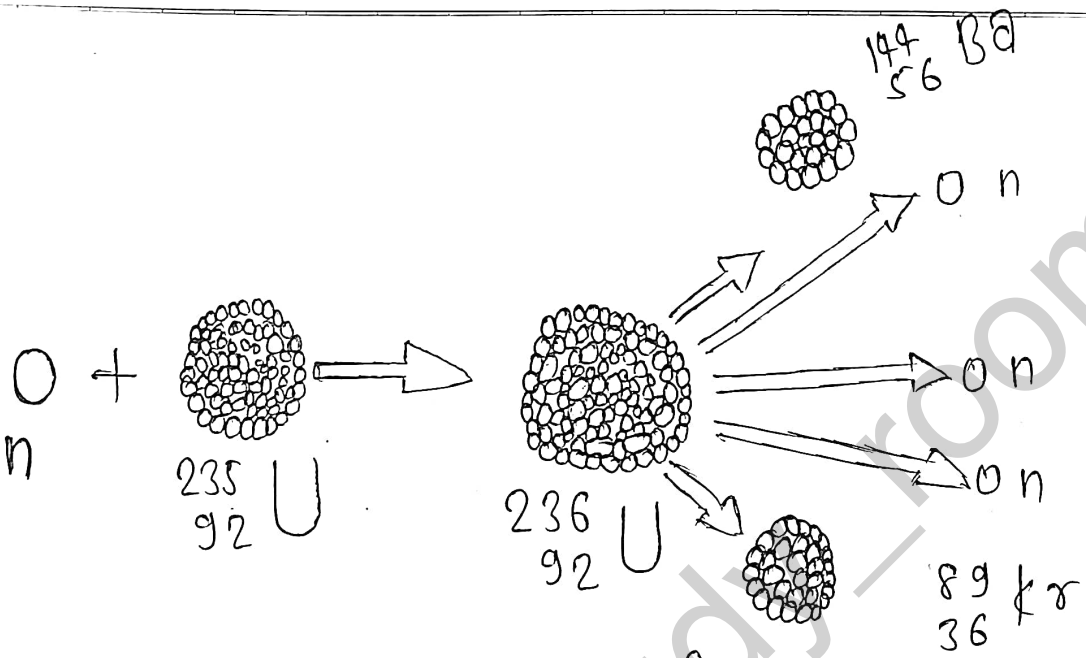
Where, N = Number of undisintegrated nuclei present in the Sample at any instant t and $\frac{dN}{dt}$ is rate of disintegration.

The required plot is shown in previous page.

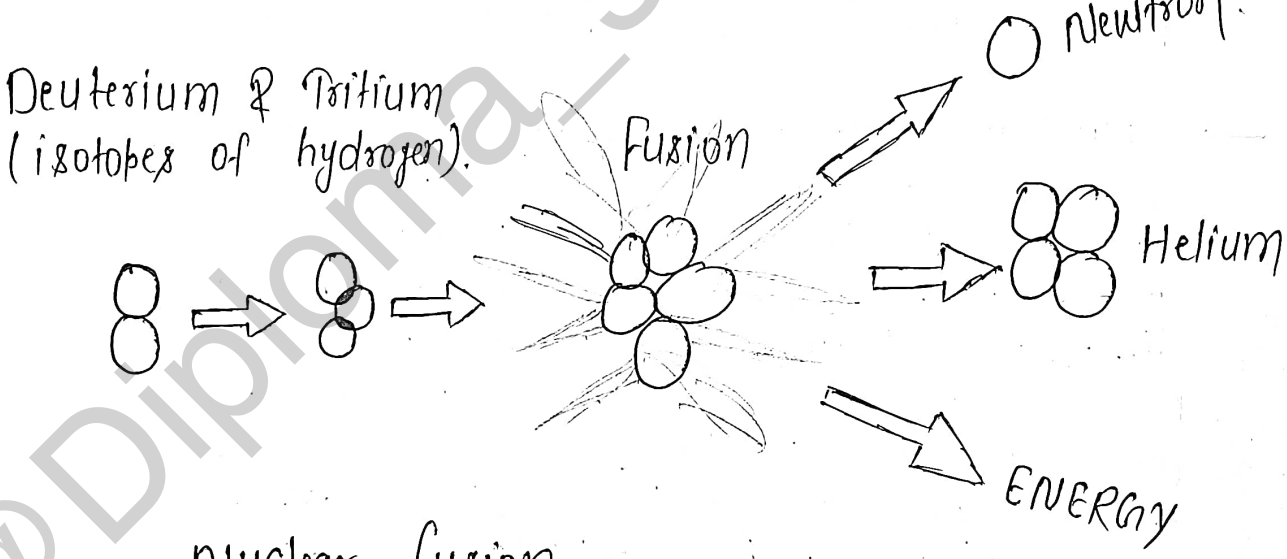
Mass defect and binding energy

→ Nuclear binding energy is the energy required to split an atom's nucleus into protons and neutrons. Mass defect is the difference between the predicted mass and the actual mass of an atom's nucleus. The binding energy of a System Can appear as extra mass, which accounts for this difference.

Teacher's Signature _____



Discovery of nuclear fission.



Nuclear fusion

Expt. No. _____ Date _____

Nuclear fission and fussion

Nuclear fission → Nuclear fission is a process where the nucleus of an atom is split into two or more smaller nuclei, known as fission products. The fission of heavy elements is an exothermic reaction, and huge amounts of energy are released in the process.

Nuclear fusion → Nuclear fusion is a reaction in which two or more atomic nuclei are combined to form one or more different atomic nuclei and subatomic particles (neutrons or proton). The difference in mass b/w the reactants and products is manifested as either the release or the absorption of energy.

Harmful effects of radiation → Radiation damages your intestines and stomach, blood vessels, and bone marrow, which makes blood cell.

Teacher's Signature _____

Expt. No. _____ Date _____

Page No. _____

7 Renewable Sources energy.

Introduction to Solar energy

→ Solar energy is the energy obtained by computering heat and light from the Sun. Energy from the Sun is referred to as Solar energy.

Active Solar → Active Solar techniques include the use of photovoltaic Systems, concentrated Solar power and Solar water heating to harness the energy.

passive Solar → passive Solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light-dispersing properties and designing Spaces that naturally Circular Circulate air.

Teacher's Signature _____

Expt. No. _____ Date _____

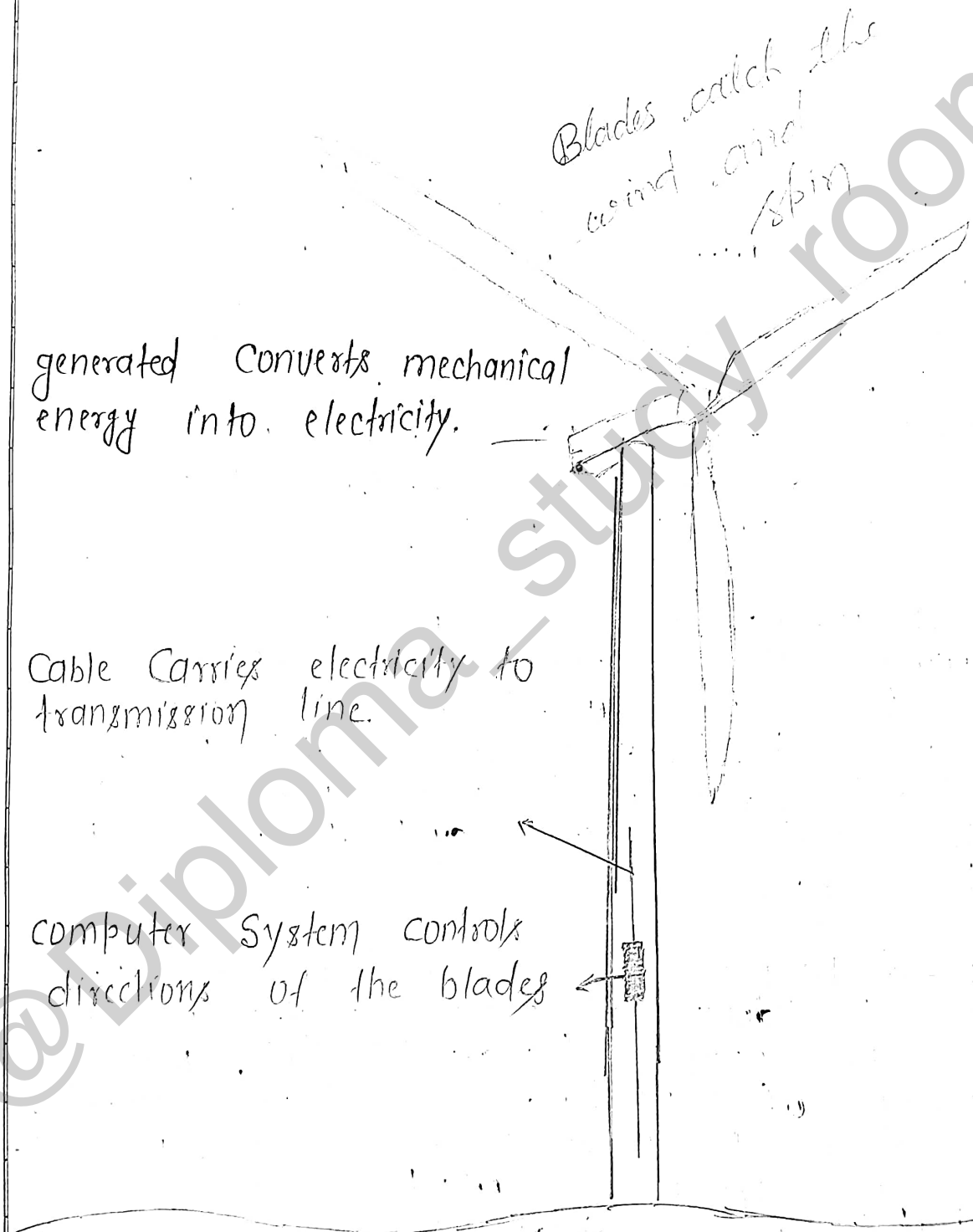
Page No. _____

Wind energy → Wind energy is a form of Solar energy. Wind energy (or wind power) describes the process by which wind is used to generate electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. Mechanical power can also be utilized directly for specific tasks such a pumping water.

Tidal energy → Tidal energy is a form of hydropower that converts energy obtained from tides into useful forms of power, such as electricity. Tides are created by the gravitational effect of the moon and the Sun on the earth causing cyclical movement of the seas.

Biogas → Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and Carbon dioxide. Biogas can be produced from raw materials such as agricultural waste, manure municipal waste, Sewage, etc.

Teacher's Signature _____



Expt. No. _____ Date _____

Effects of noise pollution

→ Exposure to prolonged or excessive noise has been shown to cause a range of health problems ranging from stress, poor concentration, productivity losses in the workplace and communication difficulties and fatigue from lack of sleep to more serious issue such as Cardiovascular disease, Cognitive impairement, tinnitus and hearing loss.

In 2011 the World Health Organization (WHO) released a report titled 'Burden of disease from environmental noise.' This Study collated data from various large-scale epidemiological studies of environmental noise in western Europe, collected over a 10-year period.

Teacher's Signature _____