

### Subjective part

(Q2) Pakistan is facing with deteriorated air quality. Explain the phenomenon, effects and give appropriate measures.

## 1- Introduction: Air Pollution

The WHO defines air pollution as the presence of materials in the air in such concentration which is harmful to man and his environment. Among all other types of pollution, one is air pollution. It is hampering the quality of life of individuals and their day to day activities are impacted because of air pollution.

## 2- Phenomena of Air pollution

Following points will explain the mechanism of air pollution:

### 2.1 Mechanism

Air is a dynamic system that absorbs pollutants from natural sources and manmade sources.

### 2.2 sources:

#### 2.2.1 Natural Sources:

It includes forests, volcanoes, wild fires, vegetation, winds, storms etc

#### 2.2.2 Artificial / Man made Sources:

Population expansions, industrialization, automobiles, urbanization etc.

### 2.3 Classification of pollutants

Air provides a natural sink for pollutants. If pollutants enter at faster rate in air,

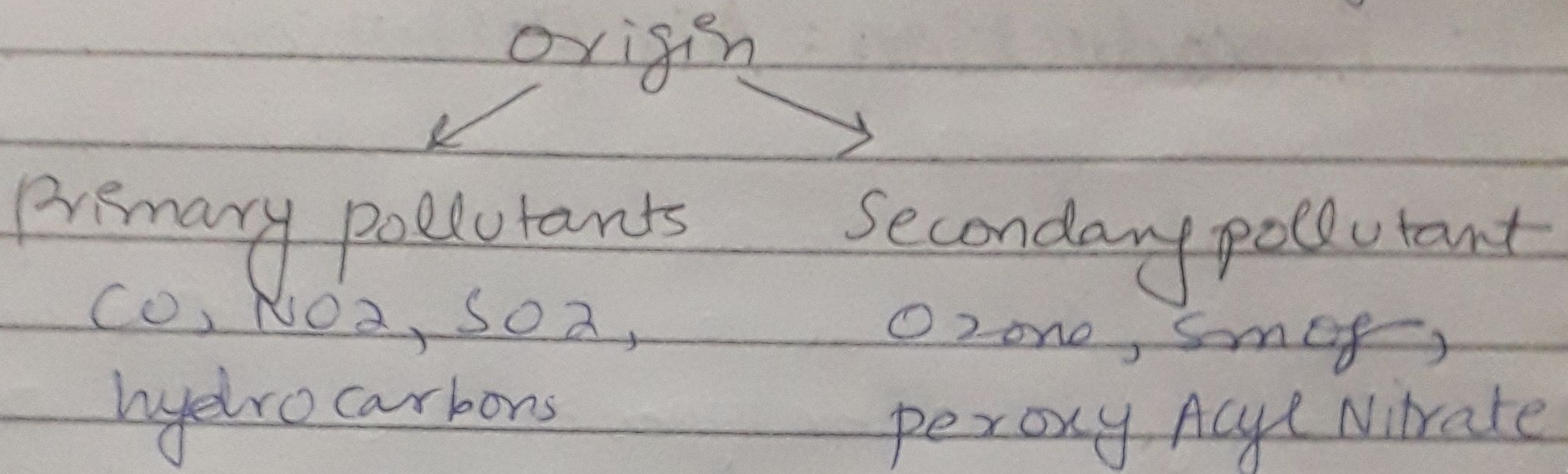


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these are accumulated in air and thus disturb the dynamic system of air.

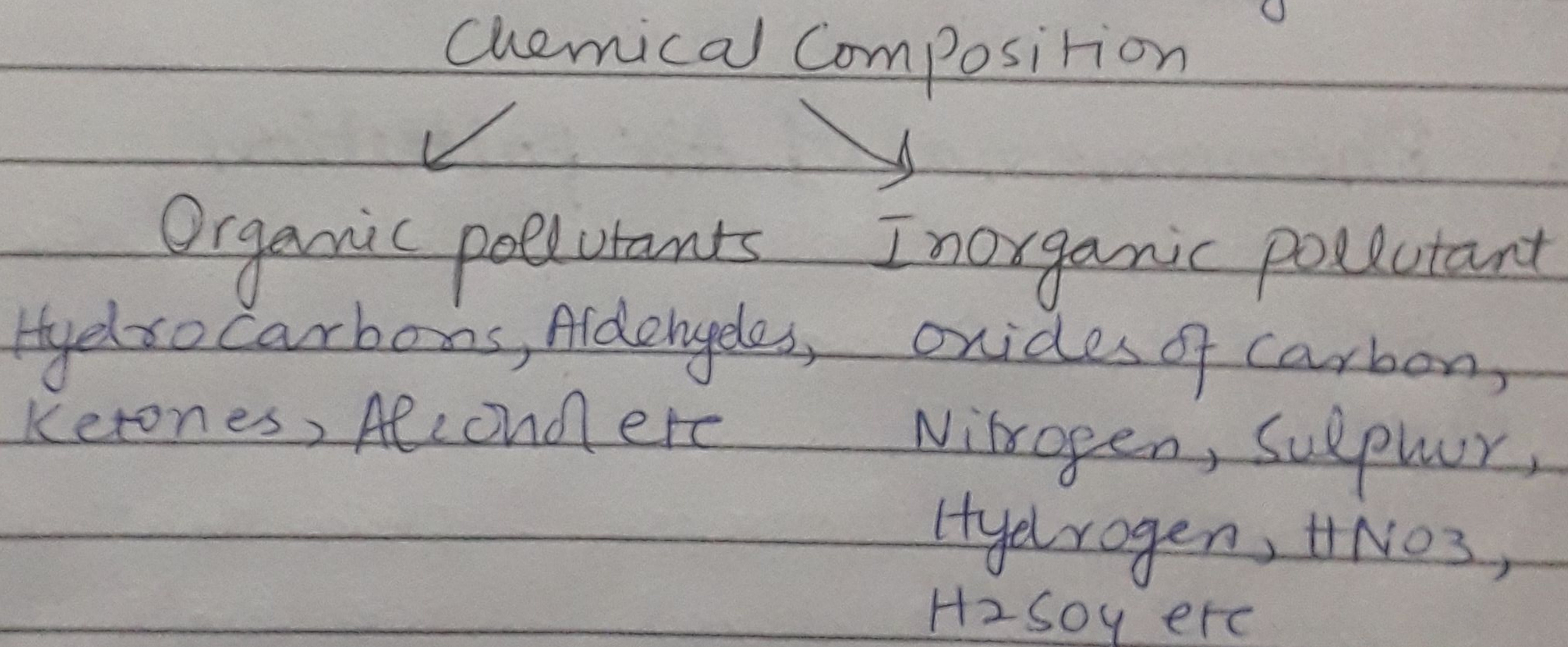
2.3.1 According to origin

It can be divided into two categories



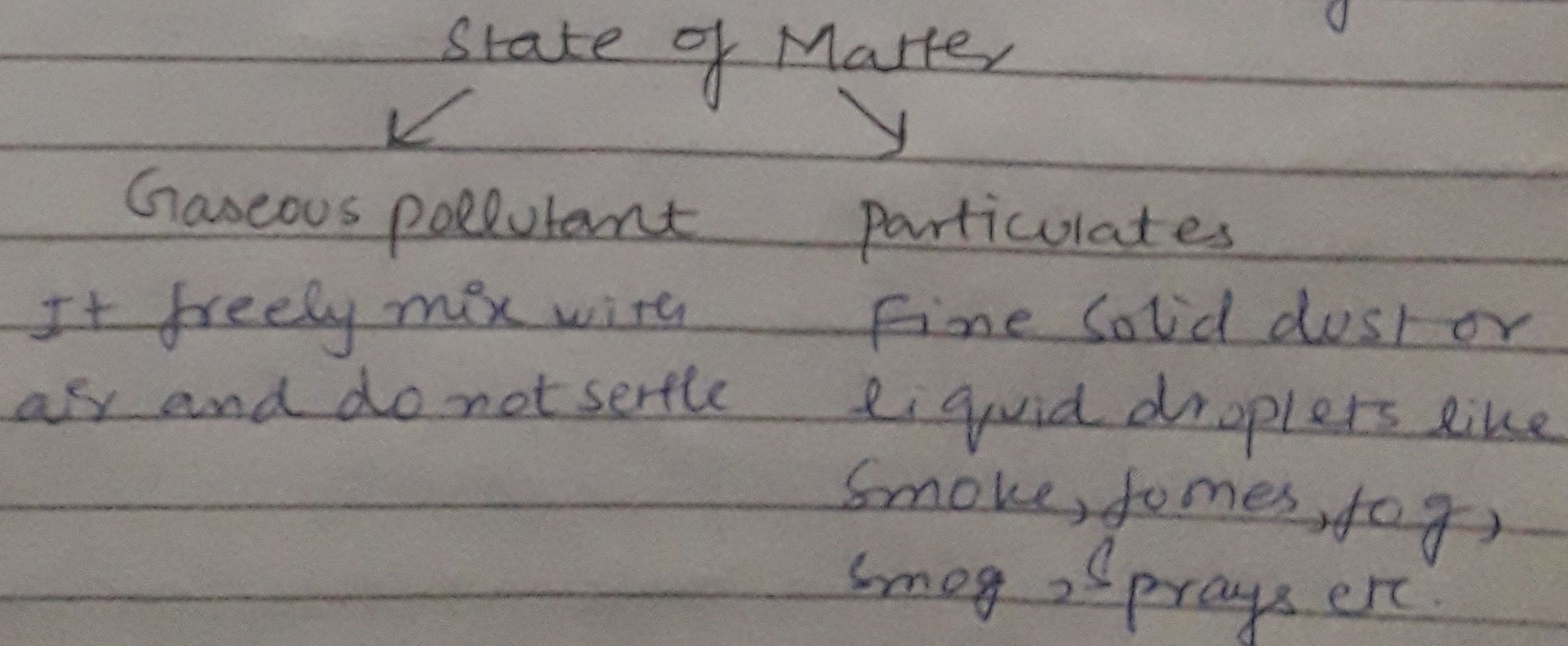
2.3.2 According to chemical composition:

It can be divided into two categories



2.3.3 According to the state of Matter.

It can be divided into two categories



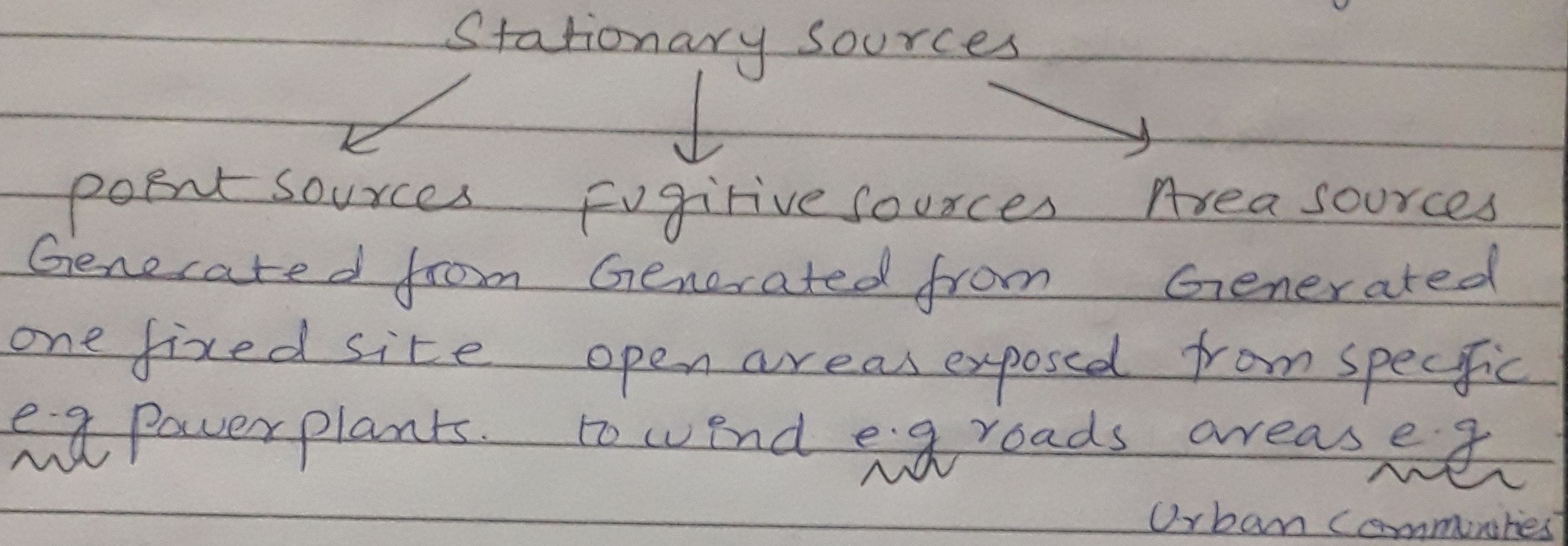


### 3- Sources of air pollution:

Sources of air pollution can be broadly categorized in two categories

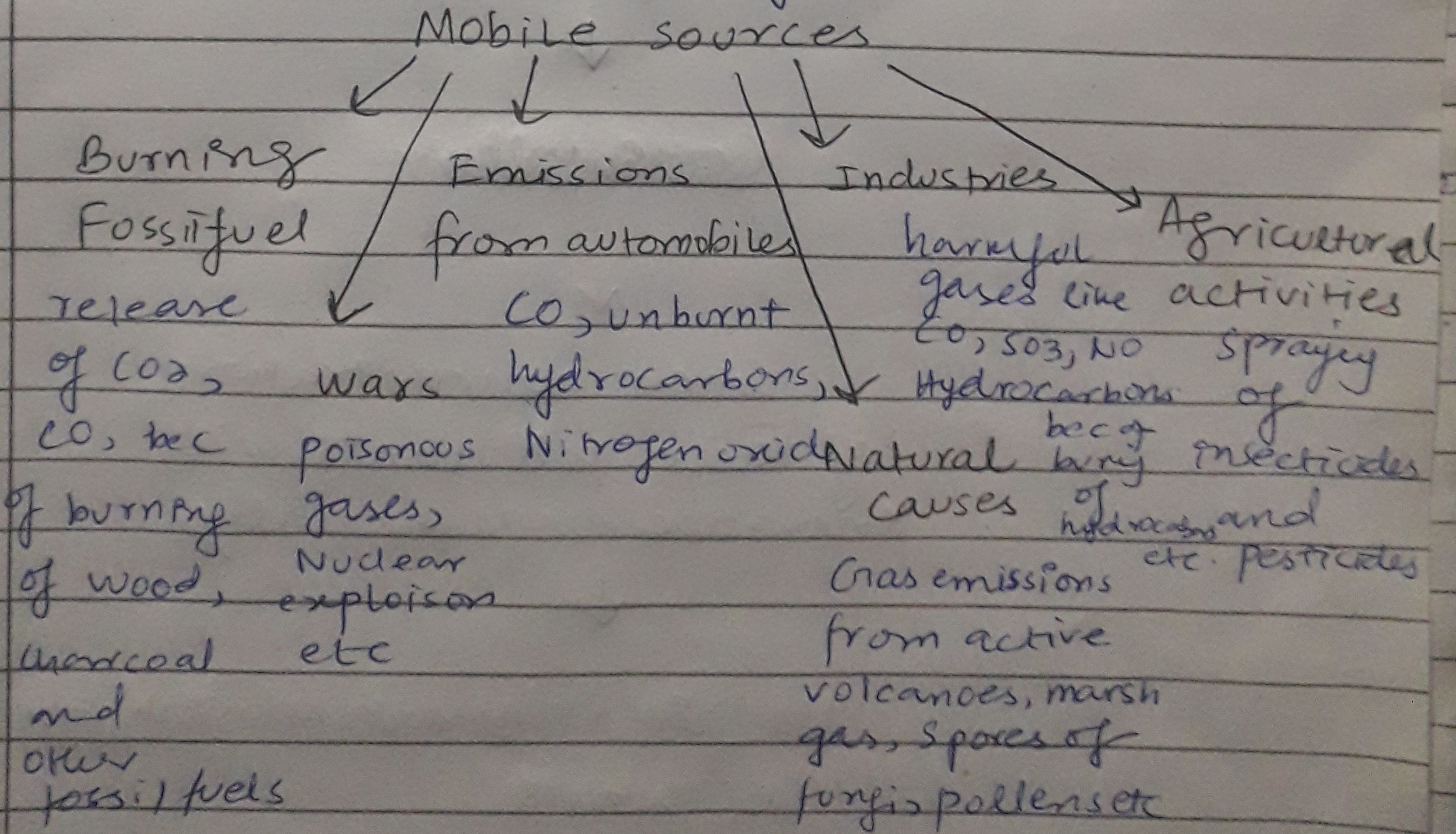
#### 3.1 Stationary Sources:

It can be divided into three categories.



#### 3.2 Mobile Sources:

It includes non-stationary sources such as automobiles, trucks, aircraft etc.





#### 4- Air Toxics:

Air toxics are those pollutants known or suspected to cause cancer and other serious health problems after either long-term or short exposure. These cause respiratory, neurological and reproductive diseases.

Examples

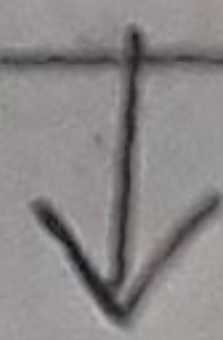
- H<sub>2</sub>S
- HF
- Mercury
- Benzene
- Arcolein etc.

#### 5- Process:

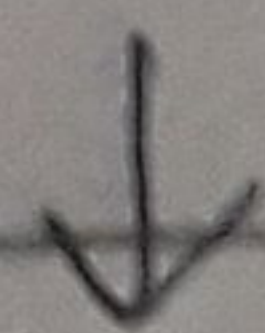
These all air pollutants  
from different sources



Comes in air



When concentration  
of these pollutants will  
increase exponentially



As air is a natural sink for  
pollutants



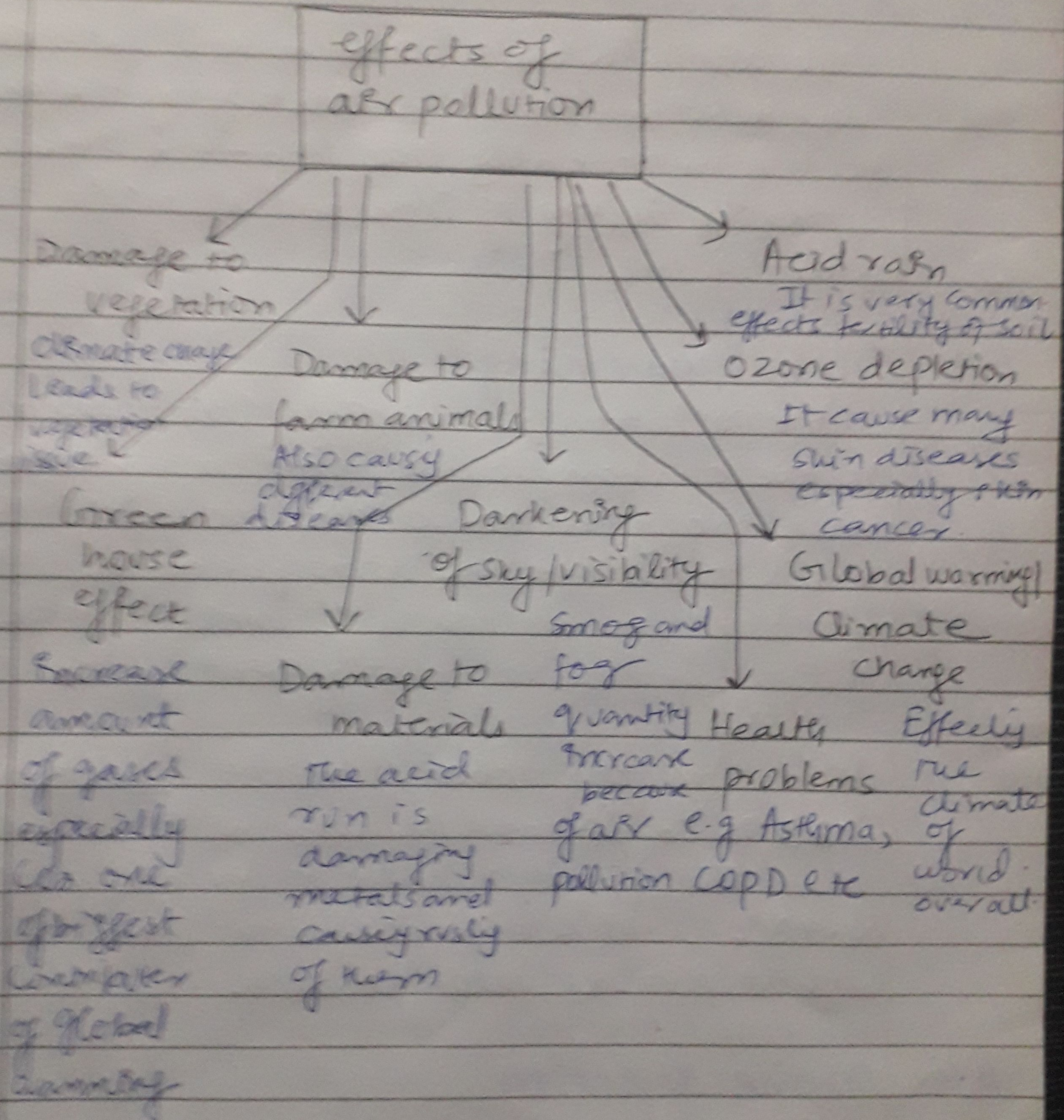
Stayed for long time. Deteriorates  
air quality

↓  
Air Pollution



## 6- Effects of Air pollution:

Air pollution has a negative impact on humans and their environment.



## 6.1 Health Problems:

The deteriorated air quality is causing various diseases to humans. e.g. Asthma, COPD, pollen allergy.



According to air pollution and Asthma organization 40 percent or more than 40 percent are suffering from asthma.

## 6.2 Acid Rain

The air pollutants when mixed with rain cause acid rain. It is destroying the environment. Acid rain generally has 4.2-4.4 pH which is causing rusting of iron and also affecting fertility of soil.

## 6.3 Global warming

Air pollution is causing global warming. As the carbon dioxide and many other gases are green house are preventing these gases to escape the atmosphere. Results in global warming which is melting the glaciers and entrapment of heat in the atmosphere of Earth.

According to Global Climate Report 2023 2023 is confirmed as warmest calendar year. The global average temperature of  $14.98^{\circ}\text{C}$ ,  $0.17^{\circ}\text{C}$  higher than the previous highest annual value in 2016.

## 6.4 Ozone depletion

Ozone depletion is occurring because of the air pollution. It is causing various diseases e.g. skin cancer. In 2023 Antarctic ozone hole has had an erratic behaviour. In September 2023, it became sixth largest ozone hole ever observed. In Australia the skin disease is prevalent.



## 6.5 Green house effect:

The green house gases are causing green house effects. They are entrapping heat in the atmosphere of earth causing global warming. CO<sub>2</sub> is one of the leading contributors in the green house effect. According to the Green house gas emission report approximately 53.8 billion metric tons of CO<sub>2</sub> was recorded in 2022.

## 6.6 Damage to vegetation

The air pollution has resulted in acid rain. It is impacting the fertility of the soil. 57% of the habitats of world was covered by forest. Almost about 6 billion. Now only 4 billion are left.

## 7 Appropriate Measures for controlling air pollution:

Following are the measures to be taken for controlling the air pollution

### 7.1 Treatment of Industrial/factory exhaust

There is a special technique done to treat the industrial exhaust. Consists of various step. At the end all the undesirable hydrocarbon and gases would be separated.

### 7.2 Treatment of Automobile exhaust

Following measures can be taken to do this.

7.2.1 By maximizing use of unleaded fuel



- 7.2.2 By using hybrid technologies
- 7.2.3 By using green fuels
- 7.2.4 By catalytic conversions (oxidation + reduction) in a combustion chamber in two stages.

### 7.3 Modification of process:

Use of modified applications e.g. use of exhaust hoods to avoid accumulation of particulate gases and dust.

### 7.4 Avoid use of crackers

Avoid use of any form of crackers for ceremonies. This releases particulate gases in air. So avoid it.

### 7.5 Using public transport

Instead of travelling in individual cars, public transport needs to be promoted in the cities.

### 7.6 LESS USE of Air conditioner

There must be less use of air conditioner or modified form of air conditioner should be used to avoid air pollution.

### Conclusion:

There is a lot of air pollution. It is alarmingly affecting the humans and their environment. Above mentioned measures are some of the measures to be taken to avoid the air pollution as much possible as one can.



Q Nos) Write short notes on any four of the following.

### 1. Food Insecurity:

According to Food and Agriculture organization of the United Nations is that "A person is food insecure when they lack regular access to enough safe and nutritious food for normal growth and development." There can be multiple reasons of food insecurity that can vary from poverty, environmental degradation, conflict and climate change.

### 2. Major Reasons of food insecurity:

Multiple reasons are responsible for food insecurity.

- Poverty
- Environmental degradation
- Climate change
- Wars or Conflicts
- Lack of affordable housing
- Chronic health condition
- Racism and discrimination

### 3. Effects of food insecurity:

- Physical health
- Mental health
- Well-being
- School and work

### 4. Measures:



#### 4.1 Prioritisation of food for public health over profits

It is the standard development goal 2.1 to end hunger and ensure access by all people to safe, nutrition and sufficient food all the year round.

#### 4.2 Modern advancement in agriculture sectors

There is a need of modern advancement in agricultural sector to increase the production of food.

#### 4.3 Reduce food waste and food loss:

preventive measures need to be taken to reduce the food waste and food loss

#### 4.4 Need to improve the economy

Every state needs to work on its economy to resolve the issues of food insecurity.

#### Conclusion:

Food insecurity is one of the major issues that needs to be resolved by taking the preventive measure to avoid food insecurity.



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## Wetlands

"A wetland is a distinct ecosystem that is flooded or saturated by water either permanently or seasonally." It is considered one of the most biologically diverse of all ecosystems, serving as a home to wide range of plant and animal species.

2

## Characteristics of wetland:

Following are the characteristics of the wetland

- Area of land that is either covered with water or saturated with water.
- wetland are transition zones. They are neither totally dry land nor totally underwater.
- The saturation of wetland soil determines the vegetation that surrounds it. wetland plants are called hydrophytes.
- Wetland exists in many kinds of climate

- It has various names.
  - mires
  - potholes
  - marshes
  - muskegs
  - sloughs
  - bogs
  - peatlands
  - fens
  - swamps



①

## 1 Ecological restoration

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.

## 2 How to restore ecology:

Ecological restoration seeks to initiate or accelerate ecosystem recovery.

- Restoration practitioners do not carry out the actual work of ecosystem recovery. Rather, they create the conditions needed for recovery so the plants and microorganisms/animals carry out the work of recovery.
- The goal of ecological restoration is to return a degraded ecosystem to its historical trajectory not its historic condition.

## 3 Ecological restoration is not suitable for conservation:

Biodiversity can be restored. But it's not a substitute for conservation. In reality, restoration may not succeed in re-establishing the full assemblage of native species or the full extent of the original ecosystem structure and function.



(6)

# 1 UNFCCC:

UNFCCC stands for United Nations Framework Convention on Climate Change. The convention has near universal membership (198 parties) and it is parent treaty of the 2015 Paris Agreement.

## 2 Points:

(Q1) It was adopted in 1992 with the ultimate aim of preventing dangerous human interference with climate system.

2.2 The 1997 Kyoto protocol and 2015 Paris Agreement build on the convention.

2.3 Every year, parties to the convention meet in Conference of the parties (COPs) as well as in technical meetings throughout the year.

(Q.3) Environmental issues can be tackled through environmental management and effective decision making. Discuss

## 1- Environmental Management System (EMS) 14000

### 1.1 Introduction:

An environmental management system helps organization identify, manage, monitor and control their environmental issues in a holistic



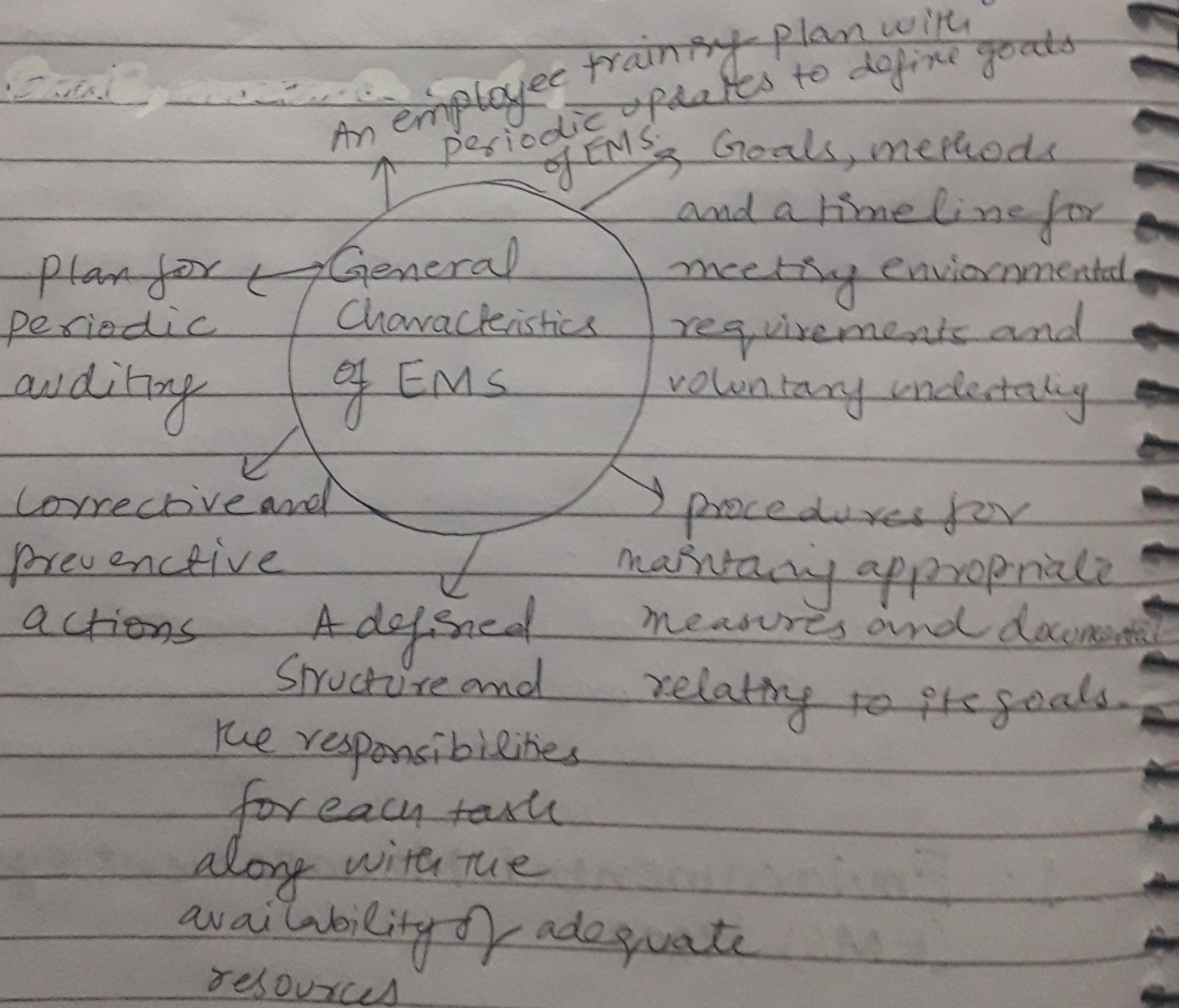
manner.

## 1.2 Tool for controlling the impacts of environment:

EMS is a tool that enables an organization of any size or type to control the impact of its activities, products or the services on the natural environment.

## 2 General Characteristics of EMS:

There are various characteristics of EMS





### 3 Formation of EMS:

EMS was formed by ISO in 1993, a technical Committee 207 on EMS to develop international standards for environmental management tools and systems.

### 4 ISO 14001 EMS Standard:

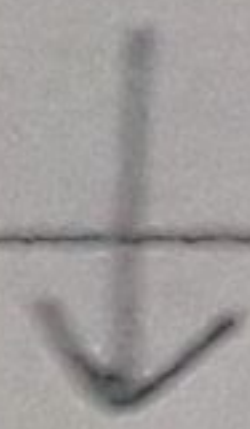
The key standard for EMS implementation and certification is ISO 14001 "Environmental management system". It is an internationally agreed standard. It helps the organizations improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of stakeholders.

### 5 Working of EMS:

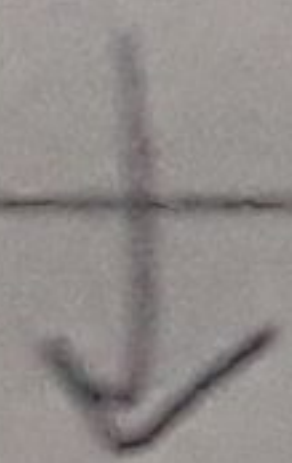
Environmental policy



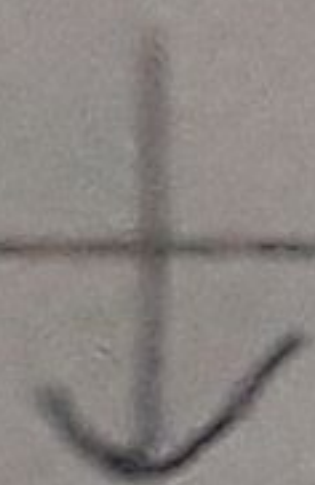
Planning



Implementation and operation



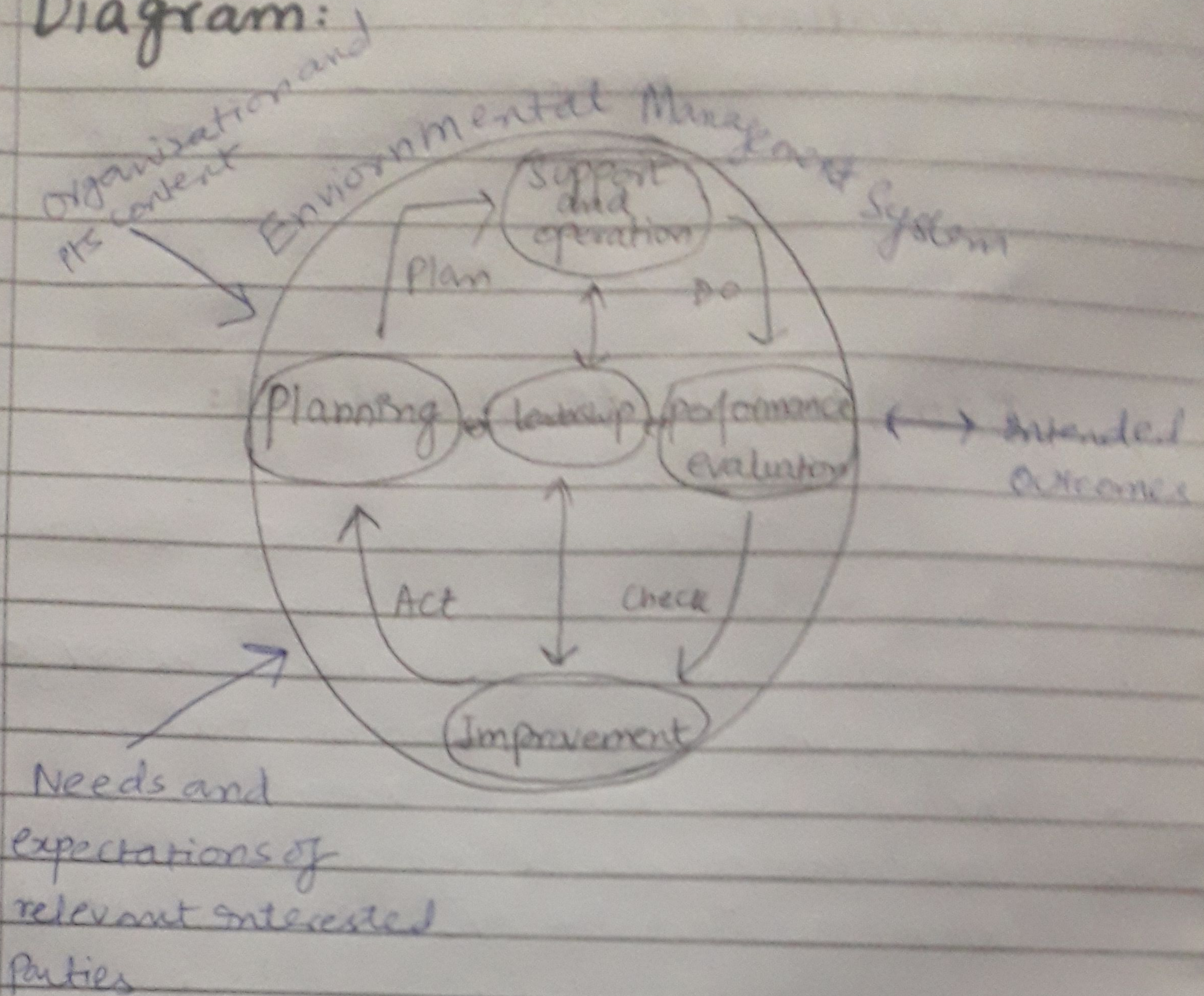
Checking and corrective action



Management review



## 6 Diagram:



## 7 Environmental Management approaches for tackling environmental problems:

### 7.1 participatory approaches to Environmental Management:

#### 7.1.1 Participation by feedback.

- Group discussion
- Public Debates
- Conferences
- Seminars
- Workshops
- Scientific exhibition
- Thematic events



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## 7.1.2 Participation by Consultation

- Aims to supply and acquire knowledge
- Advice
- Information
- Opinions
- Strategies

## 7.1.3 Participation by Negotiation

- Aims to reduce conflicts and to achieve a compromise.
- Dialogue between two or more people or parties.

## 7.1.4 Participation by Online Interaction

- Knowledge sharing
- Social media
- Visual communication
- exchanging and sharing ideas

## 7.2 Technological approaches to Environmental Management:

### 7.2.01 Design for Disassembly

- Sustainable approach
- Easy to disassemble and recycle
- decrease waste
- Preserve natural resources
- Avoided landfill



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## 7.2.2 Manufacturing for environment

- Improve ecological performance
- Using cleaner technologies
- Higher efficiency production techniques
- Minimise wastage of sources
- Supports/manufactures <sup>devices for</sup> renewable sources of energy to be utilized.

## 7.2.3 Total Quality Environmental management

- Ecologically efficient through put systems
- Minimise wastage
- pollution control

## 7.2.4 Industrial Ecosystem

- Ecological efficient use of systems
- Recycling

## 7.3 Technological approach for Environmental pollution

### 7.3.1 Air pollution Control Technique

A special instrument that passes through ten steps. Thus, separating the hydrocarbons so that air pollution can be lessened

### 7.3.2 prevention

prevention must be done. The best step can be done.



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### 7-3-3 Recycle

- The concept of recycle can reduce the waste.
- Minimize the landfill
- Prevents air and land, water pollution

### 7-3-4 Reuse

- It involves the conventional reuse.

### 7-3-4 Waste minimization

waste minimization should be done as much as possible

## 8 Conclusion:

Following steps under environmental management system and through debates, and by creating public awareness the environmental protection can be done, and pollution control can also be done.