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Read the question carefully and address exactly what is asked, avoiding unnecessary deviation.

QUESTION No 03

Start with a clear and relevant introduction that shows understanding of the topic.

DEFINITION: Eutrophication is defined as the process through which water bodies are filled with excess of nutrients making them as a dead zone.

Structure the answer logically: introduction, explanation/analysis, and a brief conclusion.

Use correct scientific terminology (e.g., biodiversity, sustainability, carbon cycle, eutrophication).

Explain concepts clearly and accurately, avoiding vague or generalized statements.

CAUSES OF EUTROPHICATION
1. Excess of Phosphorus in water bodies
2. Fertilizers run off in water bodies

Support answers with relevant examples, preferably from Pakistan or global case studies where appropriate.

Include data, statistics, or facts (e.g., temperature rise, deforestation rates) when relevant to strengthen arguments.

TYPES OF EUTROPHICATION
is mainly of two types
a) Natural
b) Man made

Incorporate environmental laws, agreements, or protocols (e.g., Paris Agreement, Kyoto Protocol, SDGs) where applicable.

a- NATURAL EUTROPHICATION
It refers to the natural process of water bodies over time. It is a slow process.

Show cause-and-effect relationships in environmental processes.

Focus on analysis and application rather than rote definitions.

Present balanced views by mentioning impacts,

b- ANTHROPOGENIC EUTROPHICATION

It is caused by human activities like fertilizers run off and human or household waste discharged in to water bodies. It is fast process compared to natural eutrophication.

PROCESS OF EUTROPHICATION

Eutrophication occurs in various steps:

1- Fertilizers run off and household waste containing nitrates and phosphates enter the water bodies.

2- Nutrients are utilized by the algae and algal growth occurs with rapid phase.

3- Algal growth spreads to the upper parts of the water body.

4- Algal growth hampers the sunlight to enter the water body.

5- Due to the lack of sunlight, organisms at the bottom of water body starts to die.

6- Ultimately, the debris and the dead plants fill the water body making it dead zone.

Eutrophication leads to dying of water bodies like ponds, lakes

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and streams etc.

Household waste / Fertilisers

↓
 PO_4 / NO_3 enters water bodies

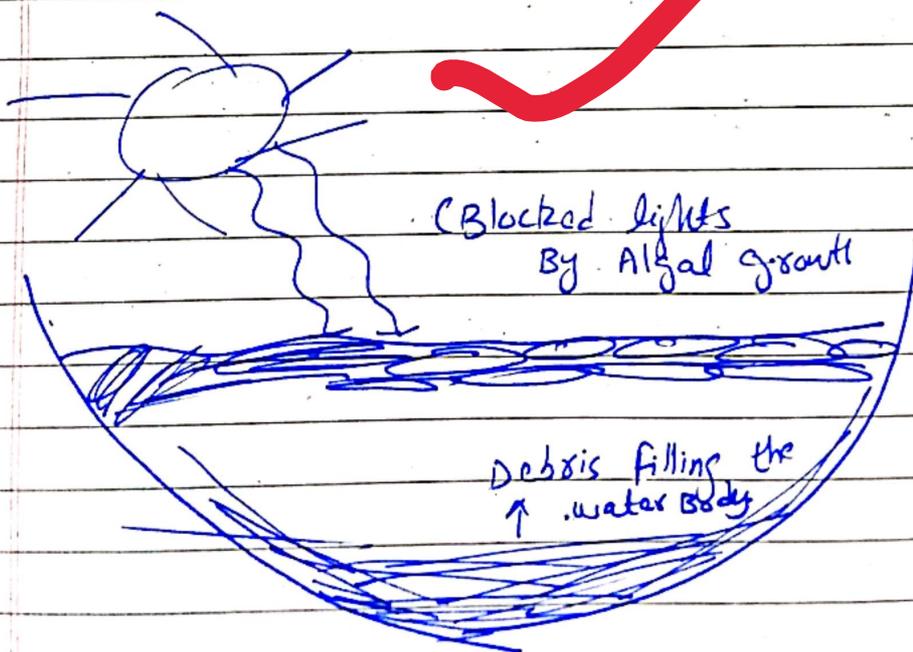
↓
Excessive Algal Growth due to Nutrients

↓
Blocking of sunlight

↓
Dead of plants

↓
Debris accumulation

↓
Drying / Eutrophication



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CONTROLLING MEASURES

- 1- Using natural fertilizers instead of synthetic fertilizers
- 2- Water treatment before discharge into water bodies
- 3- Removing excess of algae from top of the water bodies.

PART B

GREENHOUSE AND OZONE DEPLETION AND ITS ASSOCIATION WITH GLOBAL WARMING

I- GREENHOUSE EFFECT AND GLOBAL WARMING

* GREENHOUSE EFFECT

Trapping of heat waves or solar radiations by atmospheric gases is called as green house effect

* MAJOR GREENHOUSE GASES

- ↳ CARBON DIOXIDE (CO_2)
- ↳ METHANE (CH_4)
- ↳ NITROUS OXIDE (NO_2)

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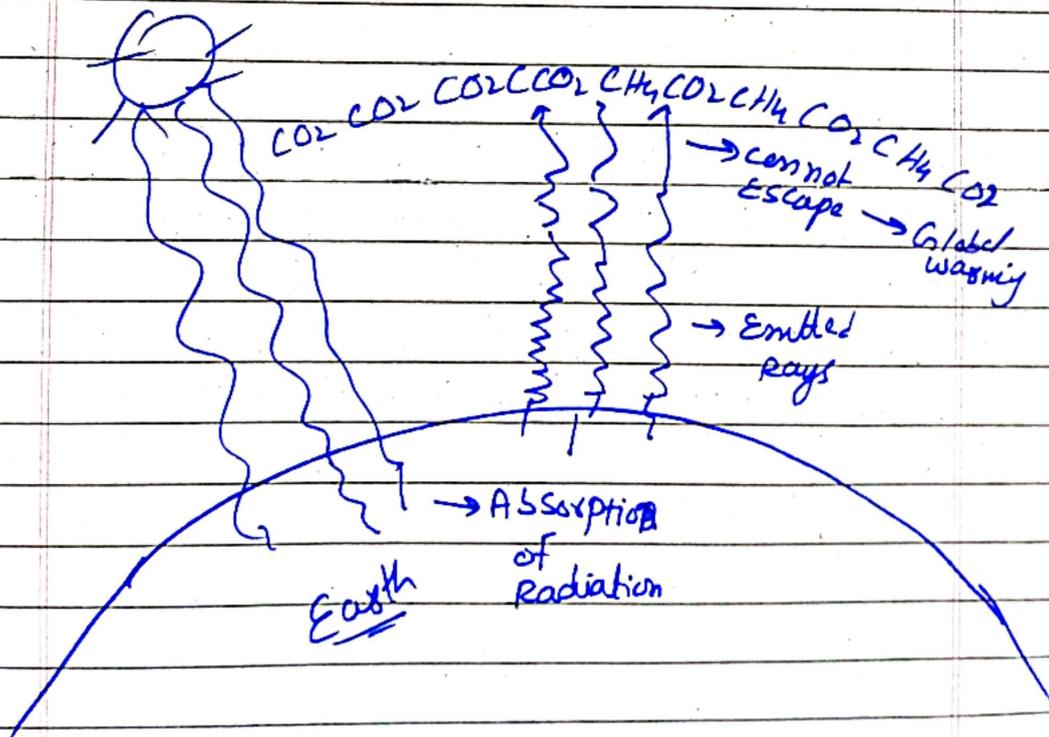
+ GREEN HOUSE EFFECT AND GLOBAL WARMING

1- During day time sunlight strike the earth surface and is absorbed by the earth

2- The ~~ray~~ earth emits the absorbed sunlight but its wavelength is changed.

3- Green House gases in the atmosphere (CO_2 , CH_4 , NO) traps these radiation in the atmosphere and do not let them escape in the outer space

4- These ~~green~~ trapped radiations increase the earth temperature and in this way these radiations lead to global warming.



IN A NUT SHELL

GHE \rightarrow Trap Heats \rightarrow Global WARMING

b- OZONE DEPLETION AND ITS ASSOCIATION WITH GLOBAL WARMING

* OZONE DEPLETION

Ozone Depletion is defined as the decrease in ozone concentration due to substances like chlorofluoro carbons in the stratosphere.

\rightarrow This leads to a hole ozone layer in the stratosphere.

\rightarrow Ozone layer is a protective layer which protects our earth from harmful UV radiations of the sun

\rightarrow It works like a filter allowing only unharmed radiations to the earth

* FACTORS BEHIND OZONE DEPLETION

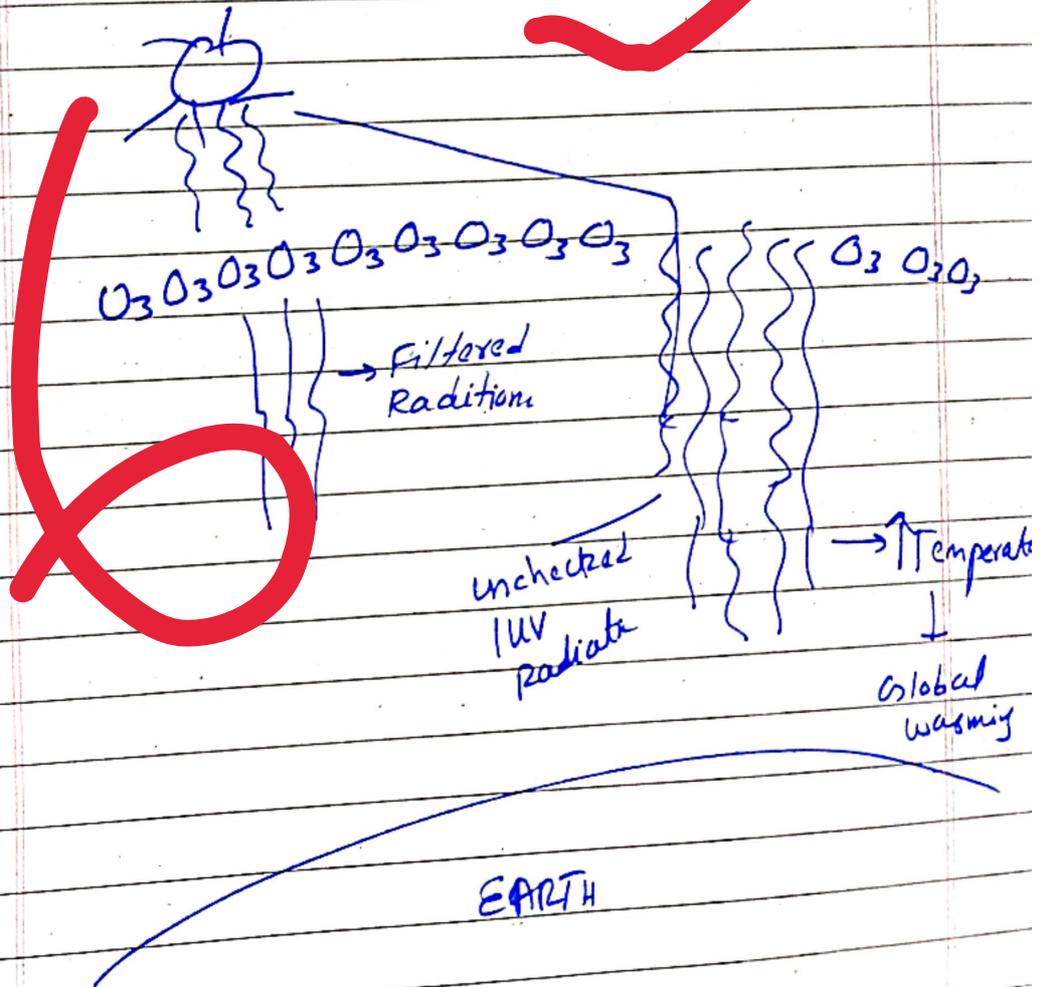
Chlorofluoro carbons (CFCs) are major factors responsible for ozone depletion. Apart from CFCs, atm testing and natural events also lead to ozone depletion.

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+ OZONE DEPLETION AND GLOBAL WARMING

Due to ozone depletion, unchecked and uncontrolled solar radiations enter the atmosphere. This leads to increase in average global temperature of the earth causing global warming.



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QUESTION NO 04

ERA OF GLOBAL WARMING HAS ENDED

INTRODUCTION

Developments as a consequence of industrial revolution, agricultural revolution and technological revolution has costed the environment a lot. Global warming was one such environmental issue which surfaced for long. But the world failed in coping with the issue efficiently and it converted from global warming to the global boiling. Scientific evidence suggests that average increase in global temperature has surged more than 1.5 percent making it global warming. Rise in sea level, decrease in glaciers thickness and increase in glaciers melting, change in migration patterns and disastrous changes in plants growth rates furrows the view that global boiling has started.

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a) ARCTIC ICE AS INDICATOR OF GLOBAL WARMING

The thickness in arctic and antarctic ice suggests the global warming. From 1970 - 2000, average 12% decrease in arctic ice length was seen. This significant decrease was observed in 2001 - 2020 to be 15%. In fact, between 2011 - 2015, ice thickness decreased 25% ^{average} per year. This shows that era of global warming has shifted to global boiling.

b) FAILURE TO CAP AVERAGE TEMPERATURE INCREASE TO 1.5°C

The average increase in global temperature to the maximum extent of 1.5°C. But the recent data shows that average temperature of the earth has exceeded the 1.5°C limit. This increase in average temperature beyond 1.5°C is another indicator that global warming is just beginning and global boiling is the present.

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c- SEASONAL VARIATIONS AND GLOBAL BOILING

likewise, seasonal variation in different regions of the earth showing changed length of summer and winter also suggests global boiling intensity of summer as well as its duration has increased, showing global boiling.

d- CHANGING RAINFALL PATTERNS AND GLOBAL BOILING

Another indicator is changing rainfall patterns. The various region having little rainfall have observed rainfalls more than average. For example, in 2022, Dubai experienced more rainfall than the average rainfall of 50 years. Likewise change in monsoon patterns, excessive rains in low rain areas and low rains in high rain areas having higher rainfall rate previously is also an indicator of global boiling.

e- CLOUD BURSTS AND NATURAL DISASTERS AND GLOBAL BOILING

Another evidence of

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of global boiling comes from natural disasters ~~and~~ like floods and cloud bursts. For example, 2015 was marked as most disastrous year related to floods in Asia. Similarly, many incidences of cloud burst ~~in~~ reported in South Asia. All these disasters were unprecedented showing global boiling.

g- GLACIAR MELTING AND GLOBAL BOILING

melting of glaciers at northern and southern poles also suggest that global boiling has started. Glaciers are melting at unprecedented pace showing global boiling.

h- PLANTS UNABILITY TO GROW SHOWS GLOBAL BOILING

likewise, various plant species which used to grow in a specific climate can no longer grow in that areas. This also proves that global boiling has replaced the global warming.

MEASURES TO CONTROL GLOBAL WARMING

a- REFORESTATION

One major step can be planting trees in areas where there were forest but were cut down.

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b- Afforestation

Afforestation refers to planting trees in area where there were no trees before.

c- CLEAN ENERGY

Shifting toward clean energy resources and giving up the fossil-fuel can mitigate the global warming.

d- POLICY ENSURANCE

Ensuring the policy made for environmental protection is better and spirit.

e- USING INTERNATIONAL PLATFORMS

Using international platform like COP and UN, global warming can be assessed

QUESTION NO 05

PART [A]

CLIMATE CHANGE

"Climate change is defined as the change in consistent and constant weather and seasonal patterns of a global or regional area over the time."

OR

"It can be defined as change in already existing climate of an area due to certain hidden factors."

POSSIBILITIES IN COUNTERING CLIMATE CHANGE

a) REFORESTATION AND AFFORESTATION CAN REVERSE CLIMATE CHANGE

One possibility is due to reasons that afforestation and reforestation drives and alters the climate change pattern and reverse the process.

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CASE STUDY:

PAKISTAN'S BILLION TREE TSUNAMI AND JAPAN'S MAYAWAKEI APPROACH

One effect in this regard was made by Pakistan ^{and Japan} through mayawakei approach and billion tree tsunami projects showing positive results in climate mitigation.

B- REVERSIBILITY OF CLIMATE

CHANGE: CASE IN POINT

- COVID AND CLIMATE CHANGE

MITIGATION

One major study that proves climate change is reversible is that the air become cleaner due to closure of industries in Covid-19. This shows that climate change reversal is possible.

C- CLIMATE FUND: MAKES IT POSSIBLE TO REVERSE CLIMATE CHANGE

Use of climate fund to mitigate the climate change is another possibility showing that climate mitigation is possible.

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d-COP PLATFORM AND POSSIBILITY OF CLIMATE CHANGE REVERSAL

Similarly
the COP platform and yearly meeting of COP members suggest that this platform can be used to mitigate the negative impacts of climate change.

e- POSITIVE IMPACTS OF NET CARBON ZERO

Research based evidence suggests that net carbon zero approach can effectively mitigate the climate change. The consent of various developing states to reduce net carbon consumption and make it zero is another possibility that it can be mitigated.

f- EUROPEAN UNION EFFORTS AND POSSIBILITY OF CLIMATE CHANGE MITIGATION

Recent efforts by European Union to mitigate the climate change are a positive sign showing a possibility that climate change can be reversed.

CHALLENGES

1- US OPPOSITION

Opposition of countries like US to climate mitigation efforts like US withdrawal of Paris climate agreement make it difficult to combat climate change.

2- RACE OF DEVELOPMENT STATES

Race of rising economic powers like US and China and their reluctance ^{IND} is also another reason posing challenge to climate change mitigation.

3- ECONOMIC ISSUES

Economic issues like lack of funds for renewable energy projects and other cause of problems related to climate mitigation in Pakistan.

PART B

DISASTER RISK MANAGEMENT

DEFINITION

Disaster risk management (DRM) refers to managing, planning and dealing the disaster in such a way to minimize its impacts.

DRM includes

1- PREPAREDNESS to minimize the disaster risk before its start

2- RESPONSE to ensure maximum survival and minimum life and economic loss during the disaster

3- POST- DISASTER REHABILITATION refers to efforts to minimize impact of disaster on marginal communities

OPPORTUNITIES IN PAKISTAN REGARDING DRM

1- AVAILABILITY OF INSTITUTION

Institutions

like NDMA and PDMA are already available to mitigate

in disasters in Pakistan.

b- AVAILABILITY OF LEGISLATIONS

existing laws ^{already} ~~also~~ provide an opportunity to Pakistan to expediate the process.

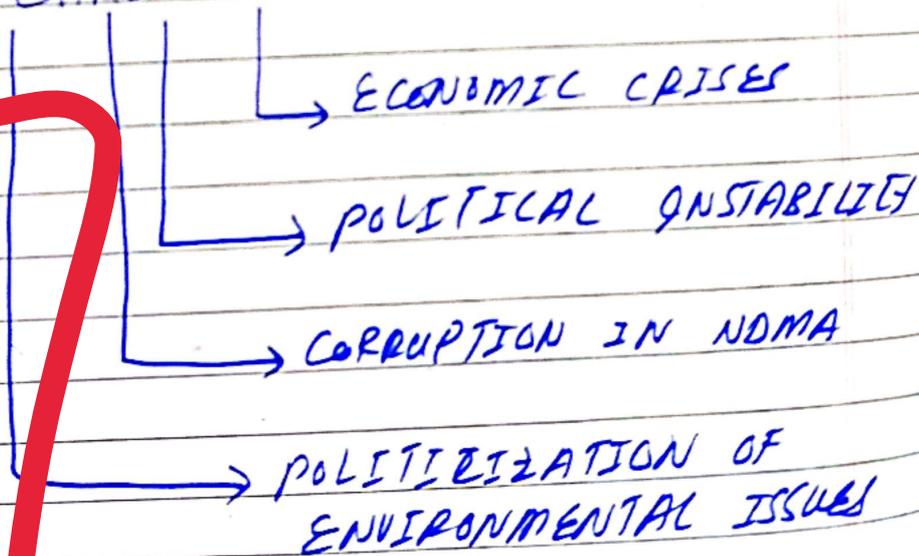
c- PRESENCE OF AWARENESS

presence of awareness in general public regarding the disaster management is another opportunity.

d- AVAILABILITY OF HUMAN RESOURCE

availability of human resource is another opportunity with Pakistan.

CHALLENGES



QUESTION NO 07

PART (A)

FOOD INSECURITY

Food insecurity refers to unavailability of food or shortage of food to all fractions of society at all the points of time at economic costs.

THREATS BY GLOBAL WARMING TO FOOD SECURITY

1- Flood → loss of crops and agriculture items

2- Droughts → leads to unavailability of food items.

3- Crop Diseases → leads to loss of food related crops.

4- LOSS OF HEAT VULNERABLE CROPS

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MEASURES

↳ Climate Change mitigation

↳ Research spending

↳ Developing global warming resistant crops.

↳ Afforestation and Reforestation

PART B

EIA

EIA refers to EIA assessment. It refers to rigorous ~~study~~ study of a project to know about environmental impacts of project ~~and~~ order to mitigate these impacts.

PROCESS OF EIA

1- SCREENING

Firstly, the screening is done to know whether EIA is required or not. Projects worth 10 million

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do not require EIA.

b- SCOPING

It refers to studying the scope (short term or long term) of the project.

c- COLLECTION OF BASELINE DATA

Next step involves the data collection by studying the site comprehensively.

d- EVALUATING ALTERNATIVES

Various methods are composed to select best available method related to environment.

e- ANALYZING ENVIRONMENTAL IMPACTS

Environmental impacts associated with the project are studied.

f- PREDICTING ENVIRONMENTAL HAZARDS

Environmental hazards associated with project are analyzed.

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g- IMPACT MITIGATION

Impact mitigation strategies are designed to ensure the mitigation of environmental hazards.

h- PUBLIC PARTICIPATION AND SIGNIFICANCE EVALUATION

Public opinion is sought through various platforms to know the significance of project.

i- REPORT PREPARATION AND DECISION MAKING

Report is prepared and decision regarding approval is made by EPA.

j- PROJECT EVALUATION (IN MID OF PROJECT)

Continuous evaluation of project is made.

k- POST PROJECT AUDIT

After completion of project, audit is made regarding environmental impacts of project.